

May 6, 1999

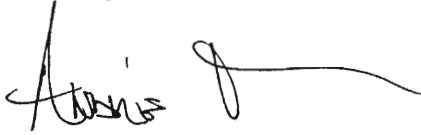
WAA-PR05-45

Dr. Frederick N. Scatena  
US Forest Service  
Call Box 25000  
Rio Piedras, PR 00928-2500

Dear Dr. Scatena,

Enclosed is our report entitled "Quality Control Analysis and World Wide Web Publication of Bisley Experimental Watersheds' Climatic Data". It was written at the International Institute of Tropical Forestry during the period of March 13 through May 6, 1999. Preliminary work was completed in Worcester, Massachusetts, prior to our arrival in Puerto Rico. Copies of this report are simultaneously being submitted to Worcester Polytechnic Institute Professors Addison and Rissmiller for their evaluation. Upon faculty review, the original copy of this report will be catalogued in the Gordon Library at Worcester Polytechnic Institute. We appreciate the time, which you have devoted to us.

Sincerely,



Andre Freeman



Michelle Lutz



Eric White

QUALITY CONTROL ANALYSIS AND WORLD WIDE WEB PUBLICATION OF  
BISLEY EXPERIMENTAL WATERSHEDS' CLIMATIC DATA

Report Submitted to:

Professor B. Addison and Professor K. Rissmiller

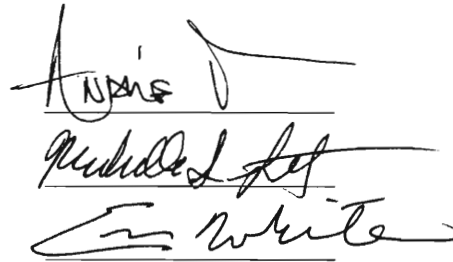
Puerto Rico, Project Center

By:

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In Cooperation With:

Dr. Frederick N. Scatena

International Institute of Tropical Forestry

May 6, 1999

This project report is submitted in partial fulfillment of the degree requirements of Worcester Polytechnic Institute. The views and opinions expressed herein are those of the authors and do not necessarily reflect the positions or opinions of the International Institute of Tropical Forestry or Worcester Polytechnic Institute.

This report is the product of the education program, and is intended to serve as partial documentation for the evaluation of academic achievement. The report should not be construed as a working document by the reader.

## **ABSTRACT**

This project was commissioned by the International Institute of Tropical Forestry (IITF). IITF is located in Rio Piedras, Puerto Rico, and is part of the United States Department of Agriculture Forest Service. IITF was interested in solving the problem of making climatic data collected in the Luquillo Experimental Forest readily available to the public. Data was incomplete and also difficult for the public to access. IITF wanted the information to be accessible through the web. This IQP team analyzed all data through the use of Statistical Analysis Software (SAS). Then the information was placed on the web, where all users can access it.

## **AUTHORSHIP PAGE**

This report, prepared by Andre Freeman, Michelle Lutz, and Eric White, is the result of a group effort by all members. Andre Freeman concentrated on programming SAS. Michelle Lutz developed Questionnaires and performed Statistical Analysis, through the use of SigmaPlot. Eric White worked on web development, through the use of HTML programming, as well as cgi-scripting. However, all members of the group contributed equally to the project as a whole and contributed to the writing and editing of every section.

## ACKNOWLEDGEMENTS

We would like to thank Dr. Frederick N. Scatena and the International Institute of Tropical Forestry, especially Andres Garcia-Martino and Brynne Bryan. We would also like to thank everyone that took the time to answer our questions and fill out our surveys. Finally, we extend our appreciation to Eda Melendez-Colon for her help with the web page information.

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## **EXECUTIVE SUMMARY**

This Interactive Qualifying Project was conducted at the International Institute of Tropical Forestry, in Rio Piedras, Puerto Rico, under the supervision of Dr. Frederick Scatena. Researchers at the Institute wanted climatic data collected from the Bisley Experimental Watersheds to be easily accessible by the general public. They also wanted to ensure the quality of the climatic data and display it on the Internet and in a manner in which environmental researchers and students would find the data useful and informative. The project was thus composed of three main parts. Conducting quality control analysis of the climatic data sets, investigating the needs of past and potential users of the data, and designing a web page, which would satisfy potential users and simultaneously serve as an educational tool for raising awareness about the Luquillo Experimental Forest.

We performed quality control analysis on four data sets collected from the Bisley Experimental Watersheds of the Luquillo Experimental Forest. The measurements were collected from a ground and tower station, each station producing hourly and daily data sets. The measurements included precipitation, temperature, relative humidity, radiation, and wind speed and direction. Using Statistical Analysis Software (SAS), we removed inappropriate measurements, added variables, and produced monthly and hourly averages. Values for the mean and standard error were then plotted using SigmaPlot in order to create an image ready for publication on the web page.

We sent out questionnaires to past and potential users of the Bisley Watershed Climatic data, which included environmental researchers, professors, students, and businessmen. The questionnaires were used to gather information regarding preferred formats for viewing the data and time frames for presenting averages, as well as the most

useful methods of variable analysis. Although the response was limited, the suggestions were useful in making decisions about the web page development.

The final portion of our project was to design an informative and reliable web page. Our first goal was to allow users to view and download the quality controlled data sets. We then divided the data sets into monthly and yearly time frames so users could download or view the data corresponding to a specific study period. Graphs and tables were included for quick reference and support information. A list of frequently asked questions was also placed on the page to expand public comprehension and appreciation of tropical forestry.

The specificity of our project objectives enabled us to successfully complete our project in the allocated time frame. We owe this to our liaison, Dr. Frederick Scatena, who assisted us throughout the entire process.

## 1. INTRODUCTION

The International Institute of Tropical Forestry (IITF) is located in Rio Piedras, Puerto Rico, and is a part of the United States Department of Agriculture Forest Service. The Institute deals with tropical forestry internationally and its goals consist in collecting scientific data in the field of tropical forestry. The Institute also houses one of the largest bilingual libraries on this topic. IITF conducts research on the wildlife, forests in tropical environments, and ecosystem research, and has labs for soil and plant analysis, Global Positioning Systems (GPS), and Global Information Systems (GIS). The Institute works with these programs in order to maintain the tropical ecosystem of Puerto Rico.

Over the past eight years, IITF has collected detailed climatic data in the Bisley Experimental Watersheds of the Luquillo Experimental Forest in northeastern Puerto Rico. Although specialists have been analyzing this data for seven years, it has not been accessible to a wider audience. IITF wanted the data checked for incorrect or missing entries and published on the web in a form that is accessible and easily understood by both specialists and the general public.

The first of our objectives was to conduct a quality control analysis of data that was supplied by IITF. We checked for incomplete data by comparing this data with known regional observations. These comparisons were used in order to remove incorrect entries.

The next objective was to formulate a statistical analysis of the data that was collected by IITF. This was achieved easily by using SAS (Statistical Analysis Software) to show mean values and standard errors by hour and month. Also using SigmaPlot, we

created bar charts to check the quality control analysis and to make reference charts for users.

Our third objective was to ask potential users for feedback concerning use of the quality controlled data. This was done through questionnaires. Potential users were asked to fill out questionnaires concerning the presentation of the data on the web page and possible usage of the data.

The final objective was to gather all the data in a manner easily understood by users and create a database accessible on the Long-Term Ecological Research's (LTER's) web site. On the World Wide Web, any possible users that may be interested in this material can easily access it.

To complete the objectives, some of the steps that we followed were interviewing researchers and observing research areas in order to obtain more information about the data collection process. We then analyzed data for incorrect or missing data and then performed statistical analysis on the quality controlled data for accuracy. The data was then sorted and bar graphs were created using some of the more interesting variables. During the data synthesis process, we interviewed potential users through the use of questionnaires. From data gathered with these questionnaires we determined how to effectively display and organize the meteorological data so that it could be interpreted easily by a wide range of users.

This project was commissioned by IITF because it realizes that their climatic data is very important for a wide variety of people, including scientists, students, environmental agencies, and industries who expect the data to be accurate. For researchers, it is important to see how certain conditions and controls affect the climate of

the rainforest and the climate of Puerto Rico as a whole. This data is used to provide information on how to successfully utilize the products of the rainforest without harming its well-being. Furthermore, the climatic data is used in various different ways in schools, including teaching students how to work on the web and how to download as well as providing examples of data analysis, rainforests research, project ideas and other scientific research.

An Interactive Qualifying Project is a project integrating science and technology with society, showing specifically how science and technology both affect society. Technology and society are linked in this project because the web enables research and educational users to gain access to information gathered on the rainforest's climate. Since rainforests are an essential part of the world's ecosystem, people are concerned with the effects of changes on the rainforests' climate and size. By placing this information on the Internet, more people will be exposed to important knowledge concerning this crucial ecosystem.

This report was prepared by members of Worcester Polytechnic Institute Puerto Rico Project Center. The relationship of the Center to the International Institute of Tropical Forestry and the relevance of the topic to the International Institute of Tropical Forestry are presented in Appendix A.

## 2. LITERATURE REVIEW

In this chapter, the various aspects of rainforests and how they have changed over the years is discussed. Some questions that are answered are: What is a rainforest? What is the climate of a rainforest and how does it differ from the rest of Puerto Rico? What affects the climate of rainforests? What is the Luquillo Experimental Forest and where is it located? What are watersheds? What are the Bisley Experimental Watersheds? How is information gathered in the rainforest? What methods are most effective in analyzing data that has been collected in the Luquillo Experimental Forests and the Bisley Experimental Watersheds?

### 2.1 Rainforests

Hot and rainy weather characterizes tropical rainforests. According to The Merriam-Webster Dictionary (1974), a rainforest has a minimum of one hundred inches of rainfall per year and is characterized by big loft canopies. According to The American Heritage Dictionary (1991), a rainforest is a dense evergreen forest occupying a tropical region with an annual rainfall of at least one hundred inches. In brief, rainforest is a dense forest occupying a region with an annual rainfall of at least one hundred inches (Carrie & Chisholm, 1998).

The different types of rainforest are tropical, temperate, and subtropical. The tropical rainforests are the most abundant type. They are located near the equator in Asia, Africa, Australia, and Central and South America, falling between the Tropic of Capricorn and the Tropic of Cancer. The wildlife and plant life are more diverse in tropical rainforests than in other types of rainforests (Carrie & Chisholm, 1998). Tropical

rainforests occupy the majority of the world's land and contain a vast portion of the freshwater animal population (Bowles et al, 1999).

Unlike tropical rainforests, temperate rainforests are located away from the tropics, along the west coast of upper North America, lower South America, and in southern Australia. Cool weather characterizes temperate rainforests (Carrie & Chisholm, 1998). The climate of subtropical rainforests varies between temperate and tropical, and they are not as cool as temperate rainforests but not as warm as tropical rainforests. The variation is dependent on the landscape of the rainforest and its surrounding lands. Examples of this type of rainforest are in southern China and eastern Australia (Carrie & Chisholm, 1998)

Within these three main types of rainforests are several distinct subtypes: monsoon, cloud, montane, and mangrove rainforests (Carrie & Chisholm, 1998). Rainforest subtypes can be characterized by their region. The monsoon rainforest region is located primarily in Southeast Asia because of its extended monsoon season. Cloud and montane rainforests occur at high elevations. Montane rainforests are sparse because of the colder climate that occurs at these elevations. Cloud rainforests are mainly located in the tropics where they are usually covered with clouds and plant life increases the amount of moisture they receive by grabbing it directly from these clouds. Mangrove rainforests are dominated by mangrove trees, salt tolerant trees, and they are located where tidal waters often flood over the mangrove roots (Carrie & Chisholm, 1998). It is possible to have a forest with a combination of these subtypes, such as in a cloud montane rainforest.



A commonality of most rainforest types is four distinct sections: the forest floor, the understory, the canopy, and the emergent layer. The forest floor is dark, humid, and receives relatively little rainfall due to the fact that the rain is blocked by the upper sections of the rainforest. Mosses, herbs, and fungi are the primary vegetation of the forest floor. Vegetation must have shallow roots because only shallow root plants can survive in the nutrient deficient or nutrient abundant soil. The plants also do not need large roots to reach water since it is located on the surface. The next and largest section is the understory, which contains trees under 33 feet tall. Those trees are young and shade tolerant. The understory also houses vines, palms, shrubs, and small ferns. In the cooler regions, edible fruits and shrubs also grow in the understory. The canopy consists of trees that form an umbrella over the rest of the forest. This layer also contains most of the wildlife found in the rainforests. The emergent layer are the trees that grow taller than the canopy (Carrie & Chisholm, 1998). Note, however, that these characteristics are not true for all rainforests. The rainforest in Puerto Rico, for example, does not contain an emergent layer and its canopy is at 33 feet or less in many places. The Amazon is the best example of these four layers. Furthermore, there is no definite definition between layers because many of the plants overlap.

### **2.1.1 Climate**

Climate is the synthesis of weather conditions over a long period of time, and includes all the varieties of weather from which the average weather experience is calculated (Rumney, 1969). In this section, various aspects regarding climate are analyzed. The section discusses the overall climate of Puerto Rico, the particular climate of the rainforests, specifically the Luquillo Experimental Forest, and a comparison

between the two. The climatic aspects that are discussed include rainfall, temperature, wind velocity, wind direction, and radiation. Another important point that we will discuss is how the climate is affected by rainfall. We will also cover how major disturbances such as hurricanes and landslides affect the climate as well as how minor disturbances, such as tree falls can do the same.

#### **2.1.1.1 Climate of Puerto Rico**

The Commonwealth of Puerto Rico, located in the northeast tradewind belt about 1,800 km from the Equator, boasts a subtropical marine climate. Puerto Rico is located about 1,000 miles southeast of Miami, Florida (*Information Please Almanac*, 1998). Four major systems are a direct result of the tradewind belt: polar troughs, easterly waves, shear lines, and tropical storms. Polar troughs are temperate, low-pressure troughs that move southeast. Easterly waves are low-pressure troughs that move west. Shear lines are remnants of cold fronts and tropical storms having low-pressure centers and also moving westward (Weaver, 1994).

Due to its location, Puerto Rico is also known for a large amount of rainfall and a large number of tropical storms. Tropical storms, especially when they are moving slowly, are capable of causing torrential rainfalls. Much of Puerto Rico's rainfall is orographic, that is, when air masses rise over topographic features, moisture contained in the trade winds condenses into rain. As much as 70 percent of the yearly rainfall is a result of tropical waves, depressions, storms, and hurricanes, which are all contained in the easterly tradewinds (Larsen, 1993). As part of the normal climate cycle, approximately every 10 years, rainfall is reduced throughout Puerto Rico. The most concentrated rainfall occurs in the higher elevations and rainforests of Puerto Rico.

Another type of precipitation, hail, is a rare occurrence in Puerto Rico, however it has been known to fall in almost every part of the island at least once throughout Puerto Rican history (Weaver, 1994.).

The island is also located in the hurricane belt of the Caribbean and often experiences high winds and heavy rains. September is the most frequent month for hurricanes. In the past 300 years, about 80 hurricanes have passed over the island of Puerto Rico (Weaver, 1994).

The tropical climate of Puerto Rico is best described in total as having slight variations in temperature and a high amount of rainfall. In one given location, the average temperature in January, the coldest month, is 21°C or 69.8°F and the average temperature of the warmest month, September, is 25°C or 77°F (Waide & Schaefer, 1997). Rainfall is more variable than temperature, but is still fairly steady depending on the month. Between January and April the average rainfall is about 200 mm per month, whereas from August to December the average rainfall is 350 mm per month.

Relative humidity is fairly constant throughout the year, and only slight changes occur between months. Individual monthly values range from 76 to 92 percent, having lows in March and highs in September through November. Relative humidity is significantly higher in the rainforests. In the Luquillo Experimental Forest the mean relative humidity is over 98 percent, and in El Yunque the relative humidity is around 100 percent year round (Weaver 1994).

#### **2.1.1.2 Climate of the Luquillo Experimental Forest**

The Luquillo Experimental Forest, situated in the northeastern part of the island, is one of the rainforests that is located in Puerto Rico. Luquillo contains four different

forest types: the Tabonuco, Colorado, Palm, and Dwarf forest types. The estimated annual rainfall for each of these forest types is 3537, 4191, 4167, and 4849 mm/yr., respectively. Of the average rainfall, about 65 percent, or about 2526 mm/yr., is converted to runoff and the remaining 35 percent, or about 1338 mm/yr., is lost by evapotranspiration and other natural processes (Garcia-Martino et al, 1996). The Luquillo Experimental Rainforest overall has more evapotranspiration than a lot of tropical montane forests, but less than a lot of lowland tropical forests. Rainfall is also dependent on altitude and often is estimated in the Luquillo Experimental Forest by the following formula:

$$\text{Rain} = 2300 + 3.8 * \text{Elev} - 0.0016 * (\text{Elev})^2$$

The formula is fairly accurate according to Waide and Schaefer. Humidity and wind velocity are also dependent on altitude, both being higher and less variable at higher altitudes. At high altitudes winds are greater due to less tree coverage and winds tend to remain at a more constant speed. Also, in these higher elevations, humidity is significantly higher and stays constant, primarily due to the cloud forest. On the other hand, at lower elevations, humidity is noticeably lower and wind speeds are erratic. Therefore, as elevation increases these two factors become greater and more constant. The rainforest also is obviously known for precipitation, which follows patterns of the climatic cycle. On average, 3864 mm/yr. falls on the Luquillo Experimental Forest. Traditionally once per decade, as a result of the natural rainfall cycle, rainfall is below average (Scatena 1998). Typically, 80 percent of rainfalls are for a short period during the day. Orographic cooling, in which air masses rise over topographic features, causes the showers, and the long rainy season is the result of trade winds. In a given spot, there

usually are between 25 and 145 cumulus clouds passing overhead per day. Cumulus clouds are indicative of precipitation. In a year, there are over 1600 rain showers with approximately 1250 of them lasting over an hour. At least 269 days per year have greater than 3 millimeters of rainfall (Scatena, 1990).

Due to its location, the climate of Luquillo is seasonal tropical, which means that rainfall is spread evenly throughout the year. By using data that has been collected at the Luquillo Experimental Forest within the last ten years, scientists found that the mean annual rainfall does not vary drastically as it had in previous years. In addition, they conclude that the number of days with greater than 5mm of rainfall is expected to decrease (Scatena, 1998). However, when referencing past climatic records of the forest, experts predict that the Luquillo Experimental Forest will become progressively drier (Scatena, 1998).

#### **2.1.1.3 Major Effects on the Climate of Rain Forests**

There are various events that can result in a change of climate and the overall well-being of the rainforests. Three of the most significant events are tree falls, hurricanes, and landslides. All are responsible for releasing nutrients from the forest canopy. This occurs when the fallen trees decay, thereby releasing their nutrients into the soil. The nutrients are necessary for the overall growth and development of the rainforest, more specifically for tree growth. When trees fall, and nutrients are released from the trees, it is then necessary for the forest to work harder to gather nutrients and then release them to the soil (Scatena, 1995). This extra work is necessary to maintain the same nutrient cycling rate with fewer trees. Although the tree falls and tree growth are natural occurrences, at times they are not constant.

Also responsible for other changes in the environment of the forest are hurricanes, which are accompanied by high winds. These winds are responsible for increasing both rainfall and tree falls, which will also affect forest growth (Scatena, 1995).

Puerto Rico is known for its Easterly Trade Winds, which exist through most of the year. These winds are responsible for transporting microscopic particles of dust from the African Sahara, and moisture from the Atlantic (Waide & Schaefer, 1997). They have various effects on the climate of Puerto Rico, ranging from simple overcast days to hurricanes and tropical storms. Every few years, hurricanes come close enough to the Luquillo Experimental Forest to cause heavy rains in that area. Once every twenty years, one passes directly over Puerto Rico and about once every fifty years one passes directly over the Luquillo Experimental Forest (Waide & Schaefer, 1997). The last hurricane to pass directly over the Luquillo Experimental Forest was Hurricane Hugo in 1989.

Hurricanes are capable of not only affecting the tree species in a forest, but also the entire forest ecosystem (Basnet, 1992). When a hurricane strikes, a large number of trees are destroyed, opening up the canopy of the forest. This opening of the canopy initiates the germination of various fast growing species that quickly cover the forest floor (McDowell & Asury, 1994). Another result of the hurricanes is that tree species diversity gradually decreases; this has happened especially in the Luquillo Experimental Forest. After every hurricane, some species are unable to survive the storm and never regenerate.

On September 17<sup>th</sup> and 18<sup>th</sup> in 1989, the first hurricane since 1932 to pass directly over the Luquillo experimental Forest, Hurricane Hugo, damaged the northeast part of Puerto Rico. The winds of this storm achieved speeds of 140 mph and total rainfall was

between 200 and 255 mm. As a direct result of these high winds, a large number of the trees in the forest were destroyed. All the species except *Dacryodes excelsa*, *Sloanea berteriana*, and *Guarea guidonia* showed 100 percent severe damage. The Tabonuco (*Dacryodes excelsa*) showed the most resistance to the storm, indicating that it will most likely always be a dominant species in the tropical montane forest of Luquillo (Basnet, 1992). Many changes occurred in the Luquillo Experimental Forest because of Hurricane Hugo. Preceding Hurricane Hugo there were more than 36 different tree species that had been identified in the Bisley Experimental Watersheds. After the hurricane, researchers were able to locate only eight of these species (Basnet, 1992). One year after the hurricane, 45 percent of the watersheds were covered by herbaceous vegetation, many species of which were new to this area (Scatena, 1991).

Another condition that directly affects the climate of rainforests is the type of tree species that are in a particular forest. In the Luquillo Experimental Forest, for example, in locations where there is a large concentration of Colorado (*Cyrilla recemiflora*) trees at altitudes below 400 meters (masl), the mean rainfall is 4191 mm/yr. However, in locations where some of the biggest Colorado trees are surrounded by smaller Tabonuco (*Dacryodes excelsa*) trees, the mean rainfall is surprisingly less than 3000 mm/yr. (Scatena, 1998).

Another factor that affects the climate of Puerto Rico is El Niño. It has been suggested by scientists that El Niño affects the Caribbean climate through effects on weather in locations like Mexico, the United States, and the winds in the north tropical Atlantic and north Africa. All of these weather systems are affected by El Niño and in turn, they affect the climate of the Caribbean islands through changes in trade winds,

polar fronts, and tropical depressions (Lugo, 1990). Other changes on the Caribbean are a result of El Niño. These range from affecting the salinity of the Caribbean basin to the death of coral reefs (Lugo, 1990).

The concentration of CO<sub>2</sub> in the atmosphere also affects the climate. Increased CO<sub>2</sub> stimulates tree growth, which, in turn, is responsible for the increase of nutrient productivity of the forest. Some scientists hypothesize that with the increase of CO<sub>2</sub> also comes an increase in global warming (Condit, 1997).

Many experts are trying to solve the problem of global warming. This problem is now being researched by the use of towers containing scientific equipment, which will produce data on how much CO<sub>2</sub> is stored in various soils and plants. This data is very important in order to solve the problem of discrepancies in carbon production from the burning of fossil fuels. Carbon dioxide is a direct cause of global warming. Tropical Forests contain as much as 40 percent of the carbon that is stored as terrestrial biomass (see glossary) and they are also responsible for 30 to 50 percent of the terrestrial production (Phillips et al, 1998). Only half of the 7.1 petagrams (see glossary) of carbon that is released by these fossil fuels stays in the atmosphere. Of the remainder, the ocean absorbs only 2 petagrams, which leaves about 1.8 petagrams that are unaccounted for (Kaiser, 1998a). If scientists are able to find out why this carbon is missing, they may be able to get a better idea of why the atmosphere is getting progressively warmer and causing global warming.

Most of the information regarding global warming and CO<sub>2</sub> loss is still being gathered. Scientists are trying to determine whether the extra CO<sub>2</sub> is causing tree growth to occur at a faster rate. This research will help scientists to decide if reforestation could



assist in preventing global warming (Kaiser 1998b). In trying to predict overall carbon production and use, two models are currently being used. One of these models estimates how much carbon the oceans absorb and release, and the other keeps track of how carbon is spread across the world through wind currents. These models unveiled another important problem. The problem is that older forests tend to eventually stop storing carbon, which eventually will cause an increase in global temperature (Kaiser 1998b).

Directly affecting the climate is the problem of deforestation. Atmospheric cooling is greatly assisted by the transpiration of plants, which is the passing of moisture to the air from plant tissues. Transpiration cools the air and produces clouds, which then cool mountains and increase rainfall (Couzin 1999). However, the opposite also occurs during deforestation. When logging occurs in the rainforest, parts of the forest are replaced with grasslands, which have lower transpiration rates than rainforests. This then creates warm and dry patches, leading to significantly less rainfall throughout the forest. Just as increased carbon dioxide causes an increase in atmospheric temperature, so can local deforestation (Couzin 1999).

### **2.1.2 Caribbean Rainforests**

On the Caribbean islands, the rainforests are tropical rainforests because they lie between the Tropic of Capricorn and the Tropic of Cancer, and are called the Caribbean rainforests. Honduras and Puerto Rico have set up experimental stations to research changes in the rainforests of the area. The Dominican Republic has the largest Caribbean Rainforest, covering most of the island including portions of Haiti. The rainforests are a major water source for the Caribbean islands. They are important to the economy and the ecology of the islands (Scatena, 1998). Many fruits, vegetables, and herbs grow in the

rainforest providing income to the islands' inhabitants. Logging is also a large industry in rainforests (Carrie & Chisholm).

### **2.1.3 Luquillo Experimental Forest**

The Luquillo Experimental Forest is located in the Sierra de Luquillo Mountains of Puerto Rico (Bourgeois et al, 1997). These Mountains are 1075 meters tall and range over ten kilometers (Scatena & Lugo, 1995). Located twenty-five miles from San Juan, the Luquillo Mountains are the dominant features in northeastern Puerto Rico, and are approximately thirty-five million years old (Scatena, 1995). The mountains are eight kilometers from the ocean making them the first barrier against the trade winds (Lugo & Lowe, 1995). The mountains are fault-blocked and asymmetric (Scatena, 1995). A mountain is fault-blocked if it was formed by the displacement of rock along a fault. A fault is a break in a rock mass where movement has occurred (Tarbuck & Lutgens, 1996). The shape of the mountains is asymmetric.

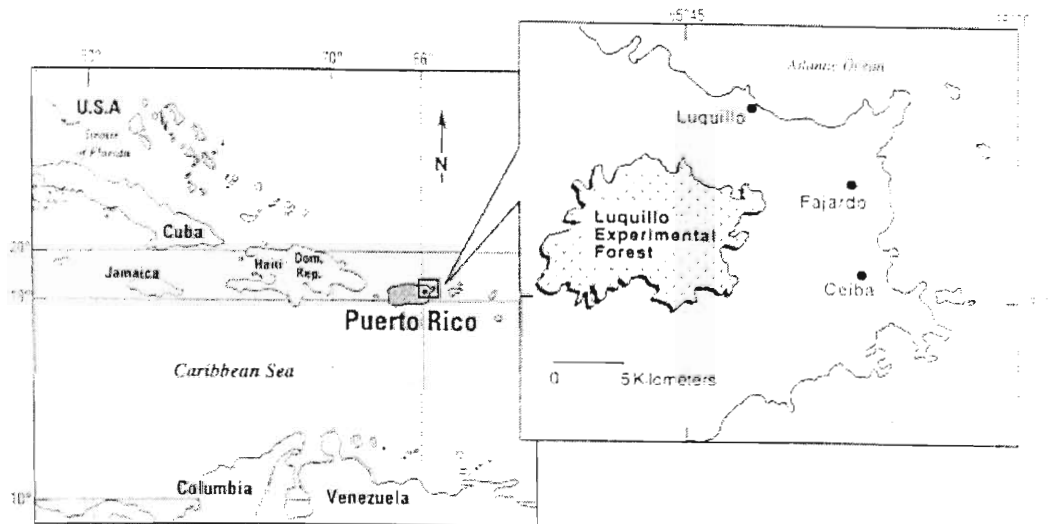


Figure 2.1 Location map of the Luquillo Experimental Forest (Scatena, 1995)

The second highest peak of the Luquillo Mountains lies in the Luquillo Experimental Forest and is called El Yunque (Scatena & Larsen, 1991). El Yunque's peak is 3,533 feet above sea level and its base is one hundred feet above sea level (Bourgeois et al, 1997). The highest peak rises ten meters above El Yunque and is called El Toro. The other peaks that are over 915 meters are El Pico de Este, El Pico de Oeste, El Cacique, and La Mina. Only three percent of the mountains are over 915 meters (Holwerda, 1997).

The Luquillo Mountains are the headwaters for six major rivers, Rio Espiritu Santo, Rio Grande de Loiza, Rio Blanco, Rio Mameyes, Rio Fajardo, and Rio Sabana. These six rivers provide water to over 600,000 people. Within the mountains, there are many tributaries to these rivers (Holwerda, 1997). These six rivers drain the eastern half of the island, mainly to the north and east.

The rainfall within the mountains varies from 3500 millimeters per year at two hundred meters to 4800 millimeters per year near the summits (Lugo & Lowe, 1995). The rainfall decreases dramatically as you cross over the mountains to the leeward side. This is due to the height of the mountains, which restricts the amount of moisture crossing over the top. The temperature range is from 19C to 24C dependent on the elevation.

Overlapping the Luquillo Experimental Forest is the Caribbean National Forest, which is run by the U.S. National Forest System and encompasses El Yunque. At the northern border of the 28,000 acre forest is the El Portal Tropical Forest Center (Robinson, 1997). Due to the overlap, the Caribbean National Forest can be considered the Luquillo Experimental Forest. The Luquillo Experimental Forest is divided into three sections: tourism, military, and research. El Yunque is the touristic area, Pico de Oeste is the military area, and Bisley Experimental Watersheds is the area used for research.

There are five life zones in the Luquillo Experimental Forest that represent roughly one-third of the forested lands in American rainforests. Since so much of American rainforests are represented, this area is good for research about rainforests in the Western Hemisphere (Bourgeois et al, 1997). There are two classification systems for categorizing the life zones (Lugo & Lowe, 1995).

The most popular way to categorize the life zones is called the Holdridge life zone method. This system is very elevation dependent. The Holdridge life zone method was published in 1947 and has thirty-seven separate life zones. Each of these life zones lies within a Latitudinal Region, an Altitudinal Belt, and a Humidity Province. The Latitudinal Regions are polar, subpolar, boreal, cool temperate, warm temperate

(subtropical), and tropical. The Altitudinal Belts are nival, alpine, subalpine, montane, and lower montane (premontane). The Humidity Provinces are semiparched, superarid, perarid, arid, semiarid, subhumid, humid, perhumid, and superhumid. The Holdridge life zone method uses mean annual precipitation and mean annual biotemperature to delineate the life zones. Mean biotemperature is a modification of the mean air temperature by substituting zero for values outside of the range 0 to 30 C. The last factor in the Holdridge life zone method is the potential evapotranspiration ratio, which is the ratio between mean annual precipitation and mean annual evapotranspiration (Ewel & Whitmore, 1973). Four of the six Puerto Rican life zones determined by this method are found in the Luquillo Experimental Forest (Garcia-Martino, 1996).

The first life zone in the Luquillo Experimental Forest is below six hundred meters and is the lower montane rainforests. The lower montane rainforests are also known as Tabonuco forests because the Tabonuco tree dominates this area (Lugo & Lowe, 1995). Seventy percent of the forest lies in this section (Wickel, 1997). Between six hundred and nine hundred meters is the montane rainforests, which is also known as the Colorado forests (Lugo & Lowe, 1995). Seventeen percent of the entire forest is Colorado forest (Wickel, 1997). Above nine hundred meters is the dwarf forests, having no dominant tree by which it might otherwise be named (Lugo & Lowe, 1995). The dwarf forest is about two percent of the forest (Wickel, 1997). There is a fourth section that is found anywhere above five hundred meters where palm trees are the dominant trees. The official name of these areas is palm brakes but they are commonly called palm forests (Lugo & Lowe, 1995).

The second system classifies four of the five life zones as subtropical wet forest, subtropical rainforest, lower montane wet forest, and lower montane rainforest (<http://sunceer.upr.clu.edu/aboutluq/sectio1a.txt>). The summit of the Luquillo Mountains is a cloud rainforest, which is a fifth life zone (Scatena, 1990). This classification system is dependent on the height of the forest. Below 600 meters are the subtropical wet and subtropical rainforests sections. These sections are also known as the Palm Forest because palms are the dominant trees. Above 600 meters are the lower montane wet rainforest on the leeward side of the mountain and the lower montane rainforests on the windward side of the mountain. These sections are also known as dwarf forests because of the small size of the trees. In this section the wind has stunted the growth of the trees (Lugo & Lowe, 1995). A tree species is not considered the dominant species just by the preponderant number of trees, but by the number of older trees.

A Tabonuco forest is named after its dominant tree, the Tabonuco. The scientific name for the Tabonuco tree is *Dacryodes excelsa*. Tabonuco forests are characterized by the abundance of large diameter, tall trees. These trees have complex canopy stratification. The roots of the trees are usually anchored to subsurface rocks and dominant ridges and slopes (Basnet et al, 1992).

The Colorado forests of the Luquillo Experimental Forest have a mean tree height of 12.7 meters. Colorado trees that are found at the lower elevations are taller than those found at higher elevations, especially on the windward side of the mountain. The scientific name for the Colorado trees is *Cyrilla recemiflora*. Colorado forests are mainly found in wet and rainforest life zones. The forests that are found where there are 3300 millimeters of rain per year at lower elevations or 4000 millimeters of rain per year at

higher elevations are in a wet forest life zone. In a rainforest life zone Colorado forests are found where the rainfall averages between 4000 millimeters per year to 4500 millimeters per year. In a rainforest life zone it does not matter what altitude the forests are found (Lugo & Lowe, 1995).

Dwarf forests are usually found on the windward side of the mountain because the wind stunts the growth of the trees. The trees are usually less than three meters in height (Schellekens et al, 1998). The average rainfall for these forests in Luquillo Experimental Forest is 4242 millimeters of rain with the higher elevations receiving less rain and the lower elevations receiving more. The mean annual temperature of dwarf forests is 18.6 degrees Celsius. The mean annual velocity of the trade winds is seventeen kilometers per hour and the average annual relative humidity is ninety-eight percent. Most of the day dwarf forests are covered in clouds because at this height they are in the cloud forest zone (Lugo & Lowe, 1995). Dwarf forests are also called cloud forests, elfin forests, and mossy forests.

Palm forests are the last type of forest. A palm brake is an area of palms on a steep slope in a montane formation. The most common palm in palm brakes is the mountain palm. These palm brakes are highly important in easing erosion. They can be found anywhere between sixty and nine hundred meters on steep slopes, often where landslides have recently occurred (Lugo & Lowe, 1995). With eleven percent of the forest as a palm forest, there are a lot of steep loose slopes (Wickel, 1997). The average rainfall for palm forests in Luquillo Experimental Forest is greater than 2200 millimeters and the temperature ranges between nineteen and twenty-four degrees Celsius. In the

Caribbean, palm forests are generally found on the eastern windward side of the mountains. Another name for palm forests is storm forests (Lugo & Lowe, 1995).

Within the Luquillo Experimental Forest there is another section called the Elfin Cloud Forest. This section is similar to Dwarf Forests and can be classified with them. The trees in this section, like the dwarf forest, are less than three meters tall on average (Schellekens et al, 1998). The International Institute of Tropical Forestry distinguishes this section from others because of its uniqueness in the Luquillo Experimental Forest. The forest is unique because of the wetland ecosystem it contains at its high elevation (Scatena, 1993). Less than two percent of Luquillo is an Elfin Cloud Forest. It is most commonly found at mountain summits that are between nine hundred and 1050 meters in height. The vegetation is short, small diameter, moss-covered trees and shrubs. The humidity is high and the evaporation is low. The mean annual rainfall of the Elfin Cloud Forest is between 4500 and 5000 millimeters of rain per year. The average temperature is between eighteen and twenty degrees Celsius with the mean annual relative humidity at 99.7 percent. The average wind speed is eighteen kilometers per hour (Hamilton, Juvik, & Scatena, 1995). This area has a very slow recovery rate after disturbances. In the section near El Pico de Este, the roadway was built thirty years ago and there has been very little recovery since then. The Elfin Cloud Forest in the Luquillo Experimental Forest is characterized by the short trees, endemic rich flora, saturated soils, and the relatively slow recovery rate (Scatena, 1993). Due to the slow recovery rate the area is very apt at resisting the introduction of nonnative plants. At El Pico de Este, the introduction of African grass has not spread to areas beyond where the roadway was built and the areas destroyed by the building of the roadway.



### **2.1.3.1 Tourism**

The largest section of the forest containing El Yunque is used for tourism. The United States Forest Service has built several areas and roads throughout this section that are traveled on and used by buses and receive many visitors yearly. With its great views and beautiful waterfalls this section of the rainforest is a place that many tourists do not miss. The Caribbean National Forest is the only rainforest located within the United States Forest Service. The tourism section and the research section of the forest are intertwined with both sections using some of the same roadways to reduce destruction to the forest. The forest service has built roads, which are large enough for buses to travel, and visitor centers. There are also lookout towers along the way and waterfalls where tourists can actually go to the waterfalls. This section has a lot of human disturbance compared to the research section.

### **2.1.3.2 Military**

El Pico de Este, or the East Peak, is used by the United States Navy for several different purposes. The main use is for weather research. El Pico de Este is located in the Baño de Oro Natural Area, owned by the United States Agriculture Department Forest Service (Weaver, 1994). The peak is almost always covered in clouds because the elevation is 1050 meters above sea level. At this elevation the dwarf forest is present. The mean annual rainfall for El Pico de Este is 4530 millimeters and the mean annual temperature is 18.6C. During the night, clouds cover the entire area so that it is hard to see. During sixty percent of the daylight hours the area is also covered by clouds (Lugo & Lowe, 1995).

The area is well away from tourist traffic. To keep tourist out, there is a large section of rough road along with a gate. At the peak, the weather and radar station is located with fences all around to keep out the few that do venture over to it. The radar station is used to control air traffic in the Caribbean and is used by the Navy and the Federal Aviation Administration. Often the clouds are dense enough to block out the view of the weather and radar station even when someone is only a hundred meters away. Around the station are areas where the members of the International Institute of Tropical Forestry have small walk-in sites for study of the dwarf cloud forest. At these walk-in sites, the IITF studies the reasons why the dwarf forest is so small and why it takes so much time for this area to grow back. Many of the trees in this area are believed to be over three hundred years old.

#### **2.1.3.3 Research**

The Luquillo Experimental Forest has been maintained by the United States Department of Agriculture Forest Service since 1934 (Scatena & Lugo, 1995). Within the forest's 27,890 acres, there are two main experimental sites, which serve as two watersheds set aside for data collection (Bourgeois et al, 1997). These two sites are the Bisley Experimental Watersheds and El Verde Field Station, a study area approximately ten kilometers from the Bisley watersheds (Scatena & Larsen, 1991).

There are many reasons why the Luquillo Experimental Forest was set aside for research and preservation. One reason is the fragility of the Elfin Cloud Forest. The things that harm the Elfin Cloud Forest also harm other areas within the rainforest, not just the Luquillo Experimental Forest. The Elfin Cloud Forest is threatened by many things such as the conversion of rainforests to grazing land for cows and sheep, extension

of subsistence agriculture, commercial temperate vegetable production, and introduction of nonnative plant and wildlife species especially in small sections of rainforests. The Elfin cloud forest is also threatened by wood harvesting for fuelwood, charcoal, and tea curing, commercial logging, exploitation of nonwood forest products such as orchids and medicinal plants, clearing for illegal or legal drug plant production, and hunting. Some additional factors are mining, tourism and recreation, communication equipment such as radar towers, and overall climate change. The introduction of nonnative plant and wildlife species is harmful because where plants are introduced the native plants do not grow back. By having a research area, the government preserves the natural beauty of the area and helps researchers study the area (Hamilton, Juvik, & Scatena, 1995).

It is also important to have research areas to understand why some rainforests are resistant to the introduction of nonnative plants and others are not. For example, the Hawaiian rainforest has been taken over by bamboo that was introduced, but the Luquillo Experimental Forest has been resistant to the introduction of bamboo. When a plant takes over an area it means that the plant spreads throughout the area and keeps native plants from growing.

Another goal of much research in Luquillo is education. With El Yunque open to visitors, people of all ages can learn about the environment of rainforests and why they need to be preserved. In just one year 1900 schools visited the Luquillo Experimental Forest. If only one class of twenty-five students per school visited the rainforest at least 47500 children would be exposed to the beauty and wonder of the rainforest. Giving young people the opportunity to learn about the rainforest and environmental sciences will help preserve the planet in the future when they grow older (Lugo & Lowe, 1995)

### 2.1.3.3.1 Bisley Experimental Watersheds

There are three Bisley experimental watersheds located in the Luquillo Experimental Forest run by the International Institute of Tropical Forestry (Sabat et al, 1997). A watershed is a dividing ridge between two drainage areas or the region or area drained by a particular body of water. Watersheds catch, store, and release water safely (Dombeck et al, 1998).

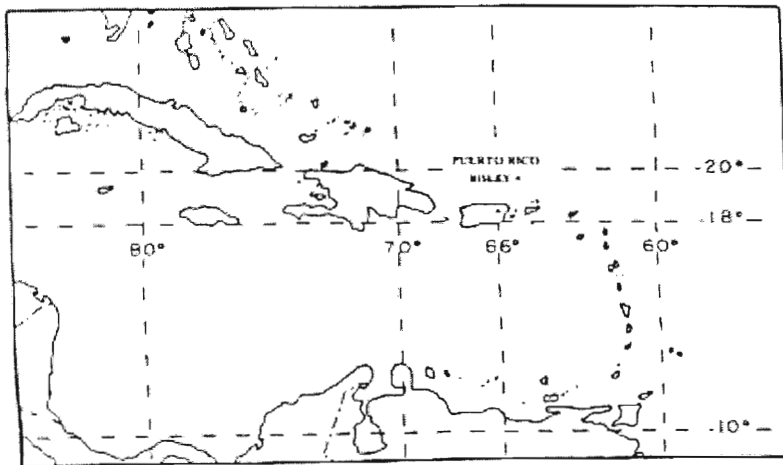


Figure 2.2 Location map of the Bisley Experimental Watersheds (Scatena & Lugo, 1995)

The Bisley watersheds are 265 meters in elevation and are part of the Tabonuco forest (Schellekens et al, 1998). Bisley watersheds 1 and 2 are located on the windward side of the Luquillo Mountains, and receive an annual precipitation of 3500 millimeters. The watersheds are considered to be in the subtropical wet forest life zone. Bisley watersheds 1 and 2 are adjacent to each other and drain approximately thirteen hectares (Scatena & Lugo, 1995). Bisley Experimental Watershed 3 is also adjacent to Bisley 2. All three watersheds drain into the Rio Mameyes. The Rio Mameyes drains to the north coast of Puerto Rico. Rio Mameyes is the only stream in northern Puerto Rico that is not touched by human constructions such as dams. Despite this, the Rio Mameyes provides

water to thousands of people each day through experimental underwater taps. The watersheds are characterized by their highly dissected, mountainous terrain (Garcia-Martino, 1999).

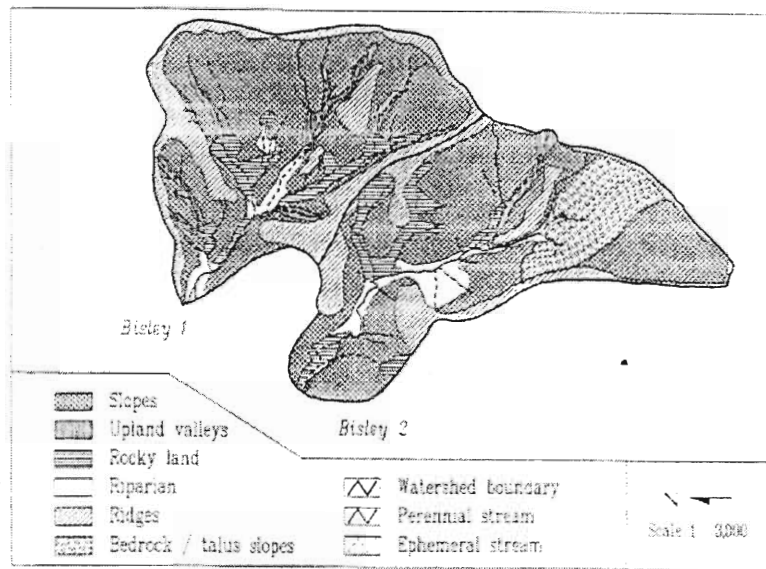


Figure 2.3 Geomorphic map of the Bisley Watersheds 1 and 2 (Scatena & Lugo, 1995)

The Bisley Watersheds are areas of long-term studies on hydrology, geomorphology, and ecology of montane tropical watersheds. In addition to the International Institute of Tropical Forestry, the Luquillo Long-Term Ecological Research Group, the Smithsonian MAB and Biosphere Program, the U.S. Geological Survey, and numerous universities from around the world use the Bisley watersheds for experiments (Sabat et al, 1997). At any given time there are at least twenty different groups doing research in Bisley. These groups are employees of the International Institute of Tropical Forestry and outside organizations. The research of each group varies widely (Interview with Scatena, 1999). Bisley Experimental Watersheds 1 and 2 are where experimental groups take observations. Bisley Experimental Watershed 3 is used as a control and the

public is not allowed to walk around this section (Sabat et al, 1997). Once a week one person from the International Institute of Tropical Forestry will gather the data that has been collected during the past week electronically. The data is transferred to a laptop computer and then analyzed back at the office.

Data is also collected from three streams, which divide up the three watersheds and the tower. Stream one is located on a 6.7 hectare plot and is the second largest drainage system. Stream two is the smallest of the three watersheds. Due to the 6.3 hectare plot that it lies on, stream two is usually the driest. Stream three is the largest and occurs on a 35.0 hectare plot (Garcia-Martino, 1999).

Our data was collected in two separate areas. The tower, the first area, is located higher in the mountains than the streams but still within the Bisley Experimental Watersheds. The tower is located between Bisley Experimental Watersheds 1 and 2. The instrumentation located at the tower is approximately two meters above the trees. The tower is 24.3 meters tall with thirteen platforms for easy access to the top and is made out of aluminum (Holwerda 1997). Hurricane Hugo knocked down the original tower but it was quickly replaced. The second station is located on the ground level at the base of the tower so that the information collected is for the same location. The information on the tower is more accurate because it is above the treetops.

Before Bisley Experimental Watersheds were designated for research, the area was used for many different things. Originally the area was forested and was rarely traveled because other land was much more suited for native peoples' needs. During the 1500's the Spanish conquistadors used the area around Bisley for mining, which only lasted for twenty years because of lack of labor. The greatest amount of mining occurred

during the 1800's. It was found that the richest of the gold deposits were in Rio Mameyes and Rio Sabana. There were other tries at mining in the late 1800's and early 1900's, but these soon failed and were abandoned. At the industry's peak there were eleven mines operational in the Rio Mameyes valley (Scatena, 1989).

During the 1800's, once the mining failed, there were many areas designated for farm use. Areas were cultivated for growing coffee, bananas, and subsistence crops such as upland rice. While this occurred the area was scarcely populated. Different absentee landlords who allowed families to live and work there owned each different area. No two farms were governed by the same set of rules or laws. At the same time the area was used to mine charcoal that all families used in their livelihood. In 1899, a hurricane went through the area destroying most farms and mines (Scatena, 1989).

Throughout Puerto Rican history the area has been used for timber management, even after the Forest Service purchased it. The largest of the timber management cycles occurred while it was owned by the forest service. Before the 1940's the area was logged in small amounts because of poor technology and bad operations. During the period before the 1940's, loggers used teams of oxen pulling skids that could not go on inclines more than thirty or forty degrees. During the charcoal period, kilns were built near fallen trees to minimize the need for animals. In the 1930's the timber crews of the Civilian Conservation Corps camped out in the area by watersheds 1 and 2. The first timber plantation was developed in 1935 in the area known as Coca Valley. The plantations were originally planted with Spanish cedar and mocha but both plants failed within a year. On the second try, mahogany and jacama was planted and each was considered to be successful. Later ausubo was planted successfully. For nine years there were two

plantations in a small area. In 1955, African and Honduran mahogany was planted in gaps and openings along Bisley road, the road that travels through Bisley. In 1957 the United States Forest Service's Forest Management designated the Bisley area as commercial forestland. In 1965 the land was reclassified because most of the area was more than 0.4 kilometers from paved road (Scatena, 1989).

From 1965 to 1985, the Bisley area was under plantation rules but with little logging because of its distance from the road. In 1985 the United States Congress authorized watershed research at the Institute of Tropical Forestry, and the Bisley area was selected for detailed study. Since 1985, there has been much less travel along the old roads of the Civilian Conservation Corps. Those that do travel the roads are people doing research in the Bisley Experimental Watersheds (Scatena, 1989).

The history of Bisley Experimental Watersheds area is important because it gives researchers and the general public some idea about what rainforests are used for. It also gives everyone an idea as to how old the research area is, in terms of how long it has been undisturbed. In Bisley, the area is relatively touched despite all that occurred there because the watershed is remote and hard to get to.

#### **2.1.3.3.2 El Verde Field Station**

El Verde Field Station is 350 meters above sea level in the Luquillo Experimental Forest. Since 1962, El Verde has been an important research location. El Verde is the primary location for the Luquillo Long-Term Ecological Research program that was established by the National Science Foundation in 1988. The Institute for Tropical Ecosystem Studies (ITES), University of Puerto Rico administers El Verde under an



agreement with the United States Forest Service. El Verde is used year round by researchers because of the large demand to do research in the area (Sabat et al, 1996).

With living quarters, El Verde reduces the number of people that travel to the area. At El Verde there is a second tower that also collects rainfall data. Often the data at El Verde and Bisley Experimental Watersheds are compared. The two are located about forty-five minutes away and the weather varies drastically along the way. Often one spot receives rain while the other station does not.

## **2.2 Data Analysis**

Climatic, meteorological, and other data collected from the Luquillo Experimental Forest enables researchers to determine numerous relationships between components and processes affecting the forest and identify behavioral patterns for the various components over time. By examining recent studies conducted on the Luquillo Experimental Forest, we were able to identify methods of data collection and different analyses performed on the data. In a recent study (see Section 2.2.1), with the use of rain gauges, a Geographic Information System, and methods of statistical analysis, researchers investigated relationships between rainfall, runoff and elevation (Garcia-Martino et al., 1996). Another study (see Section 2.2.2) discusses how vegetation sampling, litter collection, laboratory nutrient analysis, above-ground biomass and nutrient pools determined relationships between vegetation, above-ground biomass, and various nutrients (Scatena et al., 1996). In a 1995 study (see Section 2.2.3), researchers examine the light environment and its daily variation both between and within landslides in Puerto Rico (Fernandez & Myster, 1995). These studies illustrate how data collected from the Luquillo Experimental Forest is used to provide information on the various processes,

and how this data is collected. Lastly we discuss the instrumentation (see Section 2.2.4) which collects information on rainfall, temperature, relative humidity, wind velocity and direction, and radiation.

### **2.2.1 Study of Rainfall, Runoff, and Elevation Relationships**

In a 1996 study conducted in the Luquillo Mountains of Puerto Rico, using long-term rainfall and discharge data compounded with statistical analyses and a Geographic Information System, researchers determined relationships between rainfall, runoff, and elevation.

It is widely understood that rainfall is an important aspect of the Luquillo Experimental Forest (Garcia-Martino et al., 1996). Rain gauges are instrumental in determining rainfall averages and totals and enable researchers to produce various statistical comparisons. In the 1996 study, researchers compared annual and daily rainfall, analyzed relationships between elevation and mean annual rainfall, and studied the relationship between elevation and various rainfall averages. The rainfall averages included: the mean number of days per year without rainfall, the maximum number of consecutive days without rainfall, and the number of days per year without rainfall over a ten year recurrence interval (Garcia-Martino et al., 1996).

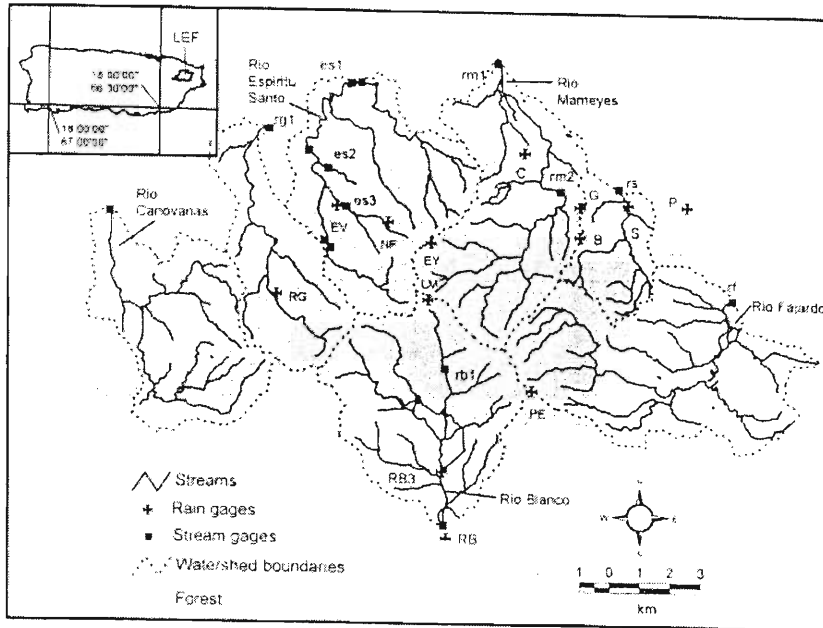


Figure 2.4 Rain Gauges and Stream Gauges in the Luquillo Experimental Forest

A Geographic Information System is an organized collection of computer hardware and software and geographic data designed to capture, store, update, manipulate, analyze, and display all forms of geographically referenced information. These systems allow users to perform very difficult or otherwise impractical spatial analyses (*Illinois Natural History Home Page*, 1998). In this study, researchers used a Geographic Information System composed of long-term rainfall, stream runoff, and elevation data to determine spatially-averaged, mean hydrologic (see Glossary) budgets for watersheds and forest types in the area (Garcia-Martino et al., 1996). Digital Elevation Models for topographic maps were obtained from the US Geological Survey. For each of the nine watersheds analyzed, boundaries were drawn on topographic maps, digitized as vector coverages, and transformed into a raster image using Arc Info, and other software programs. The Geographic Information System applied rainfall and elevation regression equations to the models. The produced image was then overlaid

with images of watershed boundaries, Luquillo Experimental Forest boundaries, and forest types to produce average annual rainfall estimates for the various forest types, watershed areas, and the whole forest (Garcia-Martino et al., 1996).

Statistical analysis is also used to investigate relationships between data collected on various components of the Luquillo Experimental Forest. Using mean daily stream flow values obtained from US Geological Survey records for nine watersheds in the Luquillo Experimental Forest, two statistical analyses were performed. Researchers studied regression relationships between mean annual runoff and the elevation of the gauge, and between mean annual runoff and the weighted mean elevation of the watershed (Garcia-Martino et al., 1996).

### **2.2.2 Study of Reorganization of Biomass and Nutrient Use After Hurricane Hugo**

In a 1995 study of the Bisley Experimental Watersheds in the Luquillo Experimental Forest, researchers investigated the first five years in the reorganization of aboveground biomass and nutrient use following Hurricane Hugo. The methods of data collection included vegetation sampling, litter and throughfall collection, laboratory nutrient analysis, and aboveground biomass and nutrient pools.

The vegetation within the Luquillo Experimental Forest is diverse. There are three hundred and thirty-six plant species, two hundred and fifty-five genera, and one hundred and two families of vegetation within the Bisley Watersheds area (Scatena & Lugo, 1995). In this study conducted in two of the Bisley Watersheds, researchers investigated relationships between landforms, soil nutrients, forest structure, and the relative importance of different disturbances (Scatena & Lugo, 1995). The above-ground biomass for certain vegetation was calculated before and after Hurricane Hugo using

allometric equations. Circular plots were established to examine the regeneration of different species of plants in various areas. These areas were categorized into four different groups: ridge, slope, upland valley, or riparian valley (Scatena & Lugo, 1995). Ridges are local divisions, which receive no upland runoff, have convex slopes, and receive divergent flows from runoff. Slopes receive runoff from upland areas and send runoff to valleys. Upland valleys are valleys where runoff converges but lack a perennial open channel flow. Riparian valleys also represent areas where runoff converges but possess a perennial channel flow (Scatena & Lugo, 1995).

Litter was collected in various areas of the Luquillo Experimental Forest to determine the amount of debris resulting from significant environmental events such as hurricanes. The material collected was then oven-dried and separated into leaf, wood, fruits and flowers, and miscellaneous fragments. Once separated, the litter was analyzed for various nutrient concentrations. Soil and vegetation samples were also analyzed for various nutrient concentrations. The samples were dried and separated into different types and analyzed for nitrogen, phosphorous, potassium, and magnesium concentrations (Scatena et al., 1996).

Biomass refers to the total number of living organisms in a specific area or volume (Berube et al., 1991). For various herbaceous species, above-ground biomass and nutrient pools were used to determine the regeneration of certain species after Hurricane Hugo, and the species that survived the hurricane. Vegetation was sorted by species and analyzed for various nutrient contents. Nutrient concentrations were compared to pre-hurricane nutrient concentrations to assess the various changes caused by the hurricane (Scatena et al., 1996).

### **2.2.3 Variation and Distribution of Photosynthetic Photon Flux on Landslides**

In a 1995 study of the light environment and its daily variation between and within landslides in the Luquillo Experimental Forest, researchers analyzed the temporal variation and frequency distribution of Photosynthetic Photon Flux Densities (PPFD). To assess the light conditions affecting the landslides, both temporal and spatial samples were collected. The temporal samples were measured daily and the spatial samples corresponded to different microhabitats and transects within and between the landslides. The observations produced daily PPFD variation, total daily PPFD, and PPFD frequency variation (Fernandez & Myster, 1995).

Researchers studied the PPFD variation within each landslide, examining how light availability; cloudiness and topography affect the PPFD values for the different microhabitats. PPFD variation effects on plant physiology were also investigated, determining how landslide position, vegetation type, light availability and cloud cover dictate the patch structures for the different landslides (Fernandez & Myster, 1995).

### **2.2.4 Instrumentation**

Various instruments are used at the Luquillo Experimental Forest to collect information on the processes within the forest, such as wind velocity and direction, temperature and relative humidity, rainfall, and radiation data.

Wind speed is calculated using the Model 014A Met-One Wind Speed Sensor. This is an anemometer, which measures wind speed in the range of 0 – 45 meters per second. The anemometer uses a magnet activated reed switch whose frequency is proportional to the wind speed (Campbell Scientific Inc., 1989). Wind direction is calculated using the Model 024A Met-One Wind Direction Sensor. The sensor measures

wind direction from 0 – 360 ° with an accuracy of  $\pm 5$  °. The sensor uses a potentiometer to vary the sensor resistance in relation to wind direction (Campbell Scientific Inc., 1989).

Temperature and relative humidity are measured using a Model XN217 Temperature and Relative Humidity Probe. The probe consists of a relative humidity sensor and a temperature thermistor. The temperature sensor is accurate to  $\pm 0.4^{\circ}\text{C}$  over the range of  $-33^{\circ}\text{C}$  to  $+48^{\circ}\text{C}$ . The relative humidity sensor ranges from 0 – 100 % with a maximum error of  $\pm 4$  % (Campbell Scientific Inc., 1989).

Rainfall is measured using a TE525 Tipping Bucket Rain Gauge. The gauge measures rainfall at five minute intervals, and is equipped with a tipping bucket system which registers 0.254 millimeters of rainfall each time the bucket is tipped (Campbell Scientific Inc., 1989).

Radiation is measured using a LI200X pyranometer. This measures incoming short wave radiation. The photocell sensor is sensitive to short wave radiation with wavelengths between 350 and 1100 nanometers. The errors are typically less than 3 percent up to an angle of incidence of 75 percent whereas up to an angle of 85 percent errors are smaller than 10 percent (Campbell Scientific Inc., 1989). The instrumentation responsible for the collection of climatic and meteorological data is an essential part of the data collection process within the Luquillo Experimental Forest.

Through the process of uncovering information about rainforests, specifically climatic information, we developed a knowledge base key to our understanding of tropical rainforest climates. By examining previous studies conducted in the forest and the relevant instrumentation used, we also gained a practical understanding of several

methods of analysis and data collection. This information proved invaluable in our comprehension of the climatic components within the Luquillo Experimental Forest.



### 3. METHODOLOGY

There were three main objectives for the Interactive Qualifying Project with the International Institute of Tropical Forestry. The first objective was to analyze raw data and clean up all incomplete and erroneous data as explained below. The second objective was to statistically analyze the cleaned data and put it into tables and graphs. The last objective was to place the cleaned data, graphs, and tables onto a web page linked to the International Institute of Tropical Forestry web site and to the Long-Term Experimental Research (LTER) web page in a manner appropriate both for researchers and scholastic education.

Our first main objective for working with the ecological data set was to find inconsistencies and errors within it. We created several programs using Statistical Analysis Software (SAS) to calculate means and standard deviations for the various parameters we investigated. These parameters include hourly and daily values of rainfall, precipitation, and temperature. The mean value for a given set of values is the average value of that particular set. Comparing each value in a set with the set's mean value determines each value's deviation from the mean. The standard deviation of a set determines the average spread or distance from the mean. By determining mean values and standard deviations, we established a reference point for each parameter.

The programs then identified inconsistent and erroneous data by searching for negative values and excessive variations for each parameter. For each variable we wrote a small subprogram. If an instrument was giving us bad data for one value, all other values were removed also because we believed all data from the instrument to be untrustworthy.

Meanwhile, the group sent questionnaires to potential users. The questionnaires enabled us to determine how potential users want to view the data, how they will use the data, and the most efficient format for a web page. Understanding how potential users prefer to view the data enabled us to develop charts and tables that correspond to the needs of the users. We were interested in how potential users would use the data in order to categorize our analysis in a form that can be easily referenced by the users. We also inquired about web page formats in order to develop our web page in a manner consistent with the demands of the users.

We decided to use questionnaires for gathering information about potential users because they enabled us to contact a large group of people in a short amount of time. After the questionnaires were created, we generated a list of people and organizations that previously used the raw data. This list also includes people and organizations that may potentially use the manipulated data. Potential users include high school and college students, environmental researchers, environmental agencies, local engineers, and government officials. We contacted these potential users through various methods. High school students were contacted through their schools. The advantage of administering the questionnaire in a classroom setting was that it was expected to produce a higher rate of response than other methods of survey research (Fowler, 1988). Researchers were contacted via email or via their research organization.

The questionnaires contained a combination of open and closed questions. They included open questions because we wanted to gain broad information on possible web page formats and content. The closed questions were designed to achieve specific objectives. For example, we asked specific questions regarding potential time frames for

displaying the data. It contained specific choices, but there is also room for explanations regarding why respondents chose a specific option. See Appendix B, C, and D for sample questionnaires. Each questionnaire contained a cover letter introducing our group and explaining the purpose of the questionnaires.

We sent out twenty questionnaires through electronic mail. We also placed fifteen questionnaires in the mailboxes of the employees of the International Institute of Tropical Forestry. When we visited El Verde Field Station we dropped off ten questionnaires. As the questionnaires were distributed, we recorded the number sent to each location, the survey type, and eventually the number returned. This enabled us to do a quick listing of who answered the survey from the number distributed.

When each questionnaire was returned, the group sorted through the responses and analyzed them for similar suggestions. We then compiled a quick reference list of the information to summarize our findings. The analysis and quick reference list were created in Excel for easy reading. The quick reference list only contained information and analysis from the number of answers received per question while the analysis contained all responses, even the questions left blank. At this point we looked through the information pertaining to the set up of a web page to determine the most logical ways to organize the data. We specifically looked for the kinds of charts, graphs, tables, or combinations of the above that the respondents thought most desirable on the web site. Next, we identified the most prevalent answers from each group of respondents to use in creating specific sections within the web page.

We also looked at the type of people who were returning our surveys and determined that our distribution of surveys was too limited. We then varied the survey

slightly and included more information about the location of the watersheds in the cover letter and sent the surveys to several local businesses and governmental agencies through members of other project groups. We sent twenty surveys to CSA Architectures and Engineers, an architecture firm because it was learned that they would be interested in climatic data taken at Bisley when planning a building. As these surveys were returned we followed the same procedure used previously with the ones sent to El Verde and distributed at the International Institute of Tropical Forestry.

After making revisions to the survey so it would be gain the most information from high school students, we handed several surveys out to a select bunch of students to fill out the survey and give us any feedback on the survey itself. Once returned and analyzed, changes were made to the survey to make it more comprehensible and more specific.

To distribute surveys to the high school students, Dr. Frederick N. Scatena, our liaison, went to several local high schools where he talked about science and the rainforest. After Dr. Scatena completed his talk and while we still had a captive audience, our group attempted to hand out surveys and asked to complete them and return them to us. After one unsuccessful attempt we handed the surveys to a teacher to hand out to her students at a later time and to send the completed ones to us at the International Institute of Tropical Forestry. The school we visited was private English speaking schools in the local San Juan area.

Upon returning to the International Institute of Tropical Forestry, we entered the answers to the survey into an EXCEL file. This was done to compile the results of the

surveys. The procedure used for summarizing the data from the other two surveys was repeated for the surveys returned by the high school students.

As the data cleaning programs were being written, a table of variables was created and placed on the web page. The table of variables contained the variable name, its label, the units the variable was measured in, the variable's range, and a link to the description of the equipment that recorded that data. This table was continuously updated as the ranges of the variable changed. The link to the description was included because it enables the user to acquire more information about the instrument and learn what it is and how it works.

Before we could design the web page we had to decide what we wanted on it. We made a small list of items that included the links, data sets, information, and the tables and graphs we believe will be most wanted. Using this we were able to make a preliminary outline of the web page as we were still analyzing the data sets.

While the data was being analyzed, the first steps in writing the web page were started. A basic code for the information that would be included was written. Code is the HTML file that is written when a web page is made. With the basic code complete we could visualize how the web page would look. The easiest page to start with was the selection page for downloading the data. Code was also written for a cgi-script, written in a language called PERL. This script separated the fields that users could choose on the page, and then merged them to form a URL to the file that the user selected. This page was crucial because everyone would be using this page.

As the code was being written, we contacted Eda Melendez-Colon, the web administrator of the LTER web page. Through Misses Melendez-Colon we found

information concerning the location of the server for the web page and how much space we would be able to have. Another reason we contacted Misses Melendez-Colon was because she receives the majority of the requests for the data on which we were completing the quality control analysis.

To make the web page more useful we created a selection page so the user would be able to choose the file that he or she wanted to download. The choice is between different time frames during the data collection period. We also created a page to select which data set (daily or hourly) that users would like to download fully or partially. The user also has the capability to select either the ground station or tower station.

To help increase the knowledge of the users about the Luquillo Experimental Forest, Bisley Experimental Watersheds, and rainforests in general, we wrote questions that are frequently asked. This was done because many researchers and students often look for information surrounding where the study site is located. These questions went onto the web under frequently asked questions.

After all data was fully analyzed and all incorrect or missing data was corrected through the use of SAS, the data was added to a database file (dbf). We chose the dbf because most programs including SAS, EXCEL, and SYSTAT can read it. In order to display the database on the Long-Term Ecological Research (LTER) web site, we placed this database in the available web space that the LTER currently owns. On the current LTER web page, we placed a link to another page that we created. Available at this link is the main page to the web page that we created. Provided here are links to all other parts of our web page, as well as links to previously created web pages.

We decided to use these methods in order to make the data accessible to a wide variety of users. Users not only will have the capability to view the data, but they also will have the capability to make changes and conduct simple searches. This will most likely be of great importance to researchers who are only interested in one aspect of the data set.

At the end of the web page we included a survey for the users. This survey will permit International Institute of Tropical Forestry to track who uses the web page and their uses for the information. The survey will also give members of the International Institute of Tropical Forestry an idea of how many times the same group or individual visits the web page.

Once the web page was uploaded to the Long-Term Ecological Research server, we created a small instruction sheet to assist the International Institute of Tropical Forestry employees with maintaining and updating the web page. This involved directing telling employees how to upload new data and change the program so that the new information can be included.

After all the information was uploaded to the Long-Term Ecological Research (LTER) server and the pages were made accessible through the World Wide Web, we again contacted potential users. The users were contacted through various methods depending upon their accessibility, the primary methods being electronic mail and telephone. These users were asked to connect to the page and attempt to do searches that would be relevant to their interests and research. We asked users questions regarding the performance of the query functions and their usefulness to the user. Our purpose at this

point was to gain a variety of opinions about our work in order to add features and functionality that previously may have been overlooked.



## **4. RESULTS**

Throughout the duration of this project there were three main objectives to be completed, each having a unique set of associated problems. These objectives were the quality control analysis, the use of questionnaires to gather information from potential users and the creation of a web page. In this chapter we discuss problems that were found during the data analysis and steps taken to address them. Also discussed are the use of questionnaires and ways to analyze them. Finally, we discuss the creation of the web page and issues that were taken into consideration during the design of the page.

In order to conduct quality control analysis on the data, it was decided that we would utilize Statistical Analysis Software (SAS). After the quality control analysis was completed and the data was free of errors, it was necessary to create questionnaires in order to acquire information about potential users. In order to analyze the questionnaires, we decided to create a table based on the users' responses and from that determine what users are looking for in the web page. Finally, through the creation of the web page, came many problems. To create this page, both HyperText Markup Language (HTML) and PERL Common Gateway Interface scripts (CGI) were used. Scripts were tested manually and then eventually solved.

### **4.1 Quality Control Analysis**

While working with the four data sets that were collected from the Bisley Experimental Watersheds, many problems with the data were found. The project team started with the daily data because it was the smaller data set and the program would be similar to the hourly data set but with different ranges. Before we could write the subprograms we needed to determine the allowable ranges for each variable. We did this

several different ways. First we looked at the variables and determined what would be reasonable expectations for their numerical values. For many of the variables, having values below zero was obviously incorrect, so we automatically made the lower limit zero. We then calculated the upper limits by looking at the current upper limits. For items such as temperature, which is measured in degrees Celsius, we determined that it would not get any warmer than forty degrees Celsius so we made that the upper limit. We also determined that the minimum and maximum daily readings should have the same limits, but we had to check and make sure that the minimum was less than the maximum. We also made sure that when we took out an erroneous data point that was connected with a time value, such as maximum daily temperature, that the time of that maximum value was also changed to a period (.). This was done because if the value that was removed happened to be a maximum or minimum value, then the time of that maximum or minimum would not correspond to anything. After that we looked at the specific instrumentation to understand how the data was taken. We did this two different ways. First we looked at the actual instrumentation in the field, to study what its limitations were. We then reviewed the manual containing most of the devices and determined their set limits. With all the information gathered we were able to write the programs and subprograms.

While conducting the quality control analysis of the daily tower data set, we found that during the data transmission from the instruments to the computer, decimal places were lost for the variables TOTAL\_RA and TOTAL\_PP. To obtain the proper value we determined that the existing values should be multiplied a factor of ten. This was easily done by using an “if” statement with SAS programming. We decided that if

the TOTAL\_RA was less than 5,000 or the TOTAL\_PP was less than 10,000 then the values should be multiplied by a factor of ten. These values were chosen because they are far below what a normal value for these variables would be. We also learned that problems occur in the data set when data is extracted from the devices in the forest. It was determined during the process of appending the data to the set that two columns had been switched and extra erroneous data had been added. Appending of data occurs when the new data is downloaded from the devices in the forest and added to a previous data set. When these new observations are added to the pre-existing data set, sometimes the data is placed in the wrong columns. For instance, the column that contained the data for volts had been switched into the column for the variable called WR\_315\_3, which is for wind speed in the direction between 315° and 360°. Also, the column, which contained the time that the volt data was recorded, was instead located in the column, which supposedly contained the volt data. In order to fix this problem, we decided that a few things could be done by using SAS programming. First, we would create an “if” statement, which says that if the value of WR\_315\_3 is greater than ten, first move all of the values in Volts to a temporary location called tvolts, then move all values in WR\_315\_3 to Volts.

After all the changes had been made we started working on the daily data collected from the ground station. First we wrote a short program to print out the mean, maximum, and minimum for each variable. We copied the program from the tower daily data and rewrote the original data set and the new data set names. Then we ran the program to find if the tower limits were wrong. Afterwards we copied and printed the mean, maximum, and minimum values for the corrected data. Then we compared the

two sets of means, minimums, and maximums and determined where any more corrections needed to be made. We went back to the second program and added several more subprograms to check that the minimums were less than their respective maximums. We also wrote this into the first program. Then we went into the first and second programs and adjusted the ranges to correct discrepancies. Afterwards we graphed the cleaned data using the quality control section within SAS. We adjusted the program to remove values that fell outside of the variable ranges from the data set.

When looking at the daily data set for both the tower and ground station, we found that many values were inaccurate. We immediately discovered that the minimum temperature in the data set was 1.4°C. This was known to be impossible in the tropical climate of Puerto Rico, where currently the lowest recorded temperature is 14°C. Once again, SAS programming was utilized in order to correct this problem. We used an “if” statement to say that if the value of MIN\_TEMP is less than ten degrees then the value will be changed to a “.” so that the values will not be taken into consideration when calculating the mean and standard deviation. Another problem that was found involved precipitation data. It was seen that in a few observations, the rainfall was recorded as a negative value. For this, we first looked through the data set and determined how many bad values there were. We then implemented another “if” statement into our program that alleviated both the problem of negative values and the problem of values that were too large. This was done by a command that stated if precipitation (PRECIP) is either less than zero or greater than six hundred then replace all values with a period.

We next looked at wind speed in the direction between 315° and 360° and observed that the maximum wind speed was 12.56 m/s. This value was suspect and

considered to be too high, and we later discovered that this was due to the fact that data was misplaced among the columns. In order to solve this problem we added a line of code to the SAS program, which says if the wind speed in any direction is either greater than ten or less than zero, then replace the value with a “.”. This line allowed us to remove all bad values so that they would not be factored in when calculating the mean and other values. There were also some problems with both MAX\_WIND and MIN\_WIND where values were plainly incorrect. In order to correct this, code was written stating if wind speed is not between 0.5 and 50 then replace the values with a period. Then, we decided it was necessary to put a line in that said if MAX\_WIND or MIN\_WIND was a period, then all of the WR (Wind Rose) variables should also be replaced with periods because all readings could be erroneous for that observation.

Another value that was immediately seen to be incorrect concerned relative humidity. Relative humidity is measured in percent and known to be between the values of zero and one hundred. However, due to errors in the instrument, values as high as 105 can be recorded when the relative humidity is supposed to be 100. At one observation, this value was five hundred percent. In order to correct faulty values such as this it was necessary to once again utilize SAS programming. Therefore, when the value of relative humidity was less than zero or greater than 105 the value was removed and replaced with the period. Immediately after that was done, all remaining values that were greater than one hundred were removed and replaced with one hundred. This assures that the relative humidity is within the proper range. The preceding examples were some of the most commonly found errors, however, a variety of other small mistakes were also found with a majority of the variables.

We also found when analyzing the data that information was missing. For example, there was no data for any of the radiation variables before day 162 of 1997. It was later learned that the device that records this information was not installed until this time. Another example of missing information is that days were missing from various parts of the data set. The missing days complicated a lot of calculations, such as the monthly summaries, and caused problems such as comparing one year of data with another, for which there were fewer observations. Our first approach to correcting this problem was to manually add the days that were missing. This was easily done when there were only a few days. However, sometimes these missing values were difficult to find. In order to find the values easily, we decided to create histogram plots of each year, and determine which years were missing days. This method worked fine until we discovered areas in the data sets where a large number of days were missing. In order to facilitate the addition of these days, a Microsoft Excel spreadsheet was created, which contained a list of all the days for every year that should be contained in the data set. This was then saved as a database file (dbf), and then, through the use of more SAS programming, was merged with the original data set. With this merging of the two files, all missing values were then added, while at the same time making sure all of the values in the original data set were unchanged.

Another item that was missing from the data set was a value for the month in which each day occurred. In order to facilitate creating statistical summaries, and making the data set more user friendly, we decided to add a new variable for the month in which each observation took place. This variable was created and given an integer value ranging from 1 to 12. Giving this variable an integer value enabled us to easily sort data

chronologically by month. However, a line of code, which displays the month in the output log, was also added to the program.

With the daily data sets completed we began work on the hourly data sets. We started with the tower hourly data set because it contained data considered to be more accurate. To begin we wrote a small program to print out the mean, maximum, and minimum for each variable. With this information and the knowledge from the daily data sets, we set the ranges for each variable. We then copied the program used for the tower daily data set and adjusted the ranges found for the tower hourly data sets. We then ran the program and printed out the new mean, maximum, and minimum value for each variable. Using the first set of means, maximums, and minimums, we compared the two to find any other errors. We adjusted our program to eliminate the errors and again printed out the means, maximums, and minimums. Afterwards we graphed the cleaned data using the quality control section within SAS. We then ran the program for the last time and printed out a final set of means, maximums, and minimums for all the variables in each data set. We also printed out the log file so we could see why each of the values was removed. This was easily accomplished because we had written code that would display a reason as to why each value was removed to the log file.

With the tower hourly data set cleaned and completed we moved on to working with the ground hourly data set. Once again, we began by writing a program to print out the mean, maximum, and minimum for each variable. The tower hourly data set was copied and then modified in order to accommodate any changes in variables for the ground station set. The program was then edited to fix the range errors, and any other

values that were determined to be bad. The program was then executed again, and the final set of means, maximums, and minimums as well as the log file were printed out.

When looking at the hourly data sets for both the tower and the ground station, we found some of the previous problems along with some new problems were found. One of the first findings was that on both the tower and ground station data sets, the values for minimum year were 186 and 95 respectively. This was resolved by writing code in the program that indicates if the year is before 1993 to replace it with a period. Then we opened the newly created data set and found where it put periods in order to examine each one individually. This was done to decide if the period should be changed to the year it was in or if all the observations for that day should be removed.

Another obvious problem was that there was a day 0, which should not be included, as the range is from 1 to 366. In order to fix this problem we wrote in the program the range for the days to be from 1 to 366, which accounts for leap years. Also, at the same time, we put in ranges for the days in order to mark in which month each occurred. For example, if the day is between 1 and 31 then the number one would be placed in the month column to represent January.

In addition, a large number of variables were found to have negative values that resulted from both bad readings and the limitations of the instruments. These values included: -99999.00 for the total amount of radiation, -99999.00 for the total amount of photosynthetic photon flux density (PPFD), -0.023 for instant radiation, -6.999 for average radiation, -6.999 for average PPFD, -69.99 for average temperature, and -3.8 for global radiation. These values were all known to be incorrect and caused problems with averages and other calculations with the variables. These values were all corrected in the



same manner as all other bad data. An “if” statement, which gave a range for each individual variable, was added into the code. If the value at one point fell beyond this range then the value was replaced with a period.

Also found were abnormally high values for wind speeds in the direction between  $0^\circ$  and  $45^\circ$ ,  $45^\circ$  and  $90^\circ$ , and  $90^\circ$  and  $135^\circ$ . These values were 163.6 m/s, 358.6 m/s, and 75.3 m/s respectively. These values are nearly impossible wind speeds and were immediately known to be false. Therefore, we removed all of these abnormally high values so they would not give bad data representation.

Another very important finding in the hourly data set were the values for all radiation-related variables. During about a 12 hour span these values were either very low or zero. This was a very important finding as it has a direct correlation to the calculation of the average. It was discovered that these recordings occurred during the night, when radiation is obviously at a bare minimum. In order to take this into account, we separated the code for all of these variables into two separate “if” statements. The first statement covers the hours between 6:00 AM to 6:00 PM, which is during the light hours of the day, and the second one covers the hours between 6:00 PM to 6:00 AM, which is during the dark hours of the day. Therefore, different ranges were given for each of the twelve hour sets, in order to take into account that the nighttime would have lower values. We decided that the minimum value for the daytime hours would also be the maximum value for the nighttime hours.

Our next step in the quality control analysis was to statistically analyze the manipulated data. The variations within each data set were analyzed using various graphical methods. These methods include time series plots, frequency bar charts, and

frequency histograms. Time series plots displayed how quantities like rainfall and temperature vary over time. This method enabled us to compare data sets over the same time frame. Frequency histograms and bar charts summarized the distribution of various values by displaying each value with its respective frequency. The following steps included using SAS programs to calculate weekly, monthly, and annual totals for the relevant parameters. We also focused on calculating hourly totals and determining hourly variations. After the totals were calculated, we placed the information into Sigma-Plot and graphed them. Graphs were created for the hourly and daily data sets for both the tower and the ground stations for variables such as radiation, maximum and minimum relative humidity, maximum and minimum temperature, wind speed, precipitation, and total photosynthetic photon flux density.

To assess and analyze the variations within the data sets, we visited the relevant data collection sites within the Luquillo Experimental Forest. This increased our understanding of the methodologies involved with collecting and assessing the data. It also increased our understanding of the various processes and elements within the Luquillo Experimental Forest. We identified factors in the data collection processes that cause faulty, inconsistent, and incomplete data. By exploring the collection sites, we also studied how differences in landscape, elevation, and other geographical characteristics produce variations in ecological and meteorological data.

#### **4.2 Questionnaires**

In order to get a better idea of what types of people utilize the field data, questionnaires were used. Questionnaires requesting information regarding the respondent's profession, expertise, and web use were distributed to researchers,

undergraduate students, graduate students, professors, and businessmen (See Appendices B, C, and D). The responses to these questionnaires provided many interesting insights into the needs and interests of the web page users. A Microsoft Excel spreadsheet was created containing all of the answers to all questions that we received. These answers were ranked in order to determine how this information would be used and considered in the creation of the web page.

Of the responses received, 14.3% of the respondents were professors, 33.3% were researchers, 19.1% were graduate students, 23.8% were high school students and 9.5% were in other professions. Respondents reported that 75% have retrieved data off the web, and 62.5% received data specifically from the LTER website. The users also expressed that they would much rather have tables and text files, as opposed to line graphs and bar graphs. Ninety-three percent of the respondents wished to have text files and eighty-five percent of the respondents wanting to have tables. The respondents could place more than one item as what they wanted the most. They also expressed a preference for the individual data sets for hourly, daily, and monthly data over the yearly data. Eighty-three percent of the users would rather have both the quality controlled data and the statistical summaries as opposed to just one or the other. Finally, we received a lot of information about the users' software preferences for manipulating the data. Seventy-eight percent of the respondents utilized Microsoft Excel with the data. Other popular software programs were SYSTAT and SAS.

**Table 4.1 Survey Tracking System**

Survey Type	Number Out	Number Returned
1	20 electronically	6
1	16 at IITF	4
1	10 to people at El Verde	6
2	At local high school	5
3	20 at CSA*	0

\*Handed out and collected by CSA group member Melissa Carreau.

### **4.3 Web Page**

World wide web publication of the quality control data was a very important part of our project. In addition to this task, we also took it upon ourselves to go above and beyond the project specifications to add other features to the web page. We first divided the web page up into different sections that would be easy to understand for the users. The sections were: a hourly data download page, a daily data download page, a frequently asked questions page, a tables, graphs, and other information page, a feedback page and then links to other pre-existing pages.

On the first page, the hourly data download page, users were given the option to download either the entire quality controlled data set from either the tower or the ground station or download data by month and year. They also could select whether or not they wanted a database file that could be imported into Excel or SAS, or if they wanted the file just to be displayed in the browser. The hourly data download page is the exact same as the daily download page, however, instead of users being able to select both month and year, they can only select the data sets by year.

The next page, the frequently asked questions page, we thought was very important in order to better educate the users, including any students that might be

accessing the page. On this page are various questions that people commonly ask. With this, the web page is both an informational and educational tool.

On the tables, graphs, and other information page, the user is given a large variety of options. First, the user is capable of downloading the SAS programs that were used in the quality control analysis of the data sets. This is important if a user wants to know how a program of this sort would be written. It can also serve as an example for a similar project. On this page, the user also is able to view a table of all the variables that were used in these data sets. Also included on the table are a list of the ranges for each variable, the units in which each variable is measured, and the instrumentation used to collect the data. The user then has the ability to click on the device name. This will bring them to another page, which gives a description of how the device collects the data and in some cases a picture of the device. Also on this page, is a link to a table of important recent climatic events. This table is very important to explain why data may have abnormally low or high points. Reasons such as hurricanes or droughts could cause this and this table will tell them if one of these disturbances was present during the time of the abnormal values. The final option on this page is to download bar graphs of the mean values of different variables. The user is able to make various selections, such as the station he wants the information from, the variable he wants, and the specific data set.

The next page is the feedback page. This page is used simply to gather more information about the people that downloaded the data. It asks questions, such as name, expertise, data set that was downloaded, its form and it provides an area for the user to ask questions or give suggestions to the International Institute of Tropical Forestry. We

thought this was important in order to allow the users to provide feedback, while at the same time, allowing the institute to acquire more information about its' users.

The final section of the web page is links to previous sites. These links include the Luquillo Experimental Forest air and soil temperature data, Bisley weekly rainfall and throughfall data, and a link to VAMPS, which is a model for Vegetation-AtMosPhere-Soil water flow.

## 5. STATISTICAL ANALYSIS

After the quality control was completed on the climatic data, the mean and standard error was calculated for the precipitation, total radiation, photosynthetic photon flux density, maximum and minimum temperatures and relative humidity, and mean wind speed per month for the daily data sets (ground and tower) using a SAS program. The SAS program placed the output information in a new file that was then transferred into EXCEL. The output was next cleaned of all unneeded information and saved. The means were then placed in a table of means (Table 5.1-5.2). The table of means contained both yearly means by month and overall means by month.

Table 5.1 Tower Monthly Means of Bisley Climatic Data by day

Variable	Jan	Feb	Mar	Apr	May	Jun	Jul
PRECIP	11.0487	8.584	6.618	8.8192	16.6906	10.1124	11.7427
TOTAL_RA	10041.62	11262.33	13249.89	15511.68	12257.82	13972.46	13256.69
TOTAL_PP	19952.49	23949.11	27331.71	32875.17	30152.22	31253.29	30039.38
MAX_TEMP	25.52	25.36	25.56	26.29	27.22	28.01	27.92
MIN_TEMP	20.57	20.29	20.03	20.84	21.87	22.59	22.69
MAX_RH	99.06	98.03	97.32	97.58	98.78	98.95	98.94
MIN_RH	77.18	73.4	69.53	69.78	74.84	75.6	75.98
MEAN_WS	1.25	1.33	1.39	1.27	1.3	1.3	1.36

Variable	Aug	Sep	Oct	Nov	Dec	Units
PRECIP	11.46	13.5574	9.8353	13.1163	6.5297	mm
TOTAL_RA	13275.49	12569.69	11839.97	10938.81	9764.71	W/m <sup>2</sup>
TOTAL_PP	29970.49	25854.92	23260.04	19080.47	21289.5	μmol/ms
MAX_TEMP	28.49	28.16	27.99	26.68	26.07	C
MIN_TEMP	23.2	22.95	22.82	22.07	21.24	C
MAX_RH	99.02	99.03	98.94	98.97	98.66	% humidity
MIN_RH	76.66	75.96	76.59	79.65	76.58	% humidity
MEAN_WS	1.39	1.5	1.16	1.24	1.26	m/s

Table 5.2 Ground Monthly Means of Bisley Climatic Data by Day

Variable	Jan	Feb	Mar	Apr	May	Jun	Jul
PRECIP	1.6859	2.37549	3.47924	3.65987	9.02236	5.90909	5.67299
TOTAL_RA	9995.97	15207.75	16675.66	17238.47	17705.62	18277.14	17831.13
TOTAL_PP		32663.92	50625.24				
MAX_TEMP	24.75	24.75	24.46	26.03	27.65	28.72	27.81
MIN_TEMP	20.84	20.33	19.55	20.36	22.09	23.26	22.59
MAX_RH	99.51	97.46	97.73	98.4	96.99	98.23	99.28
MIN_RH	82.57	76.78	71.52	68.51	70.23	76.49	76.71
MEAN_WS		0.54	0.54	0.65	0.65	0.5	0.58

Variable	Aug	Sep	Oct	Nov	Dec	Units
PRECIP	8.4805	9.06715	3.98891	4.2443	1.72581	mm
TOTAL_RA	16550.22	15280.42	15181.2	10630.9	7995.57	W/m <sup>2</sup>
TOTAL_PP	21771.09	35127.78	28193.1	38608.9	27732.21	μmol/ms
MAX_TEMP	28.39	27.65	27.12	25.71	25.24	C
MIN_TEMP	23.31	22.88	22.69	22.05	21.35	C
MAX_RH	99.32	99.57	99.54	91.43	99.39	% humidity
MIN_RH	75.4	78.73	80.59	76.65	82.11	% humidity
MEAN_WS	0.81	0.58	0.55	0.56	0.52	m/s

To ensure that the values were correct and to make a quick reference for users of the web page, the means and standard error for each variable were graphed using SigmaPlot. Each variable originally received a separate graph. Upon making the graphs, it was decided to create a single graph with the maximum and minimum temperature and a single graph with the maximum and minimum relative humidity. As each graph was made, the limits and the feasibility of the results were discussed. For the relative humidity, the graph showed that it never reached 98 percent. A discussion followed this finding to determine if this was possible. We subsequently realized that for the average maximum relative humidity to be 100 percent, it would have to be 100 percent all of the time. For the relative humidity to be over 98 percent, it would have to be 98 percent or higher the majority of the time, which does not occur. Several times the limits were shrunk to emphasize the difference in the means (Appendix F).



After the graphs were completed for the daily data sets, the mean and standard error was calculated for the precipitation, the total radiation, the photosynthetic photon flux density, the average temperature, the average relative humidity, and the mean wind speed per hour for the hourly data sets (ground and tower). The means were then placed on a table of means for the hourly data sets (Table 5.3-5.4).

Table 5.3 Tower Hourly Means of Bisley Climatic Data by Hour

Variable	0	100	200	300	400	500	600
PRECIP	1.847	2.341	1.809	2.168	1.746	1.231	2.164
TOTAL_RA	3.88	3.95	3.91	3.91	3.98	3.89	6.47
TOTAL_PP	1.49	1.5	1.51	1.51	1.5	1.53	2.13
AVER_TEM	22.66	22.58	22.48	22.4	22.34	22.29	22.27
AVER_RH	95.37	95.54	95.82	95.95	95.94	95.95	95.92
MEAN_WS	1.17	1.16	1.14	1.15	1.15	1.14	1.15

Variable	700	800	900	1000	1100	1200	1300
PRECIP	1.082	1.143	2.271	3.019	1.968	1.746	2.274
TOTAL_RA	1528.63	4045.7	7875.81	11404.69	13616.25	14227.1	14014.29
TOTAL_PP	1760.56	6686.16	12908.47	18178.94	21333.96	22254.14	21969.16
AVER_TEM	22.38	22.98	23.87	24.58	25.1	25.4	25.51
AVER_RH	95.7	94.31	91.63	88.7	86.21	84.8	84.28
MEAN_WS	1.13	1.13	1.25	1.45	1.62	1.7	1.75

Variable	1400	1500	1600	1700	1800	1900	2000	2100	2200
PRECIP	2.902	2.535	3.349	2.207	2.305	3.189	2.116	1.792	2.085
TOTAL_RA	13427.01	11983.36	8915.8	5202.04	146.15	26.64	3.25	3.65	3.81
TOTAL_PP	20816.59	18279.42	13674.51	7962.23	4.98	3.69	1.93	1.63	1.53
AVER_TEM	25.5	25.37	25.1	24.63	23.88	23.18	22.91	22.83	22.79
AVER_RH	84.37	84.98	86.28	88.32	91.25	93.83	94.83	95.07	95.16
MEAN_WS	1.73	1.67	1.51	1.34	1.16	1.11	1.11	1.13	1.16

Variable	2300	Units
PRECIP	1.838	mm
TOTAL_RA	3.83	W/m <sup>2</sup>
TOTAL_PP	1.51	μmol/ms
AVER_TEM	22.74	C
AVER_RH	95.28	% humidity
MEAN_WS	1.21	m/s

Table 5.4 Ground Hourly Means of Bisley Climatic Data by Hour

Variable	0	100	200	300	400	500	600	700
PRECIP	0.149	0.183	0.197	0.188	0.213	0.284	0.205	0.21
TOTAL_RA	20.76	20.82	20.9	20.9	20.8	20.8	18.97	789.15
TOTAL_PP	0.21	0.26	0.26	0.21	0.24	0.26	0.35	1026.58
AVER_TEM	22.62	22.53	22.44	22.36	22.29	22.23	22.19	22.24
AVER_RH	96.57	96.73	96.95	97.07	97.17	97.27	97.27	97.26
MEAN_WS	0.79	0.72	0.74	0.78	0.75	0.77	0.77	0.74

Variable	800	900	1000	1100	1200	1300	1400	1500
PRECIP	0.176	0.159	0.243	0.17	0.203	0.235	0.186	0.299
TOTAL_RA	961.87	1189.39	1499.55	2139.31	2227.54	2635.96	3158.88	2674.18
TOTAL_PP	1438.14	1883.14	2194.55	2823.66	2731.05	3077.19	2890.68	2334.69
AVER_TEM	22.65	23.33	24.05	24.69	25.16	25.44	25.51	25.39
AVER_RH	96.75	95.35	92.86	90.04	87.97	86.68	86.29	86.79
MEAN_WS	0.86	0.9	1	1.04	1.09	1.11	0.98	1.05

Variable	1600	1700	1800	1900	2000	2100	2200
PRECIP	0.3	0.217	0.227	0.156	0.153	0.165	0.163
TOTAL_RA	2308.89	1221.74	46.45	21.21	21.06	20.98	20.91
TOTAL_PP	2058.81	1673.61	0.37	0.18	0.3	0.25	0.28
AVER_TEM	25.09	24.61	23.97	23.3	22.95	22.82	22.75
AVER_RH	87.88	90.12	92.56	94.71	95.73	96.12	96.26
MEAN_WS	0.97	1.01	0.89	0.827	0.77	0.74	0.75

Variable	2300	Units
PRECIP	0.18	mm
TOTAL_RA	20.8	W/m <sup>2</sup>
TOTAL_PP	0.21	μmol/ms
AVER_TEM	22.69	C
AVER_RH	96.33	% humidity
MEAN_WS	0.82	m/s

To ensure the values were correct and to make a quick reference for users of the web page, the means and standard error for each variable were graphed using SigmaPlot. As each graph was made the limits and feasibility of the results was discussed. For several graphs, the limits were shrunk to emphasis the difference of means (Appendix F).

These graphs demonstrated to us that the ranges in the SAS program created for the quality control analysis were accurate with minimal standard errors. The photosynthetic photon flux density and the total radiation had the largest standard errors because of the large difference in the amount of radiation given off at different hours.

During the night, the radiation and photosynthetic flux density is less than during the daytime. These two variables are properties of light energy.

## 6. CONCLUSIONS AND RECOMMENDATIONS

Reflecting on our experiences during the project brings to mind a few key points. The first consideration is the prerequisites needed to conduct quality control analysis on various data sets. Due to the tedious nature of the work, it is vital that the worker be allowed ample time and the necessary facilities to complete the task. Second, the worker must possess a comprehensive understanding of the data set in order to make corrections while not compromising its integrity. In the case of our project both these conditions were met, starting with the use of Statistical Analysis Software and ending with the extensive assistance of our liaison, Dr. Frederick Scatena.

The second key observation, which is closely related to the first, is the importance of working with accurate and reliable data. We observed the difficulties that arise in data management, which include collecting the data and properly storing it. These steps lay the foundation, but the following steps are just as important. Environmental researchers conduct numerous analyses using statistical procedures on collected data. These resulting analyses are meaningless if the underlying data is flawed. These flaws can also result from data, which is not properly described and documented. Thus, it is imperative that the collected data be checked thoroughly. In the process of raising awareness of environmental issues and prescribing solutions to environmental dilemmas, it is essential that the elementary data be of high quality.

Another consideration is the necessity of educating people about preserving and studying tropical forests. The Luquillo Experimental Forest is rich with biodiversity and beauty, and is truly one of Puerto Rico's best natural resources. It is crucial that people

continue to raise awareness, so that all generations can appreciate and study its magnificence.

Finally, we appreciate the opportunity of working with International Institute of Tropical Forestry, and we thank all those who supported and assisted us, especially Dr. Frederick Scatena. We also appreciate working in the Botanical Gardens. Due to the professional, yet enjoyable environment of the International Institute of Tropical Forestry, we recommend that Worcester Polytechnic Institute maintain this project relationship. The project enabled us to develop a knowledge base on the Luquillo Experimental Forest and tropical forestry, and to participate in the praiseworthy task of preserving the environment.

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## 8. APPENDICES

### APPENDIX A

#### International Institute of Tropical Forestry

##### Introduction

The International Institute of Tropical Forestry (IITF) is a part of the United States Department of Agriculture (USDA) Forest Service. The USDA Forest Service's mission is as follows:

*Caring for the land and serving the people.*

IITF is located in Rio Piedras, Puerto Rico on the grounds of the Botanical Gardens. The Botanical Gardens are administrated by the University of Puerto Rico and are located in the metropolitan center of San Juan. Since 1939, when IITF was founded, its goals have been the development and dissemination of scientific knowledge in the field of tropical forestry, and the support of a vigorous program at the insular, national and international level. Stated below is the mission of IITF:

*(To) Develop and exchange knowledge critical to sustaining tropical ecosystem benefits for human kind.*

The IITF reports directly to the chief of Forest Service and contains a management team that coordinates all five Forest Service programs in Puerto Rico.

##### IITF Research Program

The research focus of IITF is on tropical American forests, which is organized into four major themes. Each theme is pursued by a set of experiments. These four major themes are:

- Forest monitoring, management, and rehabilitation
- Ecosystem management research
- Wildlife research

- Luquillo Experimental Forest

The four themes are enhanced by laboratory facilities for chemical analysis of soils and water and a library that contains technical information. The purpose of the research program is the following:

*[The research program] Develops and disseminates scientifically derived knowledge that contributes to the sustainable use of forest resources, the rehabilitation of degraded lands, and the management and conservation of tropical forests, wildlife, and watersheds.*

### **Forest Monitoring, Management, and Rehabilitation**

Forest management and rehabilitation research focuses on the problems of reforestation and restoration of degraded lands through the establishment of plantations, monitoring of long term forest plots, and secondary forest management in the tropics.

Some of the recent research programs are the following:

- Tropical Forest Dynamics – Long term Monitoring
- Silvics of Tropical Forest Trees
- Conservation Management – Collaboration with NGO's
- Mahogany – Silviculture, Conservation and Management
- Tropical Forest Rehabilitation and Restoration

### **Ecosystem Management Research**

Ecosystem management research currently focuses on the following experiments:

- Greenhouse Gases Exchange and Global Change
- Long Term Ecological Research Network
- Watershed and Riparian Management Research
- LEF Temperature Gradient

## **Wildlife Research**

The IITF wildlife research is intended to anticipate the needs of tropical threatened or endangered species and provide the information to natural resource managers. The research also predicts how wildlife will respond to wildlife manipulation.

The current research programs include:

- Long Term Study of the Population Biology of the Pearled Eyed Thrashers
- Long Term Population Studies of Birds in the Guanica Dry Forest
- Effects of Hurricanes on Wildlife
- Habit Distribution and Overwintering of Neo-Tropical Migrant Birds

## **Luquillo Experimental Forest**

The Luquillo Forest is a site for research conducted by scientists of the Forest Service, the University of Puerto Rico and scientists around the world. Due to its wide elevation and precipitation range, it is uniquely suited to research tropical forests and their management. There are five life zones found in the Luquillo forest, which represents one-third of the forested lands of the American Tropics, and are favorable for tropical forestry research in the Northern Hemisphere. Life zones are climatic areas where species native to the climate live. Several studies occurring in the Luquillo Experimental Forest are:

- Long Term Study of the Population Biology of the Pearled Eyed Thrashers
- Long Term Population Studies of Birds in the Guanica Dry Forest
- Effects of Hurricanes on Wildlife
- Habit Distribution and Overwintering of Neo-Tropical Migrant Birds

## **IITF International Programs**

The International Cooperation Unit at IITF exchanges knowledge critical to sustaining tropical ecosystems and their contributions to human kind. The unit accomplishes this through activities that include demonstrations, training, science

exchange, and technology transfer. The unit primarily focuses in Brazil and Mexico as well as the Caribbean and Central America. Several international issues include:

- National policies
- Ecosystem Management
- Coastal Reserves
- Protection and Erosion Control
- Forest Recreation Management and Ecotourism
- Watershed Restoration
- Environmental Education

### **States and Private Forestry**

State and Private Forestry programs provide technical assistance to Puerto Rico and the US Virgin Islands. The Department of Natural and Environmental Resources (DNER), in Puerto Rico and the Department of Agriculture in the US Virgin Islands are the primary partners. The State and Private Forestry manages about thirty-three active grants that focus on technical assistance, technology transfer and training. There are five categories of programs throughout Puerto Rico and the US Virgin Islands.

- Urban and Community Forestry
- Rural Landowner Assistance
- Economic Action
- Forest Action
- Cooperative Fire

## APPENDIX B

Our group is currently working on a project for the Worcester Polytechnic Institute located in Worcester, Massachusetts in conjunction with Dr. F. N. Scatena of the International Institute of Tropical Forestry. The project involves making the climatic data collected from the Bisley Experimental Watersheds accessible on the Web. The purpose of this survey is to gather more information regarding the people who have a need for this data and the ways they plan on using the data. This will enable us to better design the web page for the needs of the user. Please return the completed questionnaires to Dr. F. N. Scatena or email the questionnaires to any of us. Feel free to email us if you have any comments or questions. Thank you for taking the time to fill out this survey.

Dr. F. N. Scatena  
US Forest Service  
Call Box 25000  
Rio Piedras, PR 00928-2500  
Email: [fscatena@LTERnet.edu](mailto:fscatena@LTERnet.edu)

WPI Project Group  
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Andre Freeman  
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[smwonder@wpi.edu](mailto:smwonder@wpi.edu)

Eric White  
[white@wpi.edu](mailto:white@wpi.edu)

## Questionnaire

1) What is your profession?

Professor    Researcher    Graduate Student    Undergraduate Student  
Businessman    Other \_\_\_\_\_

2) What is your field of expertise?

---

3) What habitat and/or organism do you study?

Forest            Streams            Agriculture    Tropical            Atmospheric            Plants  
Animals            Other \_\_\_\_\_

4) Have you ever worked in the LEF?

Yes    No

5) Have you ever retrieved data off the web?

Yes    No

6) Have you ever retrieved data from the Luquillo LTER web site?

Yes    No

7) How often do you retrieve data off the LTER web site?

Once a Year            Several Times a Year  
Once a Month            Several Times a Month  
Once a Week            Several Times a Week  
Once a Day            Several Times a day            Never

*Please answer the following questions pertaining to information concerning climatic data.*

8) How do you plan on using the data?

---

---

9) What software do you plan on using the data with (Ex. SAS, Excel, SPSS)?

---

10) What time frame would you most like the climate data to be provided in?

Hourly            Daily            Monthly            Yearly            Other \_\_\_\_\_

11) Which form would be the most useful for viewing data?

Rate each of the following from 1 to 4 with 1 being the least useful

Table	1	2	3	4
Line graph	1	2	3	4
Bar graph	1	2	3	4
Text File	1	2	3	4

12) What form would you like to view the rainfall and climatic data?

Quality Controlled Data                      Statistical Summaries                      Both

Other \_\_\_\_\_

Thank you for taking the time to fill out the survey.



## APPENDIX C

We are three students currently working on a project for the Worcester Polytechnic Institute located in Worcester, Massachusetts in conjunction with Dr. F. N. Scatena of the International Institute of Tropical Forestry. The project involves making the climatic data collected from the Bisley Experimental Watersheds in the Caribbean National Forest accessible on the Web. The purpose of this survey is to gather more information regarding the people who have a need for this data and the ways they plan on using the data. This will enable us to better design the web page for the needs of the user. Please return the completed questionnaires to Dr. F. N. Scatena or any one of the three of us before you leave. Feel free to email us if you have any comments or questions. Thank you for taking the time to fill out this survey.

Dr. F. N. Scatena  
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## Questionnaire

1) What grade are you in?

6      7      8      9      10      11      12      other \_\_\_\_\_

2) Do you have access to a computer at home?

Yes    No

3) Do you have access to the Internet at home?

Yes    No

4) Do you have access to the Internet at school?

Yes    No

5) Do you use a computer for schoolwork?

Yes    No    Why/Why not? \_\_\_\_\_

---

6) How often do you use a computer for schoolwork?

Once a grading period      Couple times a grading period      Once a month  
Couple times a month      Once a week    Several times a week    Once a day  
Several times a day

*Assume you have been assigned a research paper. Answer the following questions in regards to that research paper.*

7) I would go to the web to look for information.

Strongly disagree    1    2    3    4    5    Strongly agree

8) When looking for information, I would like an interactive web page.

Strongly disagree    1    2    3    4    5    Strongly agree

Why? \_\_\_\_\_

---

9) When looking at data, what is the easiest to read?

Table    Bar graph    Line graph    Other \_\_\_\_\_

10) If you were doing a research paper on tropical forests, which would be most helpful?

Rainfall      Temperature      Wind Speed      Light Energy

Humidity

11) Would you be more interested having the climatic data at  
Annual average      Monthly average      Weekly average      Daily average  
Hourly average      Other \_\_\_\_\_

Thank you for taking the time to fill out this survey.

## APPENDIX D

We are three students currently working on a project for the Worcester Polytechnic Institute located in Worcester, Massachusetts in conjunction with Dr. F. N. Scatena of the International Institute of Tropical Forestry. The project involves making the climatic data collected from the Bisley Experimental Watersheds in the Caribbean National Forest accessible on the Web. The purpose of this survey is to gather more information regarding the people who have a need for this data and the ways they plan on using the data. This will enable us to better design the web page for the needs of the user. Please return the completed questionnaires to Dr. F. N. Scatena or email the questionnaires to any of us. Feel free to email us if you have any comments or questions. Thank you for taking the time to fill out this survey.

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US Forest Service  
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Rio Piedras, PR 00928-2500  
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## Questionnaire

1) What is your profession?

Professor    Researcher    Graduate Student    Undergraduate Student  
Businessman    Other\_\_\_\_\_

2) What organization do you work for and what department if any?

\_\_\_\_\_

3) What is your field of expertise?

\_\_\_\_\_

4) What habitat and/or organism do you study?

Forest            Streams            Agriculture    Tropical            Atmospheric            Plants  
Animals            Other\_\_\_\_\_

5) Have you ever worked in the Luquillo Experimental Forest?

Yes    No

6) Have you ever retrieved data off the web?

Yes    No

7) Have you ever retrieved data from the Luquillo LTER web site?

Yes    No

8) How often do you retrieve data off the LTER web site?

Once a Year            Several Times a Year  
Once a Month            Several Times a Month  
Once a Week            Several Times a Week  
Once a Day            Several Times a day            Never

*Please answer the following questions pertaining to information concerning climatic data.*

9) How do you plan on using the data?

\_\_\_\_\_  
\_\_\_\_\_

10) What software do you plan on using the data with (Ex. SAS, Excel, SPSS)?

\_\_\_\_\_

11) What time frame would you most like the climate data to be provided in?

Hourly            Daily            Monthly            Yearly            Other\_\_\_\_\_

12) Which form would be the most useful for viewing data?

Rate each of the following from 1 to 4 with 1 being the least useful

Table	1	2	3	4
Line graph	1	2	3	4
Bar graph	1	2	3	4
Text File	1	2	3	4

13) What form would you like to view the rainfall and climatic data?

Quality Controlled Data                      Statistical Summaries                      Both

Other \_\_\_\_\_

Thank you for taking the time to fill out the survey.

## APPENDIX E

### Tower Daily

```
/* Tower - Daily      4/18 .. */
data daily.tday0;
  set daily.tdmet;
/* Variable ranges .. */
if (precip > 600 or precip < 0) and precip ne '.' THEN DO;
  PUT precip = ' IS OUT OF RANGE ON ' day year;
  precip = '.';
  END;
if TOTAL_RA<5000 THEN DO;
  TOTAL_RA=TOTAL_RA*10;
  END;
if (TOTAL_RA>30000 or TOTAL_RA < 500) and TOTAL_RA ne '.' THEN DO;
  PUT TOTAL_RA = ' IS OUT OF RANGE ON ' day year;
  TOTAL_RA = '.';
  END;
if TOTAL_PP<10000 THEN DO;
  TOTAL_PP=TOTAL_PP*10;
  END;
if (TOTAL_PP > 60000 or TOTAL_PP < 9500) and TOTAL_PP ne '.' THEN DO;
  PUT TOTAL_PP = ' IS OUT OF RANGE ON ' day year;
  TOTAL_PP = '.';
  END;
if (GLOBALRA > 400.0 OR GLOBALRA <0) and GLOBALRA ne '.' THEN DO;
  PUT GLOBALRA='IS OUT OF RANGE ON ' day year;
  GLOBALRA= '.';
  END;
If year<1997 THEN DO;
  GLOBALRA='.';
  END;
If (year=1997 and day<162) THEN DO;
  GLOBALRA='.';
  END;
if (REFSRAD > 100.0 OR REFSRAD <0) and REFSRAD ne '.' THEN DO;
  PUT REFSRAD='IS OUT OF RANGE ON ' day year;
  REFSRAD= '.';
  END;
If year<1997 THEN DO;
  REFSRAD='.';
  END;
If (year=1997 and day<162) THEN DO;
  REFSRAD='.';
  END;
if (STDGLORA > 400 OR STDGLORA <0) and STDGLORA ne '.' THEN DO;
  PUT STDGLORA='IS OUT OF RANGE ON ' day year;
  STDGLORA= '.';
  END;
If year<1997 THEN DO;
  STDGLORA='.';
  END;
If (year=1997 and day<162) THEN DO;
  STDGLORA='.';
  END;
if (DEVREFSR > 100 OR DEVREFSR < 0) and DEVREFSR ne '.' THEN DO;
  PUT DEVREFSR='IS OUT OF RANGE ON ' day year;
  DEVREFSR= '.';
  END;
If year<1997 THEN DO;
  DEVREFSR='.';
  END;
If (year=1997 and day<162) THEN DO;
  DEVREFSR='.';
```

```

END;
if min_wind>max_wind THEN DO;
  max_wind='.';
END;
If (MAX_WIND > 50.0 OR MAX_WIND < 0.5) and MAX_WIND ne '.' THEN DO;
  PUT MAX_WIND='IS OUT OF RANGE ON ` day year;
  MAX_WIND= '.';
END;
if MAX_WIND='.' then do;
  TIME_MWS='.';
  MIN_WIND='.';
  MEAN_WS='.';
  MEAN_WVM='.';
  MEAN_WVD='.';
  SDWDIR='.';
  WR_0_45='.';
  WR_45_90='.';
  WR_90_13='.';
  WR_135_1='.';
  WR_180_2='.';
  WR_225_2='.';
  WR_270_3='.';
  WR_315_3='.';
END;
if (TIME_MWS > 2400 OR TIME_MWS < 0) and TIME_MWS ne '.' THEN DO;
  PUT TIME_MWS='IS OUT OF RANGE ON ` day year;
  TIME_MWS= '.';
END;
if min_temp>max_temp THEN DO;
  min_temp='.';
  max_temp='.';
END;
if (max_temp > 40.0 OR max_temp <10) and max_temp ne '.' THEN DO;
  PUT max_temp='IS OUT OF RANGE ON ` day year;
  max_temp= '.';
END;
if max_temp='.' THEN DO;
  TIME_MT='.';
END;
if (time_mt > 2400 OR time_mt < 0) and time_mt ne '.' THEN DO;
  PUT time_mt='IS OUT OF RANGE ON ` day year;
  time_mt= '.';
END;
if min_rh>max_rh THEN DO;
  min_rh='.';
  max_rh='.';
END;
if (max_rh > 105.0 OR max_rh < 0) and max_rh ne '.' THEN DO;
  PUT max_rh='IS OUT OF RANGE ON ` day year;
  max_rh= '.';
END;
if max_rh > 100.0 THEN DO;
  max_rh = 100.0;
END;
if max_rh='.' THEN DO;
  TIME_mrh='.';
END;
if (time_mrh > 2400 OR time_mrh <0) and time_mrh ne '.' THEN DO;
  PUT time_mrh='IS OUT OF RANGE ON ` day year;
  time_mrh= '.';
END;
if (MIN_WIND > 50.0 OR MIN_WIND <0.4) and MIN_WIND ne '.' THEN DO;
  PUT MIN_WIND='IS OUT OF RANGE ON ` day year;
  MIN_WIND= '.';
END;

```



```

if MIN_WIND='.' THEN DO;
  TIME_MIW='.';
  END;
if (time_MIW > 2400 OR time_miw <0) and time_miw ne '.' THEN DO;
  PUT time_miw='IS OUT OF RANGE ON ` day year;
  time_miw= '.';
  END;
if (min_temp > 40.0 OR min_temp <10) and min_temp ne '.' THEN DO;
  PUT min_temp='IS OUT OF RANGE ON ` day year;
  min_temp= '.';
  END;
if MIN_temp='.' THEN DO;
  TIME_MIt='.';
  END;
if (time_mit > 2400 OR time_mit <0) and time_mit ne '.' THEN DO;
  PUT time_mit='IS OUT OF RANGE ON ` day year;
  time_mit= '.';
  END;
if (min_rh > 105.0 OR min_rh < 0) and min_rh ne '.' THEN DO;
  PUT min_rh='IS OUT OF RANGE ON ` day year;
  min_rh= '.';
  END;
if min_rh > 100.0 THEN DO;
  min_rh = 100.0;
  END;
if MIN_rh='.' THEN DO;
  TIME_MIr='.';
  END;
if (time_mir > 2400 OR time_mir <0) and time_mir ne '.' THEN DO;
  PUT time_mir='IS OUT OF RANGE ON ` day year;
  time_mir= '.';
  END;
if (MEAN_WS > 50.0 OR MEAN_WS < 0.4) and MEAN_WS ne '.' THEN DO;
  PUT MEAN_WS='IS OUT OF RANGE ON ` day year;
  MEAN_WS= '.';
  END;
if (MEAN_WVM > 360.0 OR MEAN_WVM < 0) and MEAN_WVM ne '.' THEN DO;
  PUT MEAN_WVM='IS OUT OF RANGE ON ` day year;
  MEAN_WVM= '.';
  END;
if (MEAN_WVD > 360.0 OR MEAN_WVD < 0) and MEAN_WVD ne '.' THEN DO;
  PUT MEAN_WVD='IS OUT OF RANGE ON ` day year;
  MEAN_WVD= '.';
  END;
if (SDWDIR > 100.0 OR SDWDIR < 0) and SDWDIR ne '.' THEN DO;
  PUT SDWDIR='IS OUT OF RANGE ON ` day year;
  SDWDIR= '.';
  END;
if (WR_0_45>10.0 or WR_0_45<0) and WR_0_45 ne '.' THEN DO;
  PUT WR_0_45=' IS OUT OF RANGE ON ` day year;
  WR_0_45= '.';
  END;
if (WR_45_90>10.0 or WR_45_90<0) and WR_45_90 ne '.' THEN DO;
  PUT WR_45_90=' IS OUT OF RANGE ON ` day year;
  WR_0_45= '.';
  END;
if (WR_90_13>10.0 or WR_90_13<0) and WR_90_13 ne '.' THEN DO;
  PUT WR_90_13=' IS OUT OF RANGE ON ` day year;
  WR_90_13= '.';
  END;
if (WR_135_1>10.0 or WR_135_1<0) and WR_135_1 ne '.' THEN DO;
  PUT WR_135_1=' IS OUT OF RANGE ON ` day year;
  WR_135_1= '.';
  END;
if (WR_180_2>10.0 or WR_180_2<0) and WR_180_2 ne '.' THEN DO;

```

```

PUT WR_180_2=' IS OUT OF RANGE ON ` day year;
WR_180_2='.';
END;
if (WR_225_2>10.0 or WR_225_2<0) and WR_225_2 ne '.' THEN DO;
  PUT WR_225_2=' IS OUT OF RANGE ON ` day year;
  WR_225_2='.';
  END;
if (WR_270_3>10.0 or WR_270_3<0) and WR_270_3 ne '.' THEN DO;
  PUT WR_270_3=' IS OUT OF RANGE ON ` day year;
  WR_270_3='.';
  END;
if WR_315_3>10 THEN DO;
  tvolts=VOLTS;
  VOLTS=WR_315_3;
  END;
if (WR_315_3>10.0 or WR_315_3<0) and WR_315_3 ne '.' THEN DO;
  PUT WR_315_3=' IS OUT OF RANGE ON ` day year;
  WR_315_3='.';
  END;
if (VOLTS > 15.0 OR VOLTS < 0) and VOLTS ne '.' THEN DO;
  PUT VOLTS=' IS OUT OF RANGE ON ` day year;
  VOLTS='.';
  END;
/* Sort and merge */
proc sort;
  by year day;
proc sort data=daily.full;
  by year day;
data daily.tday1;
  merge daily.full daily.tday0;
  by year day;
/* Set month .. */
if (day > 0 and day <= 31) THEN DO;
  PUT day = ` IS IN January' year;
  month = 1;
  END;
if (year ^= 1996) THEN DO;
  if (day > 31 and day <= 59) THEN DO;
    PUT day = ` IS IN February' year;
    month = 2;
    END;
  if (day > 59 and day <= 90) THEN DO;
    PUT day = ` IS IN March' year;
    month = 3;
    END;
  if (day > 90 and day <= 120) THEN DO;
    PUT day = ` IS IN April' year;
    month = 4;
    END;
  if (day > 120 and day <= 151) THEN DO;
    PUT day = ` IS IN May' year;
    month = 5;
    END;
  if (day > 151 and day <= 181) THEN DO;
    PUT day = ` IS IN June' year;
    month = 6;
    END;
  if (day > 181 and day <= 212) THEN DO;
    PUT day = ` IS IN July' year;
    month = 7;
    END;
  if (day > 212 and day <= 243) THEN DO;
    PUT day = ` IS IN August' year;
    month = 8;
    END;

```

```

if (day > 243 and day <= 273) THEN DO;
  PUT day = ` IS IN September` year;
  month = 9;
  END;
if (day > 273 and day <= 304) THEN DO;
  PUT day = ` IS IN October` year;
  month = 10;
  END;
if (day > 304 and day <= 334) THEN DO;
  PUT day = ` IS IN November` year;
  month = 11;
  END;
if (day > 334 and day <= 365) THEN DO;
  PUT day = ` IS IN December` year;
  month = 12;
  END;
END;
if (year = 1996) THEN DO;
  if (day > 31 and day <= 60) THEN DO;
    PUT day = ` IS IN February` year;
    month = 2;
    END;
  if (day > 60 and day <= 91) THEN DO;
    PUT day = ` IS IN March` year;
    month = 3;
    END;
  if (day > 91 and day <= 121) THEN DO;
    PUT day = ` IS IN April` year;
    month = 4;
    END;
  if (day > 121 and day <= 152) THEN DO;
    PUT day = ` IS IN May` year;
    month = 5;
    END;
  if (day > 152 and day <= 182) THEN DO;
    PUT day = ` IS IN June` year;
    month = 6;
    END;
  if (day > 182 and day <= 213) THEN DO;
    PUT day = ` IS IN July` year;
    month = 7;
    END;
  if (day > 213 and day <= 244) THEN DO;
    PUT day = ` IS IN August` year;
    month = 8;
    END;
  if (day > 244 and day <= 274) THEN DO;
    PUT day = ` IS IN September` year;
    month = 9;
    END;
  if (day > 274 and day <= 305) THEN DO;
    PUT day = ` IS IN October` year;
    month = 10;
    END;
  if (day > 305 and day <= 335) THEN DO;
    PUT day = ` IS IN November` year;
    month = 11;
    END;
  if (day > 335 and day <= 366) THEN DO;
    PUT day = ` IS IN December` year;
    month = 12;
    END;
  END;
END;
data daily.tday;
  set daily.tday1;

```

```

/* Check for . */
if (year = '.' or day = '.' or OBS = '.') then do;
  put day `of` Year ` IS INCOMPLETE -- deleted`;
  delete;
  end;
if (day = lag1(day)) then do;
  put `Day` day ` in Year ` year ` has a double ..`;
  if (precip = lag1(precip) and total_ra = lag1(total_ra) and total_pp = lag1(total_pp)) then do;
    put `Day` day ` in Year ` year ` has been deleted ..`;
    delete;
  END;
  else do;
    delete;
  END;
end;
run;

```

## Division of Tower Daily

```

/* Program to produce monthly & yearly dbf files and text files */
/* Daily Data Sets */
/* Tower Station Data */
/* 1993 */
data _null_;          /* All of 1993 */
  set daily.tday;
  file 'C:/wpi/text_files/tdall93.txt' linesize=400;
  if (year = 1993 and month = 1 and day = 1) then do;
    put '<pre>';
    put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
    max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
    mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3
    wr_315_3`;
    put `-----`;
  end;
  if (year = 1993) then do;
    put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
    devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1` time_mrh 4.0 ` min_wind 6.3 `
    time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
    7.3 ` swdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
    wr_270_3 5.3 ` wr_315_3 5.3;
  end;
  if (year=1993 and day=365) then do;
    put '</pre>';
  end;
  file 'C:/wpi/dbf_files/tdall93.dbf' linesize=400;
  if (year = 1993 and month = 1 and day = 1) then do;
    put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
    max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
    mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3 wr_315_3`;
  end;
  if (year = 1993) then do;
    put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
    devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
    ` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
    7.3 ` swdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
    wr_270_3 5.3 ` wr_315_3 5.3;
  end;
data _null_;          /* 1993 - 01 */
  set daily.tday;
  file 'C:/wpi/text_files/td0193.txt' linesize=400;
  if (year = 1993 and month = 1 and day = 1) then do;
    put '<pre>';
    put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
    max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
    mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3 wr_315_3`;
  end;

```

```

put `-----`;
end;
if (year = 1993 and month = 1) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1993 and month=1 and day=31) then do;
  put `</pre>`;
end;
file 'C:/wpi/dbf_files/td0193.dbf' linesize=400;
if (year = 1993 and month = 1 and day = 1) then do;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
  mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
  wr_315_3`;
end;
if (year = 1993 and month = 1) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1993 - 02 */
set daily.tday;
file 'C:/wpi/text_files/td0293.txt' linesize=400;
if (year = 1993 and month = 2 and day = 32) then do;
  put `<pre>`;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
  mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
  wr_315_3`;
  put `-----`;
end;
if (year = 1993 and month = 2) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
  time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1993 and month=2 and day=59) then do;
  put `</pre>`;
end;
file 'C:/wpi/dbf_files/td0293.dbf' linesize=400;
if (year = 1993 and month = 2 and day = 32) then do;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
  mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
  wr_315_3`;
end;
if (year = 1993 and month = 2) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1993 - 03 */
set daily.tday;
file 'C:/wpi/text_files/td0393.txt' linesize=400;
if (year = 1993 and month = 3 and day = 60) then do;

```

```

put '<pre>';
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3
wr_315_3';
put `-----`;
end;
if (year = 1993 and month = 3) then do;
put year 4.0` month 2.0` day 3.0` precip 7.3` total_ra 9.3` total_pp 9.3` globalra 8.3` refsrad 7.3` stdglora 8.3`
devrefsr 7.3` max_wind 6.3` time_mws 4.0` max_temp 6.2` time_mt 4.0` max_rh 5.1` time_mrh 4.0` min_wind 6.3
` time_miw 4.0` min_temp 6.2` time_mit 4.0` min_rh 5.1` time_mir 4.0` mean_ws 6.3` mean_wvm 5.3` mean_wvd
7.3` swdir 6.3` wr_0_45 5.3` wr_45_90 5.3` wr_90_13 5.3` wr_135_1 5.3` wr_180_2 5.3` wr_225_2 5.3`
wr_270_3 5.3` wr_315_3 5.3;
end;
if (year=1993 and month=3 and day=90) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0393.dbf' linesize=400;
if (year = 1993 and month = 3 and day = 60) then do;
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3
wr_315_3';
end;
if (year = 1993 and month = 3) then do;
put year 4.0` month 2.0` day 3.0` precip 7.3` total_ra 9.3` total_pp 9.3` globalra 8.3` refsrad 7.3` stdglora 8.3`
devrefsr 7.3` max_wind 6.3` time_mws 4.0` max_temp 6.2` time_mt 4.0` max_rh 5.1` time_mrh 4.0` min_wind 6.3
` time_miw 4.0` min_temp 6.2` time_mit 4.0` min_rh 5.1` time_mir 4.0` mean_ws 6.3` mean_wvm 5.3` mean_wvd
7.3` swdir 6.3` wr_0_45 5.3` wr_45_90 5.3` wr_90_13 5.3` wr_135_1 5.3` wr_180_2 5.3` wr_225_2 5.3`
wr_270_3 5.3` wr_315_3 5.3;
end;
data _null_;
/* 1993 - 04 */
set daily.tday;
file 'C:/wpi/text_files/td0493.txt' linesize=400;
if (year = 1993 and month = 4 and day = 91) then do;
put '<pre>';
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3 wr_315_3';
put `-----`;
end;
if (year = 1993 and month = 4) then do;
put year 4.0` month 2.0` day 3.0` precip 7.3` total_ra 9.3` total_pp 9.3` globalra 8.3` refsrad 7.3` stdglora 8.3`
devrefsr 7.3` max_wind 6.3` time_mws 4.0` max_temp 6.2` time_mt 4.0` max_rh 5.1` time_mrh 4.0` min_wind 6.3`
time_miw 4.0` min_temp 6.2` time_mit 4.0` min_rh 5.1` time_mir 4.0` mean_ws 6.3` mean_wvm 5.3` mean_wvd
7.3` swdir 6.3` wr_0_45 5.3` wr_45_90 5.3` wr_90_13 5.3` wr_135_1 5.3` wr_180_2 5.3` wr_225_2 5.3`
wr_270_3 5.3` wr_315_3 5.3;
end;
if (year=1993 and month=4 and day=120) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0493.dbf' linesize=400;
if (year = 1993 and month = 4 and day = 91) then do;
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3
wr_315_3';
end;
if (year = 1993 and month = 4) then do;
put year 4.0` month 2.0` day 3.0` precip 7.3` total_ra 9.3` total_pp 9.3` globalra 8.3` refsrad 7.3` stdglora 8.3`
devrefsr 7.3` max_wind 6.3` time_mws 4.0` max_temp 6.2` time_mt 4.0` max_rh 5.1` time_mrh 4.0` min_wind 6.3
` time_miw 4.0` min_temp 6.2` time_mit 4.0` min_rh 5.1` time_mir 4.0` mean_ws 6.3` mean_wvm 5.3` mean_wvd
7.3` swdir 6.3` wr_0_45 5.3` wr_45_90 5.3` wr_90_13 5.3` wr_135_1 5.3` wr_180_2 5.3` wr_225_2 5.3`
wr_270_3 5.3` wr_315_3 5.3;
end;

```

```

data _null_;          /* 1993 - 05 */
set daily.tday;
file 'C:/wpi/text_files/td0593.txt' linesize=400;
if (year = 1993 and month = 5 and day = 121) then do;
  put '<pre>';
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2`wr_270_3 wr_315_3`;
  put `-----`;
end;
if (year = 1993 and month = 5) then do;
  put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` sdwdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;
if (year=1993 and month=5 and day=151) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0593.dbf' linesize=400;
if (year = 1993 and month = 5 and day = 121) then do;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3 wr_315_3`;
end;
if (year = 1993 and month = 5) then do;
  put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` sdwdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;
data _null_;          /* 1993 - 06 */
set daily.tday;
file 'C:/wpi/text_files/td0693.txt' linesize=400;
if (year = 1993 and month = 6 and day = 152) then do;
  put '<pre>';
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3 wr_315_3`;
  put `-----`;
end;
if (year = 1993 and month = 6) then do;
  put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` sdwdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;
if (year=1993 and month=6 and day=181) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0693.dbf' linesize=400;
if (year = 1993 and month = 6 and day = 152) then do;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3 wr_315_3`;
end;
if (year = 1993 and month = 6) then do;
  put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` sdwdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;

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end;
data _null_;
/* 1993 - 07 */
set daily.tday;
file 'C:/wpi/text_files/td0793.txt' linesize=400;
if (year = 1993 and month = 7 and day = 182) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
put '-----';
end;
if (year = 1993 and month = 7) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1993 and month=7 and day=212) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0793.dbf' linesize=400;
if (year = 1993 and month = 7 and day = 182) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1993 and month = 7) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1993 - 08 */
set daily.tday;
file 'C:/wpi/text_files/td0893.txt' linesize=400;
if (year = 1993 and month = 8 and day = 213) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1993 and month = 8) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1993 and month=8 and day=243) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0893.dbf' linesize=400;
if (year = 1993 and month = 8 and day = 213) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1993 and month = 8) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd

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7.3 " sdir wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1993 - 09 */
set daily.tday;
file 'C:/wpi/text_files/td0993.txt' linesize=400;
if (year = 1993 and month = 9 and day = 244) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd sdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1993 and month = 9) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1993 and month=9 and day=273) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0993.dbf' linesize=400;
if (year = 1993 and month = 9 and day = 244) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd sdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1993 and month = 9) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1993 - 10 */
set daily.tday;
file 'C:/wpi/text_files/td1093.txt' linesize=400;
if (year = 1993 and month = 10 and day = 274) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd sdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1993 and month = 10) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1993 and month=10 and day=304) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td1093.dbf' linesize=400;
if (year = 1993 and month = 10 and day = 274) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd sdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1993 and month = 10) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3

```

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" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1993 - 11 */
set daily.tday;
file 'C:/wpi/text_files/td1193.txt' linesize=400;
if (year = 1993 and month = 11 and day = 305) then do;
put '<pre>';
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3`;
put `-----';
end;
if (year = 1993 and month = 11) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1993 and month=11 and day=334) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td1193.dbf' linesize=400;
if (year = 1993 and month = 11 and day = 305) then do;
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3`;
end;
if (year = 1993 and month = 11) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1993 - 12 */
set daily.tday;
file 'C:/wpi/text_files/td1293.txt' linesize=400;
if (year = 1993 and month = 12 and day = 335) then do;
put '<pre>';
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3`;
put `-----';
end;
if (year = 1993 and month = 12) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1993 and month=12 and day=365) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td1293.dbf' linesize=400;
if (year = 1993 and month = 12 and day = 335) then do;
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3`;
end;
if (year = 1993 and month = 12) then do;

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    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
/* 1994 */
data _null_;          /* All of 1994 */
set daily.tday;
file 'C:/wpi/text_files/tdall94.txt' linesize=400;
if (year = 1994 and month = 1 and day = 1) then do;
    put '<pre>';
    put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3
wr_315_3';
    put `-----`;
end;
if (year = 1994) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and day=365) then do;
    put '</pre>';
end;
file 'C:/wpi/dbf_files/tdall94.dbf' linesize=400;
if (year = 1994 and month = 1 and day = 1) then do;
    put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3 wr_315_3';
end;
if (year = 1994) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1994 - 01 */
set daily.tday;
file 'C:/wpi/text_files/td0194.txt' linesize=400;
if (year = 1994 and month = 1 and day = 1) then do;
    put '<pre>';
    put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3 wr_315_3';
    put `-----`;
end;
if (year = 1994 and month = 1) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and month=1 and day=31) then do;
    put '</pre>';
end;
file 'C:/wpi/dbf_files/td0194.dbf' linesize=400;
if (year = 1994 and month = 1 and day = 1) then do;
    put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws

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mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 wr_270_3
wr_315_3';
end;
if (year = 1994 and month = 1) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1994 - 02 */
set daily.tday;
file 'C:/wpi/text_files/td0294.txt' linesize=400;
if (year = 1994 and month = 2 and day = 32) then do;
  put '<pre>';
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3
wr_315_3';
  put `-----`;
end;
if (year = 1994 and month = 2) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and month=2 and day=59) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0294.dbf' linesize=400;
if (year = 1994 and month = 2 and day = 32) then do;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3
wr_315_3';
end;
if (year = 1994 and month = 2) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1994 - 03 */
set daily.tday;
file 'C:/wpi/text_files/td0394.txt' linesize=400;
if (year = 1994 and month = 3 and day = 60) then do;
  put '<pre>';
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2` wr_270_3
wr_315_3';
  put `-----`;
end;
if (year = 1994 and month = 3) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and month=3 and day=90) then do;
  put '</pre>';

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end;
file 'C:/wpi/dbf_files/td0394.dbf' linesize=400;
if (year = 1994 and month = 3 and day = 60) then do;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind ` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh ` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 ` wr_270_3
wr_315_3`;
end;
if (year = 1994 and month = 3) then do;
  put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` swdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;
data _null_;          /* 1994 - 04 */
set daily.tday;
file 'C:/wpi/text_files/td0494.txt' linesize=400;
if (year = 1994 and month = 4 and day = 91) then do;
  put `<pre>`;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind ` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh ` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 ` wr_270_3 wr_315_3`;
  put `-----`;
end;
if (year = 1994 and month = 4) then do;
  put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3 `
time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` swdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;
if (year=1994 and month=4 and day=120) then do;
  put `</pre>`;
end;
file 'C:/wpi/dbf_files/td0494.dbf' linesize=400;
if (year = 1994 and month = 4 and day = 91) then do;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind ` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh ` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 ` wr_270_3
wr_315_3`;
end;
if (year = 1994 and month = 4) then do;
  put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` swdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;
data _null_;          /* 1994 - 05 */
set daily.tday;
file 'C:/wpi/text_files/td0594.txt' linesize=400;
if (year = 1994 and month = 5 and day = 121) then do;
  put `<pre>`;
  put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind ` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh ` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 ` wr_270_3 wr_315_3`;
  put `-----`;
end;
if (year = 1994 and month = 5) then do;
  put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` swdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;

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end;
if (year=1994 and month=5 and day=151) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0594.dbf' linesize=400;
if (year = 1994 and month = 5 and day = 121) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1994 and month = 5) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1994 - 06 */
set daily.tday;
file 'C:/wpi/text_files/td0694.txt' linesize=400;
if (year = 1994 and month = 6 and day = 152) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1994 and month = 6) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and month=6 and day=181) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0694.dbf' linesize=400;
if (year = 1994 and month = 6 and day = 152) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1994 and month = 6) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1994 - 07 */
set daily.tday;
file 'C:/wpi/text_files/td0794.txt' linesize=400;
if (year = 1994 and month = 7 and day = 182) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  put '-----';
end;
if (year = 1994 and month = 7) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd

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7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and month=7 and day=212) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0794.dbf' linesize=400;
if (year = 1994 and month = 7 and day = 182) then do;
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3`;
end;
if (year = 1994 and month = 7) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1994 - 08 */
set daily.tday;
file 'C:/wpi/text_files/td0894.txt' linesize=400;
if (year = 1994 and month = 8 and day = 213) then do;
put '<pre>';
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3`;
put `-----`;
end;
if (year = 1994 and month = 8) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and month=8 and day=243) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0894.dbf' linesize=400;
if (year = 1994 and month = 8 and day = 213) then do;
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3`;
end;
if (year = 1994 and month = 8) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1994 - 09 */
set daily.tday;
file 'C:/wpi/text_files/td0994.txt' linesize=400;
if (year = 1994 and month = 9 and day = 244) then do;
put '<pre>';
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind` time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh` time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3`;
put `-----`;
end;
if (year = 1994 and month = 9) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3

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" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and month=9 and day=273) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0994.dbf' linesize=400;
if (year = 1994 and month = 9 and day = 244) then do;
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind ` time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh ` time_mir mean_ws mean_wvm
mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 ` wr_270_3 wr_315_3`;
end;
if (year = 1994 and month = 9) then do;
put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` swwdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;
data _null_; /* 1994 - 10 */
set daily.tday;
file 'C:/wpi/text_files/td1094.txt' linesize=400;
if (year = 1994 and month = 10 and day = 274) then do;
put '<pre>';
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind ` time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh ` time_mir mean_ws mean_wvm
mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 ` wr_270_3 wr_315_3`;
put `-----`;
end;
if (year = 1994 and month = 10) then do;
put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` swwdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;
if (year=1994 and month=10 and day=304) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td1094.dbf' linesize=400;
if (year = 1994 and month = 10 and day = 274) then do;
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind ` time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh ` time_mir mean_ws mean_wvm
mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 ` wr_270_3 wr_315_3`;
end;
if (year = 1994 and month = 10) then do;
put year 4.0 ` month 2.0 ` day 3.0 ` precip 7.3 ` total_ra 9.3 ` total_pp 9.3 ` globalra 8.3 ` refsrad 7.3 ` stdglora 8.3 `
devrefsr 7.3 ` max_wind 6.3 ` time_mws 4.0 ` max_temp 6.2 ` time_mt 4.0 ` max_rh 5.1 ` time_mrh 4.0 ` min_wind 6.3
` time_miw 4.0 ` min_temp 6.2 ` time_mit 4.0 ` min_rh 5.1 ` time_mir 4.0 ` mean_ws 6.3 ` mean_wvm 5.3 ` mean_wvd
7.3 ` swwdir 6.3 ` wr_0_45 5.3 ` wr_45_90 5.3 ` wr_90_13 5.3 ` wr_135_1 5.3 ` wr_180_2 5.3 ` wr_225_2 5.3 `
wr_270_3 5.3 ` wr_315_3 5.3;
end;
data _null_; /* 1994 - 11 */
set daily.tday;
file 'C:/wpi/text_files/td1194.txt' linesize=400;
if (year = 1994 and month = 11 and day = 305) then do;
put '<pre>';
put `year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind ` time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh ` time_mir mean_ws mean_wvm
mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 ` wr_270_3 wr_315_3`;
put `-----`;
end;
if (year = 1994 and month = 11) then do;

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    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and month=11 and day=334) then do;
    put '</pre>';
end;
file 'C:/wpi/dbf_files/td1194.dbf' linesize=400;
if (year = 1994 and month = 11 and day = 305) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1994 and month = 11) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1994 - 12 */
set daily.tday;
file 'C:/wpi/text_files/td1294.txt' linesize=400;
if (year = 1994 and month = 12 and day = 335) then do;
    put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
    put '-----';
end;
if (year = 1994 and month = 12) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1994 and month=12 and day=365) then do;
    put '</pre>';
end;
file 'C:/wpi/dbf_files/td1294.dbf' linesize=400;
if (year = 1994 and month = 12 and day = 335) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1994 and month = 12) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
/* 1995 */
data _null_;          /* All of 1995 */
set daily.tday;
file 'C:/wpi/text_files/tdall95.txt' linesize=400;
if (year = 1995 and month = 1 and day = 1) then do;
    put '<pre>';
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;

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put '-----';
end;
if (year = 1995) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
  time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1995 and day=365) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/tdall95.dbf' linesize=400;
if (year = 1995 and month = 1 and day = 1) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
  mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1995) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1995 - 01 */
set daily.tday;
file 'C:/wpi/text_files/td0195.txt' linesize=400;
if (year = 1995 and month = 1 and day = 1) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
  mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1995 and month = 1) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1995 and month=1 and day=31) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0195.dbf' linesize=400;
if (year = 1995 and month = 1 and day = 1) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
  mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
  wr_315_3';
end;
if (year = 1995 and month = 1) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1995 - 02 */
set daily.tday;
file 'C:/wpi/text_files/td0295.txt' linesize=400;
if (year = 1995 and month = 2 and day = 32) then do;
  put '<pre>';

```

```

    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
    put '-----';
end;
if (year = 1995 and month = 2) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
    end;
if (year=1995 and month=2 and day=59) then do;
    put '</pre>';
    end;
file 'C:/wpi/dbf_files/td0295.dbf' linesize=400;
if (year = 1995 and month = 2 and day = 32) then do;
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
    end;
if (year = 1995 and month = 2) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
    end;
data _null_;
/* 1995 - 03 */
set daily.tday;
file 'C:/wpi/text_files/td0395.txt' linesize=400;
if (year = 1995 and month = 3 and day = 60) then do;
    put '<pre>';
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
    put '-----';
end;
if (year = 1995 and month = 3) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
    end;
if (year=1995 and month=3 and day=90) then do;
    put '</pre>';
    end;
file 'C:/wpi/dbf_files/td0395.dbf' linesize=400;
if (year = 1995 and month = 3 and day = 60) then do;
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
    end;
if (year = 1995 and month = 3) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
    end;

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data _null_;                                /* 1995 - 04 */
set daily.tday;
file 'C:/wpi/text_files/td0495.txt' linesize=400;
if (year = 1995 and month = 4 and day = 91) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1995 and month = 4) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1995 and month=4 and day=120) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0495.dbf' linesize=400;
if (year = 1995 and month = 4 and day = 91) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;
if (year = 1995 and month = 4) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;                                /* 1995 - 05 */
set daily.tday;
file 'C:/wpi/text_files/td0595.txt' linesize=400;
if (year = 1995 and month = 5 and day = 121) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1995 and month = 5) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1995 and month=5 and day=151) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0595.dbf' linesize=400;
if (year = 1995 and month = 5 and day = 121) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1995 and month = 5) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd

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7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1995 - 06 */
set daily.tday;
file 'C:/wpi/text_files/td0695.txt' linesize=400;
if (year = 1995 and month = 6 and day = 152) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1995 and month = 6) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1995 and month=6 and day=181) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0695.dbf' linesize=400;
if (year = 1995 and month = 6 and day = 152) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1995 and month = 6) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1995 - 07 */
set daily.tday;
file 'C:/wpi/text_files/td0795.txt' linesize=400;
if (year = 1995 and month = 7 and day = 182) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
put '-----';
end;
if (year = 1995 and month = 7) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1995 and month=7 and day=212) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0795.dbf' linesize=400;
if (year = 1995 and month = 7 and day = 182) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1995 and month = 7) then do;

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    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
    wr_270_3 5.3 " wr_315_3 5.3;
    end;
data _null_;
    /* 1995 - 08 */
    set daily.tday;
    file 'C:/wpi/text_files/td0895.txt' linesize=400;
    if (year = 1995 and month = 8 and day = 213) then do;
        put '<pre>';
        put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
        max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
        mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
        put '-----';
    end;
    if (year = 1995 and month = 8) then do;
        put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
        devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
        " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
        7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
        wr_270_3 5.3 " wr_315_3 5.3;
    end;
    if (year=1995 and month=8 and day=243) then do;
        put '</pre>';
    end;
    file 'C:/wpi/dbf_files/td0895.dbf' linesize=400;
    if (year = 1995 and month = 8 and day = 213) then do;
        put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws
        max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
        mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
    end;
    if (year = 1995 and month = 8) then do;
        put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
        devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
        " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
        7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
        wr_270_3 5.3 " wr_315_3 5.3;
    end;
data _null_;
    /* 1995 - 09 */
    set daily.tday;
    file 'C:/wpi/text_files/td0995.txt' linesize=400;
    if (year = 1995 and month = 9 and day = 244) then do;
        put '<pre>';
        put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws
        max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
        mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
        put '-----';
    end;
    if (year = 1995 and month = 9) then do;
        put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
        devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
        " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
        7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
        wr_270_3 5.3 " wr_315_3 5.3;
    end;
    if (year=1995 and month=9 and day=273) then do;
        put '</pre>';
    end;
    file 'C:/wpi/dbf_files/td0995.dbf' linesize=400;
    if (year = 1995 and month = 9 and day = 244) then do;
        put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws max_temp
        time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws mean_wvm
        mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
    end;
end;

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if (year = 1995 and month = 9) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
  /* 1995 - 10 */
  set daily.tday;
  file 'C:/wpi/text_files/td1095.txt' linesize=400;
  if (year = 1995 and month = 10 and day = 274) then do;
    put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
  time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
  mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
  if (year = 1995 and month = 10) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
    wr_270_3 5.3 " wr_315_3 5.3;
  end;
  if (year=1995 and month=10 and day=304) then do;
    put '</pre>';
  end;
  file 'C:/wpi/dbf_files/td1095.dbf' linesize=400;
  if (year = 1995 and month = 10 and day = 274) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
  time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
  mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  end;
  if (year = 1995 and month = 10) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
    wr_270_3 5.3 " wr_315_3 5.3;
  end;
data _null_;
  /* 1995 - 11 */
  set daily.tday;
  file 'C:/wpi/text_files/td1195.txt' linesize=400;
  if (year = 1995 and month = 11 and day = 305) then do;
    put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
  time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
  mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
  if (year = 1995 and month = 11) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
    wr_270_3 5.3 " wr_315_3 5.3;
  end;
  if (year=1995 and month=11 and day=334) then do;
    put '</pre>';
  end;
  file 'C:/wpi/dbf_files/td1195.dbf' linesize=400;
  if (year = 1995 and month = 11 and day = 305) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
  time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
  mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';

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end;
if (year = 1995 and month = 11) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1995 - 12 */
set daily.tday;
file 'C:/wpi/text_files/td1295.txt' linesize=400;
if (year = 1995 and month = 12 and day = 335) then do;
  put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1995 and month = 12) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1995 and month=12 and day=365) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td1295.dbf' linesize=400;
if (year = 1995 and month = 12 and day = 335) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  end;
if (year = 1995 and month = 12) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
  end;
/* 1996 */
data _null_;
/* All of 1996 */
set daily.tday;
file 'C:/wpi/text_files/tdall96.txt' linesize=400;
if (year = 1996 and month = 1 and day = 1) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  put '-----';
end;
if (year = 1996) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
  end;
if (year=1996 and day=366) then do;
  put '</pre>';
  end;
file 'C:/wpi/dbf_files/tdall96.dbf' linesize=400;
if (year = 1996 and month = 1 and day = 1) then do;

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    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1996) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1996 - 01 */
set daily.tday;
file 'C:/wpi/text_files/td0196.txt' linesize=400;
if (year = 1996 and month = 1 and day = 1) then do;
    put '<pre>';
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
    put '-----';
end;
if (year = 1996 and month = 1) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=1 and day=31) then do;
    put '</pre>';
end;
file 'C:/wpi/dbf_files/td0196.dbf' linesize=400;
if (year = 1996 and month = 1 and day = 1) then do;
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;
if (year = 1996 and month = 1) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1996 - 02 */
set daily.tday;
file 'C:/wpi/text_files/td0296.txt' linesize=400;
if (year = 1996 and month = 2 and day = 32) then do;
    put '<pre>';
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
    put '-----';
end;
if (year = 1996 and month = 2) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=2 and day=60) then do;
    put '</pre>';

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end;
file 'C:/wpi/dbf_files/td0296.dbf' linesize=400;
if (year = 1996 and month = 2 and day = 32) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;
if (year = 1996 and month = 2) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1996 - 03 */
set daily.tday;
file 'C:/wpi/text_files/td0396.txt' linesize=400;
if (year = 1996 and month = 3 and day = 61) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  put '-----';
end;
if (year = 1996 and month = 3) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=3 and day=91) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0396.dbf' linesize=400;
if (year = 1996 and month = 3 and day = 61) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;
if (year = 1996 and month = 3) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1996 - 04 */
set daily.tday;
file 'C:/wpi/text_files/td0496.txt' linesize=400;
if (year = 1996 and month = 4 and day = 92) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1996 and month = 4) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd

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7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=4 and day=121) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0496.dbf' linesize=400;
if (year = 1996 and month = 4 and day = 92) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;
if (year = 1996 and month = 4) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1996 - 05 */
set daily.tday;
file 'C:/wpi/text_files/td0596.txt' linesize=400;
if (year = 1996 and month = 5 and day = 122) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1996 and month = 5) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=5 and day=152) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0596.dbf' linesize=400;
if (year = 1996 and month = 5 and day = 122) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1996 and month = 5) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1996 - 06 */
set daily.tday;
file 'C:/wpi/text_files/td0696.txt' linesize=400;
if (year = 1996 and month = 6 and day = 153) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1996 and month = 6) then do;

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put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=6 and day=182) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0696.dbf' linesize=400;
if (year = 1996 and month = 6 and day = 153) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1996 and month = 6) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1996 - 07 */
set daily.tday;
file 'C:/wpi/text_files/td0796.txt' linesize=400;
if (year = 1996 and month = 7 and day = 183) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
put '-----';
end;
if (year = 1996 and month = 7) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=7 and day=213) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0796.dbf' linesize=400;
if (year = 1996 and month = 7 and day = 183) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1996 and month = 7) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1996 - 08 */
set daily.tday;
file 'C:/wpi/text_files/td0896.txt' linesize=400;
if (year = 1996 and month = 8 and day = 214) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';

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end;
if (year = 1996 and month = 8) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=8 and day=244) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0896.dbf' linesize=400;
if (year = 1996 and month = 8 and day = 214) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
  mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1996 and month = 8) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1996 - 09 */
set daily.tday;
file 'C:/wpi/text_files/td0996.txt' linesize=400;
if (year = 1996 and month = 9 and day = 245) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
  mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1996 and month = 9) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=9 and day=274) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0996.dbf' linesize=400;
if (year = 1996 and month = 9 and day = 245) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws max_temp
  time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws mean_wvm
  mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1996 and month = 9) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1996 - 10 */
set daily.tday;
file 'C:/wpi/text_files/td1096.txt' linesize=400;
if (year = 1996 and month = 10 and day = 275) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws max_temp
  time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws mean_wvm
  mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;

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    put '-----';
end;
if (year = 1996 and month = 10) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
    wr_270_3 5.3 " wr_315_3 5.3;
    end;
if (year=1996 and month=10 and day=305) then do;
    put '</pre>';
    end;
file 'C:/wpi/dbf_files/td1096.dbf' linesize=400;
if (year = 1996 and month = 10 and day = 275) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
    end;
if (year = 1996 and month = 10) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
    wr_270_3 5.3 " wr_315_3 5.3;
    end;
data _null_;
/* 1996 - 11 */
set daily.tday;
file 'C:/wpi/text_files/td1196.txt' linesize=400;
if (year = 1996 and month = 11 and day = 306) then do;
    put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
    put '-----';
end;
if (year = 1996 and month = 11) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
    wr_270_3 5.3 " wr_315_3 5.3;
    end;
if (year=1996 and month=11 and day=335) then do;
    put '</pre>';
    end;
file 'C:/wpi/dbf_files/td1196.dbf' linesize=400;
if (year = 1996 and month = 11 and day = 306) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
    end;
if (year = 1996 and month = 11) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
    wr_270_3 5.3 " wr_315_3 5.3;
    end;
data _null_;
/* 1996 - 12 */
set daily.tday;
file 'C:/wpi/text_files/td1296.txt' linesize=400;
if (year = 1996 and month = 12 and day = 336) then do;
    put '<pre>';

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put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1996 and month = 12) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1996 and month=12 and day=366) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td1296.dbf' linesize=400;
if (year = 1996 and month = 12 and day = 336) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1996 and month = 12) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
/* 1997 */
data _null_; /* All of 1997 */
set daily.tday;
file 'C:/wpi/text_files/tdall97.txt' linesize=400;
if (year = 1997 and month = 1 and day = 1) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
put '-----';
end;
if (year = 1997) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and day=365) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/tdall97.dbf' linesize=400;
if (year = 1997 and month = 1 and day = 1) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1997) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1997 - 01 */
set daily.tday;

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file 'C:/wpi/text_files/td0197.txt' linesize=400;
if (year = 1997 and month = 1 and day = 1) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1997 and month = 1) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=1 and day=31) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0197.dbf' linesize=400;
if (year = 1997 and month = 1 and day = 1) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;
if (year = 1997 and month = 1) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1997 - 02 */
set daily.tday;
file 'C:/wpi/text_files/td0297.txt' linesize=400;
if (year = 1997 and month = 2 and day = 32) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  put '-----';
end;
if (year = 1997 and month = 2) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=2 and day=59) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0297.dbf' linesize=400;
if (year = 1997 and month = 2 and day = 32) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;
if (year = 1997 and month = 2) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd

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7.3 " sdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1997 - 03 */
set daily.tday;
file 'C:/wpi/text_files/td0397.txt' linesize=400;
if (year = 1997 and month = 3 and day = 60) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd sdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  put '-----';
end;
if (year = 1997 and month = 3) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=3 and day=90) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0397.dbf' linesize=400;
if (year = 1997 and month = 3 and day = 60) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd sdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;
if (year = 1997 and month = 3) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1997 - 04 */
set daily.tday;
file 'C:/wpi/text_files/td0497.txt' linesize=400;
if (year = 1997 and month = 4 and day = 91) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd sdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1997 and month = 4) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=4 and day=120) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0497.dbf' linesize=400;
if (year = 1997 and month = 4 and day = 91) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd sdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
end;
end;

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if (year = 1997 and month = 4) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1997 - 05 */
set daily.tday;
file 'C:/wpi/text_files/td0597.txt' linesize=400;
if (year = 1997 and month = 5 and day = 121) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 "wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1997 and month = 5) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=5 and day=151) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0597.dbf' linesize=400;
if (year = 1997 and month = 5 and day = 121) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1997 and month = 5) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1997 - 06 */
set daily.tday;
file 'C:/wpi/text_files/td0697.txt' linesize=400;
if (year = 1997 and month = 6 and day = 152) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1997 and month = 6) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=6 and day=181) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0697.dbf' linesize=400;
if (year = 1997 and month = 6 and day = 152) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;

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end;
if (year = 1997 and month = 6) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1997 - 07 */
set daily.tday;
file 'C:/wpi/text_files/td0797.txt' linesize=400;
if (year = 1997 and month = 7 and day = 182) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  put '-----';
end;
if (year = 1997 and month = 7) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=7 and day=212) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0797.dbf' linesize=400;
if (year = 1997 and month = 7 and day = 182) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1997 and month = 7) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1997 - 08 */
set daily.tday;
file 'C:/wpi/text_files/td0897.txt' linesize=400;
if (year = 1997 and month = 8 and day = 213) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1997 and month = 8) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=8 and day=243) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0897.dbf' linesize=400;
if (year = 1997 and month = 8 and day = 213) then do;

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    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1997 and month = 8) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1997 - 09 */
set daily.tday;
file 'C:/wpi/text_files/td0997.txt' linesize=400;
if (year = 1997 and month = 9 and day = 244) then do;
    put '<pre>';
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
    put '-----';
end;
if (year = 1997 and month = 9) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=9 and day=273) then do;
    put '</pre>';
end;
file 'C:/wpi/dbf_files/td0997.dbf' linesize=400;
if (year = 1997 and month = 9 and day = 244) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1997 and month = 9) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1997 - 10 */
set daily.tday;
file 'C:/wpi/text_files/td1097.txt' linesize=400;
if (year = 1997 and month = 10 and day = 274) then do;
    put '<pre>';
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
    put '-----';
end;
if (year = 1997 and month = 10) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=10 and day=304) then do;
    put '</pre>';
end;
file 'C:/wpi/dbf_files/td1097.dbf' linesize=400;

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if (year = 1997 and month = 10 and day = 274) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1997 and month = 10) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1997 - 11 */
set daily.tday;
file 'C:/wpi/text_files/td1197.txt' linesize=400;
if (year = 1997 and month = 11 and day = 305) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1997 and month = 11) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=11 and day=334) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td1197.dbf' linesize=400;
if (year = 1997 and month = 11 and day = 305) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1997 and month = 11) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1997 - 12 */
set daily.tday;
file 'C:/wpi/text_files/td1297.txt' linesize=400;
if (year = 1997 and month = 12 and day = 335) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1997 and month = 12) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1997 and month=12 and day=365) then do;
put '</pre>';
end;

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file 'C:/wpi/dbf_files/td1297.dbf' linesize=400;
if (year = 1997 and month = 12 and day = 335) then do;
put year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1997 and month = 12) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
/* 1998 */
data _null_; /* All of 1998 */
set daily.tday;
file 'C:/wpi/text_files/tdall98.txt' linesize=400;
if (year = 1998 and month = 1 and day = 1) then do;
put '<pre>';
put year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
put '-----';
end;
if (year = 1998) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1998 and day=365) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/tdall98.dbf' linesize=400;
if (year = 1998 and month = 1 and day = 1) then do;
put year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1998) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1998 - 01 */
set daily.tday;
file 'C:/wpi/text_files/td0198.txt' linesize=400;
if (year = 1998 and month = 1 and day = 1) then do;
put '<pre>';
put year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1998 and month = 1) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;

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if (year=1998 and month=1 and day=31) then do;
  put '</pre>';
  end;
file 'C:/wpi/dbf_files/td0198.dbf' linesize=400;
if (year = 1998 and month = 1 and day = 1) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  end;
  if (year = 1998 and month = 1) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
  end;
data _null_;          /* 1998 - 02 */
set daily.tday;
file 'C:/wpi/text_files/td0298.txt' linesize=400;
if (year = 1998 and month = 2 and day = 32) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  put '-----';
end;
  if (year = 1998 and month = 2) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
  end;
  if (year=1998 and month=2 and day=59) then do;
    put '</pre>';
  end;
file 'C:/wpi/dbf_files/td0298.dbf' linesize=400;
if (year = 1998 and month = 2 and day = 32) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  end;
  if (year = 1998 and month = 2) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
  end;
data _null_;          /* 1998 - 03 */
set daily.tday;
file 'C:/wpi/text_files/td0398.txt' linesize=400;
if (year = 1998 and month = 3 and day = 60) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  put '-----';
end;
  if (year = 1998 and month = 3) then do;

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    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
    wr_270_3 5.3 " wr_315_3 5.3;
    end;
    if (year=1998 and month=3 and day=90) then do;
        put '</pre>';
        end;
        file 'C:/wpi/dbf_files/td0398.dbf' linesize=400;
        if (year = 1998 and month = 3 and day = 60) then do;
            put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
            max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
            mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
            wr_315_3';
            end;
            if (year = 1998 and month = 3) then do;
                put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
                devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
                " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
                7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
                wr_270_3 5.3 " wr_315_3 5.3;
                end;
                data _null_;
                /* 1998 - 04 */
                set daily.tday;
                file 'C:/wpi/text_files/td0498.txt' linesize=400;
                if (year = 1998 and month = 4 and day = 91) then do;
                    put '<pre>';
                    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
                    max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
                    mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
                    put '-----';
                    end;
                    if (year = 1998 and month = 4) then do;
                        put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
                        devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3 "
                        time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
                        7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
                        wr_270_3 5.3 " wr_315_3 5.3;
                        end;
                        if (year=1998 and month=4 and day=120) then do;
                            put '</pre>';
                            end;
                            file 'C:/wpi/dbf_files/td0498.dbf' linesize=400;
                            if (year = 1998 and month = 4 and day = 91) then do;
                                put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
                                max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
                                mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
                                wr_315_3';
                                end;
                                if (year = 1998 and month = 4) then do;
                                    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
                                    devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
                                    " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
                                    7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
                                    wr_270_3 5.3 " wr_315_3 5.3;
                                    end;
                                    data _null_;
                                    /* 1998 - 05 */
                                    set daily.tday;
                                    file 'C:/wpi/text_files/td0598.txt' linesize=400;
                                    if (year = 1998 and month = 5 and day = 121) then do;
                                        put '<pre>';
                                        put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
                                        max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
                                        mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';

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put '-----';
end;
if (year = 1998 and month = 5) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1998 and month=5 and day=151) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0598.dbf' linesize=400;
if (year = 1998 and month = 5 and day = 121) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
  mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1998 and month = 5) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1998 - 06 */
set daily.tday;
file 'C:/wpi/text_files/td0698.txt' linesize=400;
if (year = 1998 and month = 6 and day = 152) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
  mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
if (year = 1998 and month = 6) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1998 and month=6 and day=181) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/td0698.dbf' linesize=400;
if (year = 1998 and month = 6 and day = 152) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
  mean_wvm mean_wvd swwdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1998 and month = 6) then do;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
  devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
  " time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
  7.3 " swwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
  wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1998 - 07 */
set daily.tday;
file 'C:/wpi/text_files/td0798.txt' linesize=400;
if (year = 1998 and month = 7 and day = 182) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
  max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws

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mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3
wr_315_3';
  put '-----';
end;
  if (year = 1998 and month = 7) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
  end;
  if (year=1998 and month=7 and day=212) then do;
    put '</pre>';
  end;
  file 'C:/wpi/dbf_files/td0798.dbf' linesize=400;
  if (year = 1998 and month = 7 and day = 182) then do;
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  end;
  if (year = 1998 and month = 7) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
  end;
data _null_;          /* 1998 - 08 */
set daily.tday;
file 'C:/wpi/text_files/td0898.txt' linesize=400;
if (year = 1998 and month = 8 and day = 213) then do;
  put '<pre>';
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  put '-----';
end;
  if (year = 1998 and month = 8) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
  end;
  if (year=1998 and month=8 and day=243) then do;
    put '</pre>';
  end;
  file 'C:/wpi/dbf_files/td0898.dbf' linesize=400;
  if (year = 1998 and month = 8 and day = 213) then do;
    put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
  end;
  if (year = 1998 and month = 8) then do;
    put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
  end;
data _null_;          /* 1998 - 09 */
set daily.tday;
file 'C:/wpi/text_files/td0998.txt' linesize=400;
if (year = 1998 and month = 9 and day = 244) then do;
  put '<pre>';

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put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1998 and month = 9) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1998 and month=9 and day=273) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td0998.dbf' linesize=400;
if (year = 1998 and month = 9 and day = 244) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1998 and month = 9) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1998 - 10 */
set daily.tday;
file 'C:/wpi/text_files/td1098.txt' linesize=400;
if (year = 1998 and month = 10 and day = 274) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1998 and month = 10) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year=1998 and month=10 and day=304) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td1098.dbf' linesize=400;
if (year = 1998 and month = 10 and day = 274) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind " time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh " time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3';
end;
if (year = 1998 and month = 10) then do;
put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " sdwdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_; /* 1998 - 11 */
set daily.tday;
file 'C:/wpi/text_files/td1198.txt' linesize=400;
if (year = 1998 and month = 11 and day = 305) then do;

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```

put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind`time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh`time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2`wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1998 and month = 11) then do;
put year 4.0 `month 2.0 `day 3.0 `precip 7.3 `total_ra 9.3 `total_pp 9.3 `globalra 8.3 `refsrad 7.3 `stdglora 8.3 `
devrefsr 7.3 `max_wind 6.3 `time_mws 4.0 `max_temp 6.2 `time_mt 4.0 `max_rh 5.1 `time_mrh 4.0 `min_wind 6.3
`time_miw 4.0 `min_temp 6.2 `time_mit 4.0 `min_rh 5.1 `time_mir 4.0 `mean_ws 6.3 `mean_wvm 5.3 `mean_wvd
7.3 `swdir 6.3 `wr_0_45 5.3 `wr_45_90 5.3 `wr_90_13 5.3 `wr_135_1 5.3 `wr_180_2 5.3 `wr_225_2 5.3 `
wr_270_3 5.3 `wr_315_3 5.3;
end;
if (year=1998 and month=11 and day=334) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td1198.dbf' linesize=400;
if (year = 1998 and month = 11 and day = 305) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind`time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh`time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2`wr_270_3 wr_315_3';
end;
if (year = 1998 and month = 11) then do;
put year 4.0 `month 2.0 `day 3.0 `precip 7.3 `total_ra 9.3 `total_pp 9.3 `globalra 8.3 `refsrad 7.3 `stdglora 8.3 `
devrefsr 7.3 `max_wind 6.3 `time_mws 4.0 `max_temp 6.2 `time_mt 4.0 `max_rh 5.1 `time_mrh 4.0 `min_wind 6.3
`time_miw 4.0 `min_temp 6.2 `time_mit 4.0 `min_rh 5.1 `time_mir 4.0 `mean_ws 6.3 `mean_wvm 5.3 `mean_wvd
7.3 `swdir 6.3 `wr_0_45 5.3 `wr_45_90 5.3 `wr_90_13 5.3 `wr_135_1 5.3 `wr_180_2 5.3 `wr_225_2 5.3 `
wr_270_3 5.3 `wr_315_3 5.3;
end;
data _null_; /* 1998 - 12 */
set daily.tday;
file 'C:/wpi/text_files/td1298.txt' linesize=400;
if (year = 1998 and month = 12 and day = 335) then do;
put '<pre>';
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind`time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh`time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2`wr_270_3 wr_315_3';
put '-----';
end;
if (year = 1998 and month = 12) then do;
put year 4.0 `month 2.0 `day 3.0 `precip 7.3 `total_ra 9.3 `total_pp 9.3 `globalra 8.3 `refsrad 7.3`stdglora 8.3 `
devrefsr 7.3 `max_wind 6.3 `time_mws 4.0 `max_temp 6.2 `time_mt 4.0 `max_rh 5.1 `time_mrh 4.0 `min_wind 6.3
`time_miw 4.0 `min_temp 6.2 `time_mit 4.0 `min_rh 5.1 `time_mir 4.0 `mean_ws 6.3 `mean_wvm 5.3 `mean_wvd
7.3 `swdir 6.3 `wr_0_45 5.3 `wr_45_90 5.3 `wr_90_13 5.3 `wr_135_1 5.3 `wr_180_2 5.3 `wr_225_2 5.3 `
wr_270_3 5.3 `wr_315_3 5.3;
end;
if (year=1998 and month=12 and day=365) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/td1298.dbf' linesize=400;
if (year = 1998 and month = 12 and day = 335) then do;
put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind`time_mws max_temp
time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh`time_mir mean_ws mean_wvm
mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2`wr_270_3 wr_315_3';
end;
if (year = 1998 and month = 12) then do;
put year 4.0 `month 2.0 `day 3.0 `precip 7.3 `total_ra 9.3 `total_pp 9.3 `globalra 8.3 `refsrad 7.3 `stdglora 8.3 `
devrefsr 7.3 `max_wind 6.3 `time_mws 4.0 `max_temp 6.2 `time_mt 4.0 `max_rh 5.1 `time_mrh 4.0 `min_wind 6.3
`time_miw 4.0 `min_temp 6.2 `time_mit 4.0 `min_rh 5.1 `time_mir 4.0 `mean_ws 6.3 `mean_wvm 5.3 `mean_wvd
7.3 `swdir 6.3 `wr_0_45 5.3 `wr_45_90 5.3 `wr_90_13 5.3 `wr_135_1 5.3 `wr_180_2 5.3 `wr_225_2 5.3 `
wr_270_3 5.3 `wr_315_3 5.3;
end;
/* Produce dbf file of complete database .. */
data _null_;
set daily.tday;

```

```

file 'C:/wpi/dbf_files/tdmet.dbf' linesize = 360;
if (year = 1993 and day = 1) then do;
  put 'year month day precip total_ra total_pp globalra refsrad stdglora devrefsr max_wind" time_mws
max_temp time_mt max_rh time_mrh min_wind time_miw min_temp time_mit min_rh" time_mir mean_ws
mean_wvm mean_wvd swdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2" wr_270_3 wr_315_3';
end;
  put year 4.0 " month 2.0 " day 3.0 " precip 7.3 " total_ra 9.3 " total_pp 9.3 " globalra 8.3 " refsrad 7.3 " stdglora 8.3 "
devrefsr 7.3 " max_wind 6.3 " time_mws 4.0 " max_temp 6.2 " time_mt 4.0 " max_rh 5.1 " time_mrh 4.0 " min_wind 6.3
" time_miw 4.0 " min_temp 6.2 " time_mit 4.0 " min_rh 5.1 " time_mir 4.0 " mean_ws 6.3 " mean_wvm 5.3 " mean_wvd
7.3 " swdir 6.3 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
run;

```

## Tower Hourly

```

/* Tower - Hourly 4/19 .. */
data daily.th;
  set daily.thmet;
/* Variable Ranges */
if (year > 1998 or year < 1993) and year ne '.' THEN DO;
  PUT year = ' IS OUT OF RANGE ' day year;
  year = '.';
END;
if (day > 366 or day < 1) and day ne '.' THEN DO;
  PUT day = ' IS OUT OF RANGE ON ' day year;
  day = '.';
END;
if (hour > 2300 or hour < 0 or mod(hour,100) ^= 0) and hour ne '.' THEN DO;
  PUT hour = ' IS OUT OF RANGE ON ' day year;
  hour='.';
END;
if (precip > 600 or precip < 0) and precip ne '.' THEN DO;
  PUT precip = ' IS OUT OF RANGE ON ' day year;
  precip = '.';
END;
if (hour>600 and hour<1800) and TOTAL_RA<5000 THEN DO;
  TOTAL_RA=TOTAL_RA*10;
END;
if (hour>600 and hour<1800) and (TOTAL_RA>30000 or TOTAL_RA < 500) and TOTAL_RA ne '.' THEN DO;
  PUT TOTAL_RA = ' IS OUT OF RANGE ON ' day year;
  TOTAL_RA = '.';
END;
if (hour<=600 or hour>=1800) and (TOTAL_RA>500 or TOTAL_RA<0) and TOTAL_RA ne '.' THEN DO;
  PUT TOTAL_RA = ' IS OUT OF RANGE ON ' day year;
  TOTAL_RA='.';
END;
if (hour>600 and hour<1800) and TOTAL_PP<10000 THEN DO;
  TOTAL_PP=TOTAL_PP*10;
END;
if (hour>600 and hour<1800) and (TOTAL_PP > 60000 or TOTAL_PP < 10) and TOTAL_PP ne '.' THEN DO;
  PUT TOTAL_PP = ' IS OUT OF RANGE ON ' day year;
  TOTAL_PP = '.';
END;
if (hour<=600 or hour>=1800) and (TOTAL_PP > 10 or TOTAL_PP < 0) and TOTAL_PP ne '.' THEN DO;
  PUT TOTAL_PP = ' IS OUT OF RANGE ON ' day year;
  TOTAL_PP = '.';
END;
If (INSTAN_R > 5000.0 OR INSTAN_R < 0) and INSTAN_R ne '.' THEN DO;
  PUT INSTAN_R='IS OUT OF RANGE ON ' day year;
  INSTAN_R= '.';
END;
If (INST_PPF > 50.0 OR INST_PPF < 0) and INST_PPF ne '.' THEN DO;
  PUT INST_PPF='IS OUT OF RANGE ON ' day year;
  INST_PPF= '.';
END;

```

```

if (INST_tem > 40.0 OR INST_tem <10) and INST_tem ne '.' THEN DO;
  PUT INST_tem='IS OUT OF RANGE ON ' day year;
  INST_tem= '.';
  END;
if (INST_rh > 105.0 OR INST_rh < 0) and INST_rh ne '.' THEN DO;
  PUT INST_rh='IS OUT OF RANGE ON ' day year;
  INST_rh= '.';
  END;
if INST_rh > 100.0 THEN DO;
  INST_rh = 100.0;
  END;
If (AVER_RAD > 5000.0 OR AVER_RAD < 0) and AVER_RAD ne '.' THEN DO;
  PUT AVER_RAD='IS OUT OF RANGE ON ' day year;
  AVER_RAD= '.';
  END;
if AVER_RAD='.' THEN DO;
  SD_RAD='.';
  END;
if (AVER_PPF > 50.0 OR AVER_PPF < 0) and AVER_PPF ne '.' THEN DO;
  PUT AVER_PPF='IS OUT OF RANGE ON ' day year;
  AVER_PPF= '.';
  END;
if AVER_PPF='.' THEN DO;
  SD_PPF='.';
  END;
if (AVER_tem > 40.0 OR AVER_tem <10) and AVER_tem ne '.' THEN DO;
  PUT AVER_tem='IS OUT OF RANGE ON ' day year;
  AVER_tem= '.';
  END;
if AVER_TEM='.' THEN DO;
  SD_TEMP='.';
  END;
if (AVER_rh > 105.0 OR AVER_rh < 0) and AVER_rh ne '.' THEN DO;
  PUT AVER_rh='IS OUT OF RANGE ON ' day year;
  AVER_rh= '.';
  END;
if AVER_rh > 100.0 THEN DO;
  AVER_rh = 100.0;
  END;
if AVER_RH='.' THEN DO;
  SD_RH='.';
  END;
if (GLOBALRA > 400.0 OR GLOBALRA <0) and GLOBALRA ne '.' THEN DO;
  PUT GLOBALRA='IS OUT OF RANGE ON ' day year;
  GLOBALRA= '.';
  END;
If year<1997 THEN DO;
  GLOBALRA='.';
  END;
If (year=1997 and day<162) THEN DO;
  GLOBALRA='.';
  END;
if (REFSRAD > 100.0 OR REFSRAD <0) and REFSRAD ne '.' THEN DO;
  PUT REFSRAD='IS OUT OF RANGE ON ' day year;
  REFSRAD= '.';
  END;
If year<1997 THEN DO;
  REFSRAD='.';
  END;
If (year=1997 and day<162) THEN DO;
  REFSRAD='.';
  END;
if (SD_RAD > 1.2474 OR SD_RAD <0) and SD_RAD ne '.' THEN DO;
  PUT SD_RAD='IS OUT OF RANGE ON ' day year;
  SD_RAD= '.';

```

```

END;
if (SD_PPFDF > 1.113 OR SD_PPFDF <0) and SD_PPFDF ne '' THEN DO;
  PUT SD_PPFDF='IS OUT OF RANGE ON ' day year;
  SD_PPFDF= '';
END;
if (SD_temp > 5.9448 OR SD_temp <0) and SD_temp ne '' THEN DO;
  PUT SD_temp='IS OUT OF RANGE ON ' day year;
  SD_temp= '';
END;
if (SD_rh > 4.1055 OR SD_rh < 0) and SD_rh ne '' THEN DO;
  PUT SD_rh='IS OUT OF RANGE ON ' day year;
  SD_rh= '';
END;
if (SDGLOBRA > 400 OR SDGLOBRA <0) and SDGLOBRA ne '' THEN DO;
  PUT SDGLOBRA='IS OUT OF RANGE ON ' day year;
  SDGLOBRA= '';
END;
If year<1997 THEN DO;
  SDGLOBRA='';
END;
If (year=1997 and day<162) THEN DO;
  SDGLOBRA='';
END;
if (DEVREFSR > 100 OR DEVREFSR < 0) and DEVREFSR ne '' THEN DO;
  PUT DEVREFSR='IS OUT OF RANGE ON ' day year;
  DEVREFSR= '';
END;
If year<1997 THEN DO;
  DEVREFSR='';
END;
If (year=1997 and day<162) THEN DO;
  DEVREFSR='';
END;
if (MEAN_WS > 50.0 OR MEAN_WS < 0.4) and MEAN_WS ne '' THEN DO;
  PUT MEAN_WS='IS OUT OF RANGE ON ' day year;
  MEAN_WS= '';
END;
if (MEAN_WVM > 360.0 OR MEAN_WVM < 0) and MEAN_WVM ne '' THEN DO;
  PUT MEAN_WVM='IS OUT OF RANGE ON ' day year;
  MEAN_WVM= '';
END;
if (MEAN_WVD > 360.0 OR MEAN_WVD < 0) and MEAN_WVD ne '' THEN DO;
  PUT MEAN_WVD='IS OUT OF RANGE ON ' day year;
  MEAN_WVD= '';
END;
if (SD_WDIR > 100.0 OR SD_WDIR < 0) and SD_WDIR ne '' THEN DO;
  PUT SD_WDIR='IS OUT OF RANGE ON ' day year;
  SD_WDIR= '';
END;
if (WR_0_45>10.0 or WR_0_45<0) and WR_0_45 ne '' THEN DO;
  PUT WR_0_45=' IS OUT OF RANGE ON ' day year;
  WR_0_45= '';
END;
if (WR_45_90>10.0 or WR_45_90<0) and WR_45_90 ne '' THEN DO;
  PUT WR_45_90=' IS OUT OF RANGE ON ' day year;
  WR_45_90= '';
END;
if (WR_90_13>10.0 or WR_90_13<0) and WR_90_13 ne '' THEN DO;
  PUT WR_90_13=' IS OUT OF RANGE ON ' day year;
  WR_90_13= '';
END;
if (WR_135_1>10.0 or WR_135_1<0) and WR_135_1 ne '' THEN DO;
  PUT WR_135_1=' IS OUT OF RANGE ON ' day year;
  WR_135_1= '';
END;

```

```

if (WR_180_2>10.0 or WR_180_2<0) and WR_180_2 ne '.' THEN DO;
  PUT WR_180_2=' IS OUT OF RANGE ON ' day year;
  WR_180_2= '.';
END;
if (WR_225_2>10.0 or WR_225_2<0) and WR_225_2 ne '.' THEN DO;
  PUT WR_225_2=' IS OUT OF RANGE ON ' day year;
  WR_225_2= '.';
END;
if (WR_270_3>10.0 or WR_270_3<0) and WR_270_3 ne '.' THEN DO;
  PUT WR_270_3=' IS OUT OF RANGE ON ' day year;
  WR_270_3= '.';
END;
if (WR_315_3>10.0 or WR_315_3<0) and WR_315_3 ne '.' THEN DO;
  PUT WR_315_3=' IS OUT OF RANGE ON ' day year;
  WR_315_3= '.';
END;
/* Sort and add missing days */
proc sort;
  by year day hour;
proc sort data=daily.full1;
  by year day;
data daily.th1;
  merge daily.full1 daily.th;
  by year day;
/* Create Month Column */
if (day > 0 and day <= 31) THEN DO;
  PUT day = ' IS IN January' year;
  month = 1;
END;
if (year ^= 1996) THEN DO;
  if (day > 31 and day <= 59) THEN DO;
    PUT day = ' IS IN February' year;
    month = 2;
  END;
  if (day > 59 and day <= 90) THEN DO;
    PUT day = ' IS IN March' year;
    month = 3;
  END;
  if (day > 90 and day <= 120) THEN DO;
    PUT day = ' IS IN April' year;
    month = 4;
  END;
  if (day > 120 and day <= 151) THEN DO;
    PUT day = ' IS IN May' year;
    month = 5;
  END;
  if (day > 151 and day <= 181) THEN DO;
    PUT day = ' IS IN June' year;
    month = 6;
  END;
  if (day > 181 and day <= 212) THEN DO;
    PUT day = ' IS IN July' year;
    month = 7;
  END;
  if (day > 212 and day <= 243) THEN DO;
    PUT day = ' IS IN August' year;
    month = 8;
  END;
  if (day > 243 and day <= 273) THEN DO;
    PUT day = ' IS IN September' year;
    month = 9;
  END;
  if (day > 273 and day <= 304) THEN DO;
    PUT day = ' IS IN October' year;
    month = 10;

```



```

END;
if (day > 304 and day <= 334) THEN DO;
  PUT day = ' IS IN November' year;
  month = 11;
END;
if (day > 334 and day <= 365) THEN DO;
  PUT day = ' IS IN December' year;
  month = 12;
END;
END;
if (year = 1996) THEN DO;
  if (day > 31 and day <= 60) THEN DO;
    PUT day = ' IS IN February' year;
    month = 2;
  END;
  if (day > 60 and day <= 91) THEN DO;
    PUT day = ' IS IN March' year;
    month = 3;
  END;
  if (day > 91 and day <= 121) THEN DO;
    PUT day = ' IS IN April' year;
    month = 4;
  END;
  if (day > 121 and day <= 152) THEN DO;
    PUT day = ' IS IN May' year;
    month = 5;
  END;
  if (day > 152 and day <= 182) THEN DO;
    PUT day = ' IS IN June' year;
    month = 6;
  END;
  if (day > 182 and day <= 213) THEN DO;
    PUT day = ' IS IN July' year;
    month = 7;
  END;
  if (day > 213 and day <= 244) THEN DO;
    PUT day = ' IS IN August' year;
    month = 8;
  END;
  if (day > 244 and day <= 274) THEN DO;
    PUT day = ' IS IN September' year;
    month = 9;
  END;
  if (day > 274 and day <= 305) THEN DO;
    PUT day = ' IS IN October' year;
    month = 10;
  END;
  if (day > 305 and day <= 335) THEN DO;
    PUT day = ' IS IN November' year;
    month = 11;
  END;
  if (day > 335 and day <= 366) THEN DO;
    PUT day = ' IS IN December' year;
    month = 12;
  END;
END;
data daily.th2;
  set daily.th1;
  /* Check for . */
  if (year = '.' or day = '.') then do;
    put day 'of ' month ' of ' Year ' IS INCOMPLETE -- deleted ';
    delete;
  end;
  /* Check for doubles */
  if (hour = lag1(hour) and hour ^= '.') then do;

```

```

put 'Day ' day ' in Year ' year ' has a double .. deleted ';
delete;
END;
data daily.th2;
merge daily.th2 daily.obs;
if (year = '.') then do;
delete;
end;
run;

```

## Division of Tower Hourly

```

/* Program to produce yearly dbf files and text files */
/* Hourly Data Sets */
/* Tower Station Data */
data _null_;          /* 1993 */
set daily.th2;
file 'C:/wpi/text_files/th93.txt' linesize = 470;
if (year = 1993 and day = 1) then do;
put '<pre>';
put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh globalra refsrad sd_rad sd_ppfd sd_temp sd_rh sdglobra devrefsr " mean_ws mean_wvm
mean_wvd sd_wdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
put '-----';
end;
if (year = 1993) then do;
put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " globalra 7.3 " refsrad 7.3 " sd_rad
5.3 " sd_ppfd 5.3 " sd_temp 5.3 " sd_rh 5.3 " sdglobra 7.3 " devrefsr 7.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd
7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year = 1993 and day = 365 and hour = 2300) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/th93.dbf' linesize = 470;
if (year = 1993 and day = 1 and hour = 0) then do;
put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh globalra refsrad sd_rad sd_ppfd sd_temp sd_rh sdglobra devrefsr " mean_ws mean_wvm
mean_wvd sd_wdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
end;
if (year = 1993) then do;
put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " globalra 7.3 " refsrad 7.3 " sd_rad
5.3 " sd_ppfd 5.3 " sd_temp 5.3 " sd_rh 5.3 " sdglobra 7.3 " devrefsr 7.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd
7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;          /* 1994 */
set daily.th2;
file 'C:/wpi/text_files/th94.txt' linesize = 470;
if (year = 1994 and day = 1 and hour = 0) then do;
put '<pre>';
put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh globalra refsrad sd_rad sd_ppfd sd_temp sd_rh sdglobra devrefsr " mean_ws mean_wvm
mean_wvd sd_wdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
put '-----';
end;
if (year = 1994) then do;
put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " globalra 7.3 " refsrad 7.3 " sd_rad
5.3 " sd_ppfd 5.3 " sd_temp 5.3 " sd_rh 5.3 " sdglobra 7.3 " devrefsr 7.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd
7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;

```

```

if (year = 1994 and day = 365 and hour = 2300) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/th94.dbf' linesize = 470;
if (year = 1994 and day = 1 and hour = 0) then do;
put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh globalra refsrad sd_rad sd_ppfd sd_temp sd_rh sdglobra devrefsr " mean_ws mean_wvm
mean_wvd sd_wdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
end;
if (year = 1994) then do;
  put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " globalra 7.3 " refsrad 7.3 " sd_rad
5.3 " sd_ppfd 5.3 " sd_temp 5.3 " sd_rh 5.3 " sdglobra 7.3 " devrefsr 7.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd
7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1995 */
set daily.th2;
file 'C:/wpi/text_files/th95.txt' linesize = 470;
if (year = 1995 and day = 1 and hour = 0) then do;
  put '<pre>';
  put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh globalra refsrad sd_rad sd_ppfd sd_temp sd_rh sdglobra devrefsr " mean_ws mean_wvm
mean_wvd sd_wdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 ' 'wr_270_3 wr_315_3 ' ;
  put '-----';
end;
if (year = 1995) then do;
  put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " globalra 7.3 " refsrad 7.3 " sd_rad
5.3 " sd_ppfd 5.3 " sd_temp 5.3 " sd_rh 5.3 " sdglobra 7.3 " devrefsr 7.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd
7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year = 1995 and day = 365 and hour = 2300) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/th95.dbf' linesize = 470;
if (year = 1995 and day = 1 and hour = 0) then do;
put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh globalra refsrad sd_rad sd_ppfd sd_temp sd_rh sdglobra devrefsr " mean_ws mean_wvm
mean_wvd sd_wdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
end;
if (year = 1995) then do;
  put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " globalra 7.3 " refsrad 7.3 " sd_rad
5.3 " sd_ppfd 5.3 " sd_temp 5.3 " sd_rh 5.3 " sdglobra 7.3 " devrefsr 7.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd
7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_;
/* 1996 */
set daily.th2;
file 'C:/wpi/text_files/th96.txt' linesize = 470;
if (year = 1996 and day = 1 and hour = 0) then do;
  put '<pre>';
  put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh globalra refsrad sd_rad sd_ppfd sd_temp sd_rh sdglobra devrefsr " mean_ws mean_wvm
mean_wvd sd_wdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
  put '-----';
end;
if (year = 1996) then do;
  put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " globalra 7.3 " refsrad 7.3 " sd_rad
5.3 " sd_ppfd 5.3 " sd_temp 5.3 " sd_rh 5.3 " sdglobra 7.3 " devrefsr 7.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd
7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;

```



```

7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year = 1998 and day = 365) then do;
put '</pre>';
end;
file 'C:/wpi/dbf_files/th98.dbf' linesize = 470;
if (year = 1998 and day = 1 and hour = 0) then do;
put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh globalra refsrad sd_rad sd_ppfd sd_temp sd_rh sdglobra devrefsr " mean_ws mean_wvm
mean_wvd sd_wdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
end;
if (year = 1998) then do;
put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " globalra 7.3 " refsrad 7.3 " sd_rad
5.3 " sd_ppfd 5.3 " sd_temp 5.3 " sd_rh 5.3 " sdglobra 7.3 " devrefsr 7.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd
7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
end;
/* Produce dbf file for complete data set .. */
data _null_;
set daily.th2;
file 'C:/wpi/dbf_files/thmet.dbf' linesize = 470;
if (year = 1993 and day = 1) then do;
put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh globalra refsrad sd_rad sd_ppfd sd_temp sd_rh sdglobra devrefsr " mean_ws mean_wvm
mean_wvd sd_wdir wr_0_45 wr_45_90 wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
end;
put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " globalra 7.3 " refsrad 7.3 " sd_rad
5.3 " sd_ppfd 5.3 " sd_temp 5.3 " sd_rh 5.3 " sdglobra 7.3 " devrefsr 7.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd
7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 " wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 "
wr_270_3 5.3 " wr_315_3 5.3;
run;

```

## Ground Daily

```

/* Ground - Daily 4/20 .. */
data daily.gday0;
set daily.gdmet;
if (year > 1998 or year < 1993) and year ne '' THEN DO;
PUT year = ' IS OUT OF RANGE ' day year;
year = '';
END;
if (day > 366 or day < 1) and day ne '' THEN DO;
PUT day = ' IS OUT OF RANGE ON ' day year;
day = '';
END;
/* Variable Ranges */
if (precip > 600 or precip < 0) and precip ne '' THEN DO;
PUT precip = ' IS OUT OF RANGE ON ' day year;
precip = '';
END;
if TOTAL_RA < 5000 THEN DO;
TOTAL_RA=TOTAL_RA*10;
END;
if (TOTAL_RA > 30000 or TOTAL_RA < 500) and TOTAL_RA ne '' THEN DO;
PUT TOTAL_RA = ' IS OUT OF RANGE ON ' day year;
TOTAL_RA = '';
END;
if TOTAL_PP < 10000 THEN DO;
TOTAL_PP=TOTAL_PP*10;
END;
if (TOTAL_PP > 60000 or TOTAL_PP < 9500) and TOTAL_PP ne '' THEN DO;
PUT TOTAL_PP = ' IS OUT OF RANGE ON ' day year;

```

```

TOTAL_PP = '!';
END;
if min_wind > max_wind THEN DO;
  min_wind='!';
  max_wind='!';
END;
If (MAX_WIND > 50.0 OR MAX_WIND < 0.5) and MAX_WIND ne '!' THEN DO;
  PUT MAX_WIND='IS OUT OF RANGE ON ' day year;
  MAX_WIND= '!';
END;
if MAX_WIND='!' then do;
  TIME_MWS='!';
  MIN_WIND='!';
  MEAN_WS='!';
  MEAN_WVM='!';
  MEAN_WVD='!';
  SD_WDIR='!';
  WR_0_45='!';
  WR_45_90='!';
  WR_90_13='!';
  WR_135_1='!';
  WR_180_2='!';
  WR_225_2='!';
  WR_270_3='!';
  WR_315_3='!';
END;
if (TIME_MWS > 2400 OR TIME_MWS < 0) and TIME_MWS ne '!' THEN DO;
  PUT TIME_MWS='IS OUT OF RANGE ON ' day year;
  TIME_MWS= '!';
END;
if min_temp > max_temp THEN DO;
  min_temp='!';
  max_temp='!';
END;
if (max_temp > 40.0 OR max_temp < 10) and max_temp ne '!' THEN DO;
  PUT max_temp='IS OUT OF RANGE ON ' day year;
  max_temp= '!';
END;
if max_temp='!' THEN DO;
  TIME_MT='!';
  min_temp='!';
END;
if (time_mt > 2400 OR time_mt < 0) and time_mt ne '!' THEN DO;
  PUT time_mt='IS OUT OF RANGE ON ' day year;
  time_mt='!';
END;
if min_rh > max_rh THEN DO;
  min_rh='!';
  max_rh='!';
END;
if (max_rh > 105.0 OR max_rh < 0) and max_rh ne '!' THEN DO;
  PUT max_rh='IS OUT OF RANGE ON ' day year;
  max_rh= '!';
END;
if max_rh > 100.0 THEN DO;
  max_rh = 100.0;
END;
if max_rh='!' THEN DO;
  TIME_mrh='!';
  min_rh='!';
END;
if (time_mrh > 2400 OR time_mrh < 0) and time_mrh ne '!' THEN DO;
  PUT time_mrh='IS OUT OF RANGE ON ' day year;
  time_mrh= '!';
END;

```

```

if (MIN_WIND > 50.0 OR MIN_WIND <0.4) and MIN_WIND ne '.' THEN DO;
  PUT MIN_WIND='IS OUT OF RANGE ON ' day year;
  MIN_WIND= '.';
  END;
if MIN_WIND='.' THEN DO;
  TIME_MIW='.';
  END;
if (time_MIW > 2400 OR time_miw <0) and time_miw ne '.' THEN DO;
  PUT time_miw='IS OUT OF RANGE ON ' day year;
  time_miw= '.';
  END;
if (min_temp > 40.0 OR min_temp <10) and min_temp ne '.' THEN DO;
  PUT min_temp='IS OUT OF RANGE ON ' day year;
  min_temp= '.';
  END;
if MIN_temp='.' THEN DO;
  TIME_MIT='.';
  END;
if (time_mit > 2400 OR time_mit <0) and time_mit ne '.' THEN DO;
  PUT time_mit='IS OUT OF RANGE ON ' day year;
  time_mit= '.';
  END;
if (min_rh > 105.0 OR min_rh < 0) and min_rh ne '.' THEN DO;
  PUT min_rh='IS OUT OF RANGE ON ' day year;
  min_rh= '.';
  END;
if min_rh > 100.0 THEN DO;
  min_rh = 100.0;
  END;
if MIN_rh='.' THEN DO;
  TIME_MIR='.';
  END;
if (time_mir > 2400 OR time_mir <0) and time_mir ne '.' THEN DO;
  PUT time_mir='IS OUT OF RANGE ON ' day year;
  time_mir= '.';
  END;
if (MEAN_WS > 50.0 OR MEAN_WS < 0.4) and MEAN_WS ne '.' THEN DO;
  PUT MEAN_WS='IS OUT OF RANGE ON ' day year;
  MEAN_WS= '.';
  END;
if (MEAN_WVM > 360.0 OR MEAN_WVM < 0) and MEAN_WVM ne '.' THEN DO;
  PUT MEAN_WVM='IS OUT OF RANGE ON ' day year;
  MEAN_WVM= '.';
  END;
if (MEAN_WVD > 360.0 OR MEAN_WVD < 0) and MEAN_WVD ne '.' THEN DO;
  PUT MEAN_WVD='IS OUT OF RANGE ON ' day year;
  MEAN_WVD= '.';
  END;
if (SD_WDIR > 100.0 OR SD_WDIR < 0) and SD_WDIR ne '.' THEN DO;
  PUT SD_WDIR='IS OUT OF RANGE ON ' day year;
  SD_WDIR= '.';
  END;
if (WR_0_45>10.0 or WR_0_45<0) and WR_0_45 ne '.' THEN DO;
  PUT WR_0_45=' IS OUT OF RANGE ON ' day year;
  WR_0_45= '.';
  END;
if (WR_45_90>10.0 or WR_45_90<0) and WR_45_90 ne '.' THEN DO;
  PUT WR_45_90=' IS OUT OF RANGE ON ' day year;
  WR_0_45= '.';
  END;
if (WR_90_13>10.0 or WR_90_13<0) and WR_90_13 ne '.' THEN DO;
  PUT WR_90_13=' IS OUT OF RANGE ON ' day year;
  WR_90_13= '.';
  END;
if (WR_135_1>10.0 or WR_135_1<0) and WR_135_1 ne '.' THEN DO;

```

```

PUT WR_135_1=' IS OUT OF RANGE ON ' day year;
WR_135_1= '.';
END;
if (WR_180_2>10.0 or WR_180_2<0) and WR_180_2 ne '.' THEN DO;
PUT WR_180_2=' IS OUT OF RANGE ON ' day year;
WR_180_2= '.';
END;
if (WR_225_2>10.0 or WR_225_2<0) and WR_225_2 ne '.' THEN DO;
PUT WR_225_2=' IS OUT OF RANGE ON ' day year;
WR_225_2= '.';
END;
if (WR_270_3>10.0 or WR_270_3<0) and WR_270_3 ne '.' THEN DO;
PUT WR_270_3=' IS OUT OF RANGE ON ' day year;
WR_270_3= '.';
END;
if (WR_315_3>10 and WR_315_3<14) THEN DO;
tvolts=VOLTS;
VOLTS=WR_315_3;
END;
if (WR_315_3>10.0 or WR_315_3<0) and WR_315_3 ne '.' THEN DO;
PUT WR_315_3=' IS OUT OF RANGE ON ' day year;
WR_315_3= '.';
END;
if (VOLTS > 15.0 OR VOLTS < 0) and VOLTS ne '.' THEN DO;
PUT VOLTS='IS OUT OF RANGE ON ' day year;
VOLTS= '.';
END;
/* Sort and add missing days */
proc sort;
by year day;
proc sort data=daily.full;
by year day;
data daily.gday1;
merge daily.full daily.gday0;
by year day;
/* Create Month Column */
if (day > 0 and day <= 31) THEN DO;
PUT day = ' IS IN January' year;
month = 1;
END;
if (year ^= 1996) THEN DO;
if (day > 31 and day <= 59) THEN DO;
PUT day = ' IS IN February' year;
month = 2;
END;
if (day > 59 and day <= 90) THEN DO;
PUT day = ' IS IN March' year;
month = 3;
END;
if (day > 90 and day <= 120) THEN DO;
PUT day = ' IS IN April' year;
month = 4;
END;
if (day > 120 and day <= 151) THEN DO;
PUT day = ' IS IN May' year;
month = 5;
END;
if (day > 151 and day <= 181) THEN DO;
PUT day = ' IS IN June' year;
month = 6;
END;
if (day > 181 and day <= 212) THEN DO;
PUT day = ' IS IN July' year;
month = 7;
END;

```



```

if (day > 212 and day <= 243) THEN DO;
  PUT day = ' IS IN August' year;
  month = 8;
  END;
if (day > 243 and day <= 273) THEN DO;
  PUT day = ' IS IN September' year;
  month = 9;
  END;
if (day > 273 and day <= 304) THEN DO;
  PUT day = ' IS IN October' year;
  month = 10;
  END;
if (day > 304 and day <= 334) THEN DO;
  PUT day = ' IS IN November' year;
  month = 11;
  END;
if (day > 334 and day <= 365) THEN DO;
  PUT day = ' IS IN December' year;
  month = 12;
  END;
END;
if (year = 1996) THEN DO;
  if (day > 31 and day <= 60) THEN DO;
    PUT day = ' IS IN February' year;
    month = 2;
    END;
  if (day > 60 and day <= 91) THEN DO;
    PUT day = ' IS IN March' year;
    month = 3;
    END;
  if (day > 91 and day <= 121) THEN DO;
    PUT day = ' IS IN April' year;
    month = 4;
    END;
  if (day > 121 and day <= 152) THEN DO;
    PUT day = ' IS IN May' year;
    month = 5;
    END;
  if (day > 152 and day <= 182) THEN DO;
    PUT day = ' IS IN June' year;
    month = 6;
    END;
  if (day > 182 and day <= 213) THEN DO;
    PUT day = ' IS IN July' year;
    month = 7;
    END;
  if (day > 213 and day <= 244) THEN DO;
    PUT day = ' IS IN August' year;
    month = 8;
    END;
  if (day > 244 and day <= 274) THEN DO;
    PUT day = ' IS IN September' year;
    month = 9;
    END;
  if (day > 274 and day <= 305) THEN DO;
    PUT day = ' IS IN October' year;
    month = 10;
    END;
  if (day > 305 and day <= 335) THEN DO;
    PUT day = ' IS IN November' year;
    month = 11;
    END;
  if (day > 335 and day <= 366) THEN DO;
    PUT day = ' IS IN December' year;
    month = 12;
  
```

```

    END;
END;
data daily.gday;
  set daily.gday1;
/* Check for . */
if (year = '.' or day = '.' or OBS = '.') then do;
  put day 'of ' Year ' IS INCOMPLETE -- deleted ';
  delete;
  end;
if (day = lag1(day)) then do;
  put 'Day ' day ' in Year ' year ' has a double .. deleted ';
  delete;
  END;
run;

```

## Division of Ground Daily

The division of ground daily is similar to the division to tower daily. The only difference is the variables in the tower and ground data sets.

## Ground Hourly

```

/* Ground - Hourly 4/20 .. */
data daily.gh;
  set daily.ghmet;
/* Variable Ranges */
if (year>1998 or year<1993) and year ne '.' THEN DO;
  PUT year = ' IS OUT OF RANGE ' day year;
  year = '.';
  END;
if (day > 366 or day < 1) and day ne '.' THEN DO;
  PUT day = ' IS OUT OF RANGE ON ' day year;
  day = '.';
  END;
if (hour>2300 or hour<0 or mod(hour,100) ^= 0) and hour ne '.' THEN DO;
  PUT hour = ' IS OUT OF RANGE ON ' day year;
  hour='.';
  END;
if (precip > 600 or precip < 0) and precip ne '.' THEN DO;
  PUT precip = ' IS OUT OF RANGE ON ' day year;
  precip = '.';
  END;
if (hour>600 and hour<1800) and TOTAL_RA<5000 THEN DO;
  TOTAL_RA=TOTAL_RA*10;
  END;
if (hour>600 and hour<1800) and (TOTAL_RA>30000 or TOTAL_RA < 500) and TOTAL_RA ne '.' THEN DO;
  PUT TOTAL_RA = ' IS OUT OF RANGE ON ' day year;
  TOTAL_RA = '.';
  END;
if (hour<=600 or hour>=1800) and (TOTAL_RA>500 or TOTAL_RA<0) and TOTAL_RA ne '.' THEN DO;
  PUT TOTAL_RA = ' IS OUT OF RANGE ON ' day year;
  TOTAL_RA='.';
  END;
if (hour>600 and hour<1800) and TOTAL_PP<10000 THEN DO;
  TOTAL_PP=TOTAL_PP*10;
  END;
if (hour>600 and hour<1800) and (TOTAL_PP > 60000 or TOTAL_PP < 10) and TOTAL_PP ne '.' THEN DO;
  PUT TOTAL_PP = ' IS OUT OF RANGE ON ' day year;
  TOTAL_PP = '.';
  END;
if (hour<=600 or hour>=1800) and (TOTAL_PP > 10 or TOTAL_PP < 0) and TOTAL_PP ne '.' THEN DO;
  PUT TOTAL_PP = ' IS OUT OF RANGE ON ' day year;
  TOTAL_PP = '.';
  END;
If (INSTAN_R > 5000.0 OR INSTAN_R < 0) and INSTAN_R ne '.' THEN DO;
  PUT INSTAN_R='IS OUT OF RANGE ON ' day year;

```

```

INSTAN_R= '.';
END;
if (INST_PPF > 50.0 OR INST_PPF < 0) and INST_PPF ne '.' THEN DO;
  PUT INST_PPF='IS OUT OF RANGE ON ' day year;
  INST_PPF= '.';
END;
if (INST_tem > 40.0 OR INST_tem <10) and INST_tem ne '.' THEN DO;
  PUT INST_tem='IS OUT OF RANGE ON ' day year;
  INST_tem= '.';
END;
if (INST_rh > 105.0 OR INST_rh < 0) and INST_rh ne '.' THEN DO;
  PUT INST_rh='IS OUT OF RANGE ON ' day year;
  INST_rh= '.';
END;
if INST_rh > 100.0 THEN DO;
  INST_rh = 100.0;
END;
if (AVER_RAD > 5000.0 OR AVER_RAD < 0) and AVER_RAD ne '.' THEN DO;
  PUT AVER_RAD='IS OUT OF RANGE ON ' day year;
  AVER_RAD= '.';
END;
if (AVER_PPF > 50.0 OR AVER_PPF < 0) and AVER_PPF ne '.' THEN DO;
  PUT AVER_PPF='IS OUT OF RANGE ON ' day year;
  AVER_PPF= '.';
END;
if (AVER_tem > 40.0 OR AVER_tem <10) and AVER_tem ne '.' THEN DO;
  PUT AVER_tem='IS OUT OF RANGE ON ' day year;
  AVER_tem= '.';
END;
if (AVER_rh > 105.0 OR AVER_rh < 0) and AVER_rh ne '.' THEN DO;
  PUT AVER_rh='IS OUT OF RANGE ON ' day year;
  AVER_rh= '.';
END;
if AVER_rh > 100.0 THEN DO;
  AVER_rh = 100.0;
END;
if (SD_RAD > 7.0 OR SD_RAD <0) and SD_RAD ne '.' THEN DO;
  PUT SD_RAD='IS OUT OF RANGE ON ' day year;
  SD_RAD= '.';
END;
if (SD_PPF >1.1061 OR SD_PPF <0) and SD_PPF ne '.' THEN DO;
  PUT SD_PPF='IS OUT OF RANGE ON ' day year;
  SD_PPF= '.';
END;
if (SD_temp > 6.3489 OR SD_temp <0) and SD_temp ne '.' THEN DO;
  PUT SD_temp='IS OUT OF RANGE ON ' day year;
  SD_temp= '.';
END;
if (SD_rh > 8.8589 OR SD_rh < 0) and SD_rh ne '.' THEN DO;
  PUT SD_rh='IS OUT OF RANGE ON ' day year;
  SD_rh= '.';
END;
if (MEAN_WS > 50.0 OR MEAN_WS < 0.4) and MEAN_WS ne '.' THEN DO;
  PUT MEAN_WS='IS OUT OF RANGE ON ' day year;
  MEAN_WS= '.';
END;
if (MEAN_WVM > 360.0 OR MEAN_WVM < 0) and MEAN_WVM ne '.' THEN DO;
  PUT MEAN_WVM='IS OUT OF RANGE ON ' day year;
  MEAN_WVM= '.';
END;
if (MEAN_WVD > 360.0 OR MEAN_WVD < 0) and MEAN_WVD ne '.' THEN DO;
  PUT MEAN_WVD='IS OUT OF RANGE ON ' day year;
  MEAN_WVD= '.';
END;
if (SD_WDIR > 100.0 OR SD_WDIR < 0) and SD_WDIR ne '.' THEN DO;

```

```

PUT SD_WDIR='IS OUT OF RANGE ON ' day year;
SD_WDIR= '!';
END;
if (WR_0_45>10.0 or WR_0_45<0) and WR_0_45 ne '! ' THEN DO;
  PUT WR_0_45=' IS OUT OF RANGE ON ' day year;
  WR_0_45= '!';
END;
if (WR_45_90>10.0 or WR_45_90<0) and WR_45_90 ne '! ' THEN DO;
  PUT WR_45_90=' IS OUT OF RANGE ON ' day year;
  WR_45_90= '!';
END;
if (WR_90_13>10.0 or WR_90_13<0) and WR_90_13 ne '! ' THEN DO;
  PUT WR_90_13=' IS OUT OF RANGE ON ' day year;
  WR_90_13= '!';
END;
if (WR_135_1>10.0 or WR_135_1<0) and WR_135_1 ne '! ' THEN DO;
  PUT WR_135_1=' IS OUT OF RANGE ON ' day year;
  WR_135_1= '!';
END;
if (WR_180_2>10.0 or WR_180_2<0) and WR_180_2 ne '! ' THEN DO;
  PUT WR_180_2=' IS OUT OF RANGE ON ' day year;
  WR_180_2= '!';
END;
if (WR_225_2>10.0 or WR_225_2<0) and WR_225_2 ne '! ' THEN DO;
  PUT WR_225_2=' IS OUT OF RANGE ON ' day year;
  WR_225_2= '!';
END;
if (WR_270_3>10.0 or WR_270_3<0) and WR_270_3 ne '! ' THEN DO;
  PUT WR_270_3=' IS OUT OF RANGE ON ' day year;
  WR_270_3= '!';
END;
if (WR_315_3>10.0 or WR_315_3<0) and WR_315_3 ne '! ' THEN DO;
  PUT WR_315_3=' IS OUT OF RANGE ON ' day year;
  WR_315_3= '!';
END;
/* Sort and add missing days */
proc sort;
  by year day hour;
proc sort data=daily.full1;
  by year day;
data daily.gh1;
  merge daily.full1 daily.gh;
  by year day;
/* Create Month Column */
if (day > 0 and day <= 31) THEN DO;
  PUT day = ' IS IN January' year;
  month = 1;
END;
if (year ^= 1996) THEN DO;
  if (day > 31 and day <= 59) THEN DO;
    PUT day = ' IS IN February' year;
    month = 2;
  END;
  if (day > 59 and day <= 90) THEN DO;
    PUT day = ' IS IN March' year;
    month = 3;
  END;
  if (day > 90 and day <= 120) THEN DO;
    PUT day = ' IS IN April' year;
    month = 4;
  END;
  if (day > 120 and day <= 151) THEN DO;
    PUT day = ' IS IN May' year;
    month = 5;
  END;
END;

```

```

if (day > 151 and day <= 181) THEN DO;
  PUT day = ' IS IN June' year;
  month = 6;
  END;
if (day > 181 and day <= 212) THEN DO;
  PUT day = ' IS IN July' year;
  month = 7;
  END;
if (day > 212 and day <= 243) THEN DO;
  PUT day = ' IS IN August' year;
  month = 8;
  END;
if (day > 243 and day <= 273) THEN DO;
  PUT day = ' IS IN September' year;
  month = 9;
  END;
if (day > 273 and day <= 304) THEN DO;
  PUT day = ' IS IN October' year;
  month = 10;
  END;
if (day > 304 and day <= 334) THEN DO;
  PUT day = ' IS IN November' year;
  month = 11;
  END;
if (day > 334 and day <= 365) THEN DO;
  PUT day = ' IS IN December' year;
  month = 12;
  END;
END;
if (year = 1996) THEN DO;
  if (day > 31 and day <= 60) THEN DO;
    PUT day = ' IS IN February' year;
    month = 2;
    END;
  if (day > 60 and day <= 91) THEN DO;
    PUT day = ' IS IN March' year;
    month = 3;
    END;
  if (day > 91 and day <= 121) THEN DO;
    PUT day = ' IS IN April' year;
    month = 4;
    END;
  if (day > 121 and day <= 152) THEN DO;
    PUT day = ' IS IN May' year;
    month = 5;
    END;
  if (day > 152 and day <= 182) THEN DO;
    PUT day = ' IS IN June' year;
    month = 6;
    END;
  if (day > 182 and day <= 213) THEN DO;
    PUT day = ' IS IN July' year;
    month = 7;
    END;
  if (day > 213 and day <= 244) THEN DO;
    PUT day = ' IS IN August' year;
    month = 8;
    END;
  if (day > 244 and day <= 274) THEN DO;
    PUT day = ' IS IN September' year;
    month = 9;
    END;
  if (day > 274 and day <= 305) THEN DO;
    PUT day = ' IS IN October' year;
    month = 10;

```

```

END;
if (day > 305 and day <= 335) THEN DO;
  PUT day = ' IS IN November' year;
  month = 11;
END;
if (day > 335 and day <= 366) THEN DO;
  PUT day = ' IS IN December' year;
  month = 12;
END;
END;
data daily.gh2;
  set daily.gh1;
/* Check for . */
if (year = '.' or day = '.') then do;
  put day 'of' month 'of' Year ' IS INCOMPLETE -- deleted ';
  delete;
  end;
/* Check for doubles */
if (hour = lag1(hour) and hour ^= '.') then do;
  put 'Day ' day ' in Year ' year ' has a double .. deleted ';
  delete;
  END;
data daily.gh2;
  merge daily.gh2 daily.obs;
  if (year = '.') then do;
    delete;
  end;
run;

```

## Division of Ground Hourly

```

/* Ground Hourly */
data _null_;
  set daily.gh2;
  file 'C:/wpi/text_files/gh93.txt' linesize = 470;
  if (year = 1993 and day = 1) then do;
    put '<pre>';
    put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh " mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ';
    put '-----';
  end;
  if (year = 1993) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
  end;
  if (year = 1993 and day = 365 and hour = 2300) then do;
    put '</pre>';
  end;
  file 'C:/wpi/dbf_files/gh93.dbf' linesize = 470;
  if (year = 1993 and day = 1) then do;
    put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh " mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ';
  end;
  if (year = 1993) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
  end;
data _null_;
  set daily.gh2;

```

```

file 'C:/wpi/text_files/gh94.txt' linesize = 470;
if (year = 1994 and day = 1 and hour = 0) then do;
  put '<pre>';
  put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad" aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh" mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2" wr_270_3 wr_315_3 ';
  put '-----';
  end;
  if (year = 1994) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
    end;
  if (year = 1994 and day = 365 and hour = 2300) then do;
    put '</pre>';
    end;
file 'C:/wpi/dbf_files/gh94.dbf' linesize = 470;
if (year = 1994 and day = 1 and hour = 0) then do;
  put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad" aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh" mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2" wr_270_3 wr_315_3 ';
  end;
  if (year = 1994) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
    end;
data _null_;
/* 1995 */
set daily.gh2;
file 'C:/wpi/text_files/gh95.txt' linesize = 470;
if (year = 1995 and day = 1 and hour = 0) then do;
  put '<pre>';
  put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad" aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh" mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2" wr_270_3 wr_315_3 ';
  put '-----';
  end;
  if (year = 1995) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
    end;
  if (year = 1995 and day = 365 and hour = 2300) then do;
    put '</pre>';
    end;
file 'C:/wpi/dbf_files/gh95.dbf' linesize = 470;
if (year = 1995 and day = 1 and hour = 0) then do;
  put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad" aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh" mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2" wr_270_3 wr_315_3 ';
  end;
  if (year = 1995) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
    end;
data _null_;
/* 1996 */
set daily.gh2;
file 'C:/wpi/text_files/gh96.txt' linesize = 470;
if (year = 1996 and day = 1 and hour = 0) then do;
  put '<pre>';

```

```

    put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh" mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
    put '-----';
end;
if (year = 1996) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year = 1996 and day = 366 and hour = 2300) then do;
    put '</pre>';
end;
file 'C:/wpi/dbf_files/gh96.dbf' linesize = 470;
if (year = 1996 and day = 1 and hour = 0) then do;
    put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh" mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
end;
if (year = 1996) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_ ;                /* 1997 */
set daily.gh2;
file 'C:/wpi/text_files/gh97.txt' linesize = 470;
if (year = 1997 and day = 1 and hour = 0) then do;
    put '<pre>';
    put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh" mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
    put '-----';
end;
if (year = 1997) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year = 1997 and day = 365 and hour = 2300) then do;
    put '</pre>';
end;
file 'C:/wpi/dbf_files/gh97.dbf' linesize = 470;
if (year = 1997 and day = 1 and hour = 0) then do;
    put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh" mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;
end;
if (year = 1997) then do;
    put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
end;
data _null_ ;                /* 1998 */
set daily.gh2;
file 'C:/wpi/text_files/gh98.txt' linesize = 470;
if (year = 1998 and day = 1 and hour = 0) then do;
    put '<pre>';
    put 'year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad " aver_ppf
aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh" mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
wr_90_13 wr_135_1 wr_180_2 wr_225_2 " wr_270_3 wr_315_3 ' ;

```



```

put '-----';
end;
if (year = 1998) then do;
  put year 4.0 " month 2.0 " day 3.0 " hour 4.0 " precip 6.3 " total_ra 10.4 " total_pp 10.4 " instan_r 6.3 " inst_ppf 6.3 "
  inst_tem 6.2 " inst_rh 5.1 " aver_rad 6.3 " aver_ppf 6.3 " aver_tem 5.2 " aver_rh 5.2 " sd_rad 5.3 " sd_ppfd 5.3 "
  sd_temp 5.3 " sd_rh 5.3 " mean_ws 5.3 " mean_wvm 7.3 " mean_wvd 7.3 " sd_wdir 4.2 " wr_0_45 5.3 " wr_45_90 5.3 "
  wr_90_13 5.3 " wr_135_1 5.3 " wr_180_2 5.3 " wr_225_2 5.3 " wr_270_3 5.3 " wr_315_3 5.3;
end;
if (year = 1998 and day = 365) then do;
  put '</pre>';
end;
file 'C:/wpi/dbf_files/gh98.dbf' linesize = 470;
if (year = 1998 and day = 1 and hour = 0) then do;
  put `year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad `aver_ppf
  aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh `mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
  wr_90_13 wr_135_1 wr_180_2 wr_225_2 `wr_270_3 wr_315_3`;
end;
if (year = 1998) then do;
  put year 4.0 `month 2.0 `day 3.0 `hour 4.0 `precip 6.3 `total_ra 10.4 `total_pp 10.4 `instan_r 6.3 `inst_ppf 6.3 `
  inst_tem 6.2 `inst_rh 5.1 `aver_rad 6.3 `aver_ppf 6.3 `aver_tem 5.2 `aver_rh 5.2 `sd_rad 5.3 `sd_ppfd 5.3 `
  sd_temp 5.3 `sd_rh 5.3 `mean_ws 5.3 `mean_wvm 7.3 `mean_wvd 7.3 `sd_wdir 4.2 `wr_0_45 5.3 `wr_45_90 5.3 `
  wr_90_13 5.3 `wr_135_1 5.3 `wr_180_2 5.3 `wr_225_2 5.3 `wr_270_3 5.3 `wr_315_3 5.3;
end;
/* Produce dbf file of complete data set .. */
data _null_;
  set daily.gh2;
  file 'C:/wpi/dbf_files/ghmet.dbf' linesize = 470;
  if (year = 1993 and day = 1) then do;
    put `year month day hour precip total_ra total_pp instan_r inst_ppf inst_tem inst_rh aver_rad `aver_ppf
    aver_tem aver_rh sd_rad sd_ppfd sd_temp sd_rh `mean_ws mean_wvm mean_wvd sd_wdir wr_0_45 wr_45_90
    wr_90_13 wr_135_1 wr_180_2 wr_225_2 `wr_270_3 wr_315_3`;
  end;
  put year 4.0 `month 2.0 `day 3.0 `hour 4.0 `precip 6.3 `total_ra 10.4 `total_pp 10.4 `instan_r 6.3 `inst_ppf 6.3 `
  inst_tem 6.2 `inst_rh 5.1 `aver_rad 6.3 `aver_ppf 6.3 `aver_tem 5.2 `aver_rh 5.2 `sd_rad 5.3 `sd_ppfd 5.3 `
  sd_temp 5.3 `sd_rh 5.3 `mean_ws 5.3 `mean_wvm 7.3 `mean_wvd 7.3 `sd_wdir 4.2 `wr_0_45 5.3 `wr_45_90 5.3 `
  wr_90_13 5.3 `wr_135_1 5.3 `wr_180_2 5.3 `wr_225_2 5.3 `wr_270_3 5.3 `wr_315_3 5.3;
run;

```

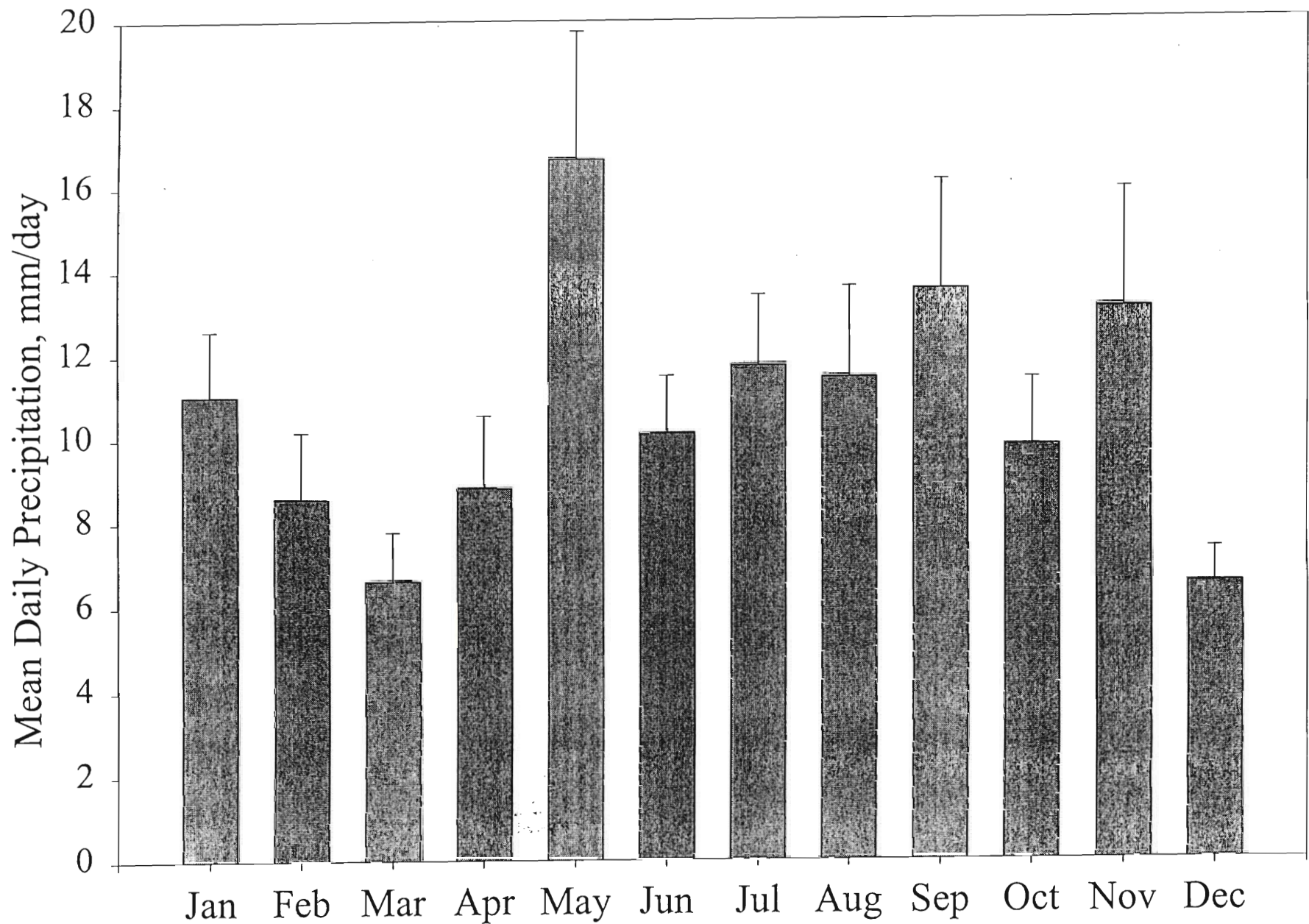
## Mean Program

```

/* This program is to sort and calculate the mean and standard error*/
proc sort DATA=DAILY.TH2;
  by hour;
proc means mean stderr NOPRINT;
  by hour;
  var PRECIP TOTAL_RA TOTAL_PP AVER_TEM AVER_RH MEAN_WS;
/* places output into new file*/
  OUTPUT OUT=NEW3 MEAN=MP MRA MPP MTEM MRH MWS
  STDERR=SP SRA SPP STEM SRH SWS;
PROC PRINT;
  VAR HOUR MP SP MRA SRA MPP SPP MTEM STEM MRH SRH MWS SWS;
RUN;

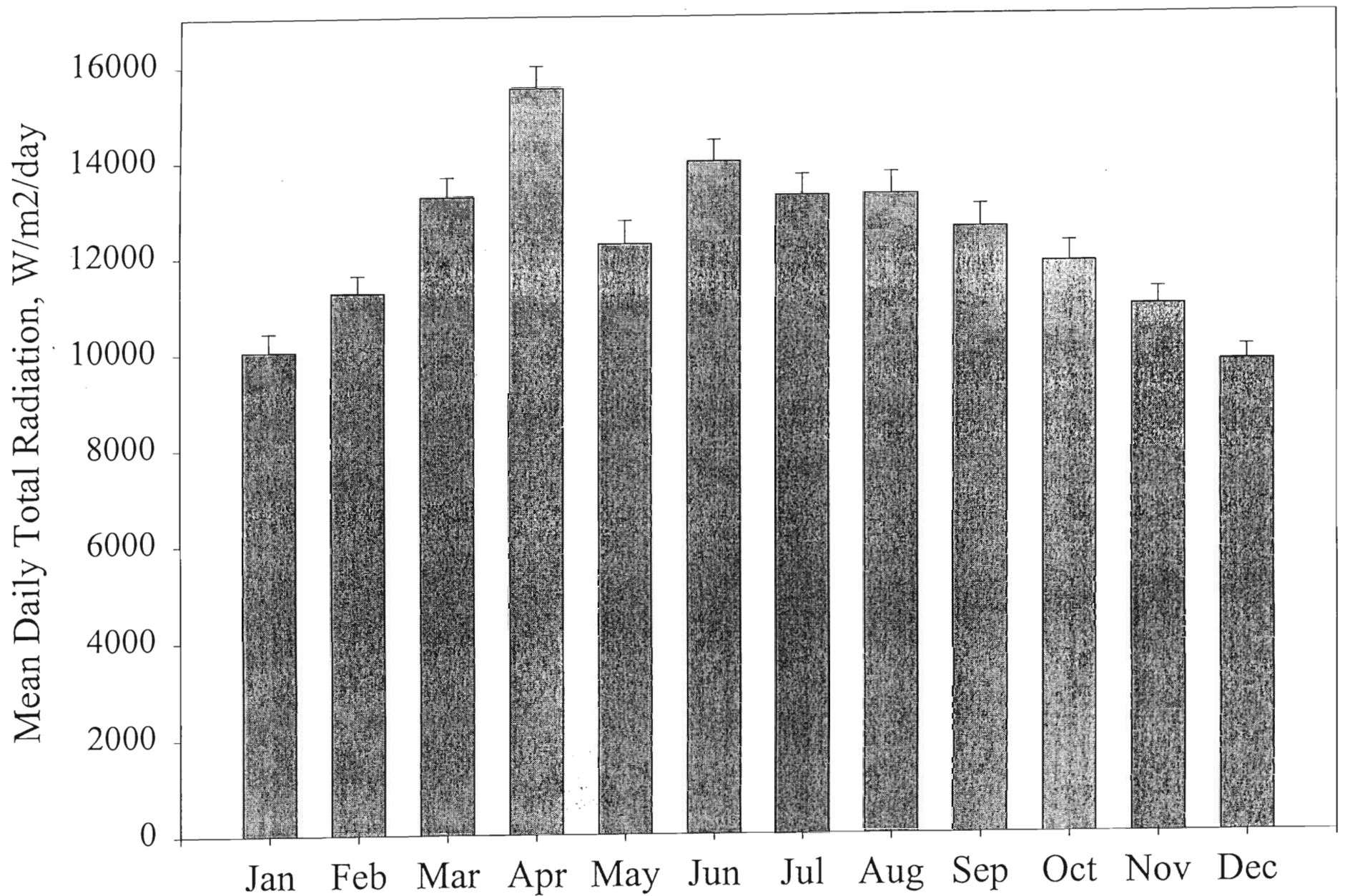
```

Bisley Tower Climate Station  
1993 to 1998



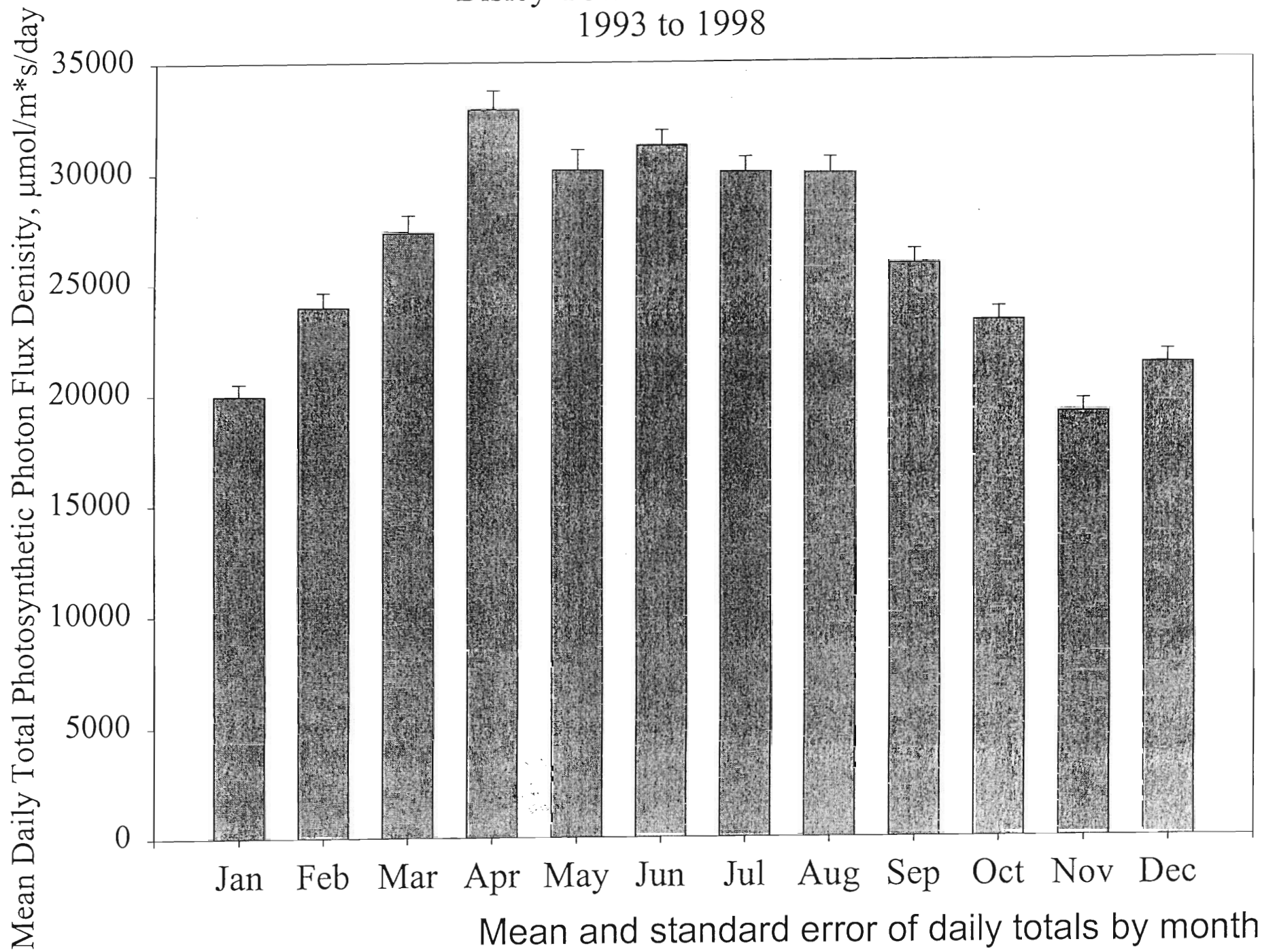
Mean and standard error of daily totals by month

# Bisley Tower Climate Station 1993 to 1998

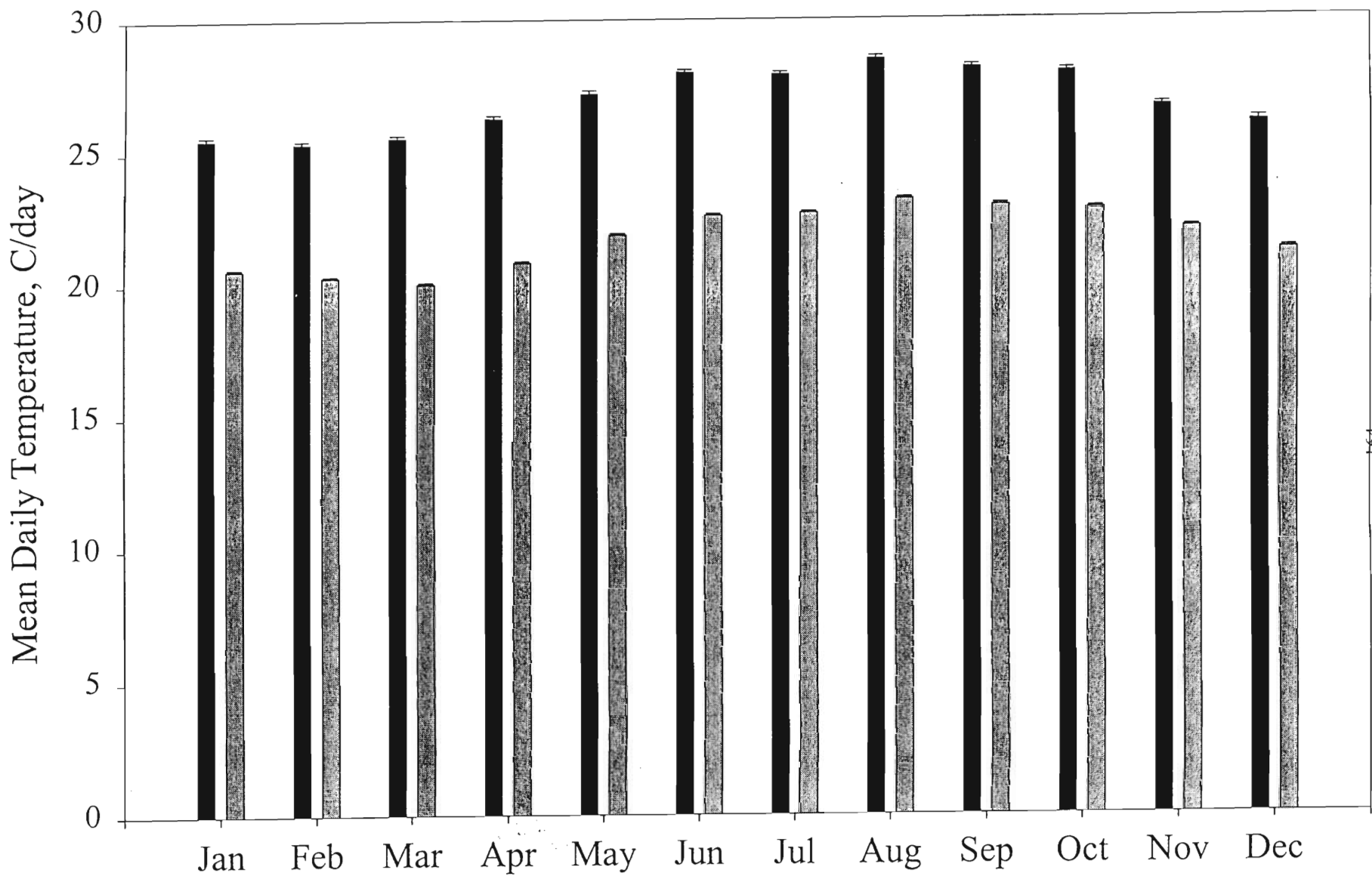


Mean and standard error of daily totals by month

Bisley Tower Climate Station  
1993 to 1998



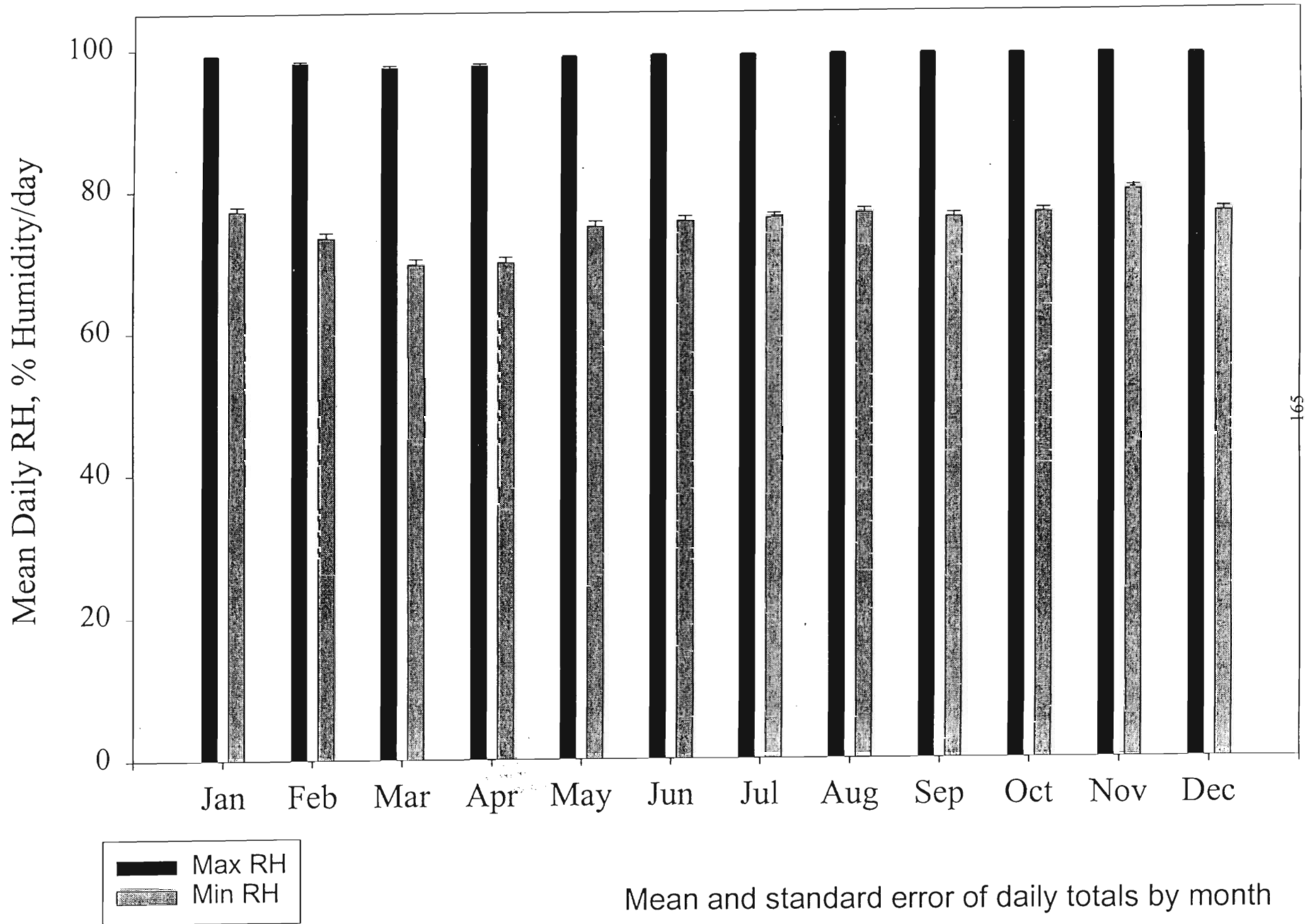
Bisley Tower Climate Station  
1993 to 1998



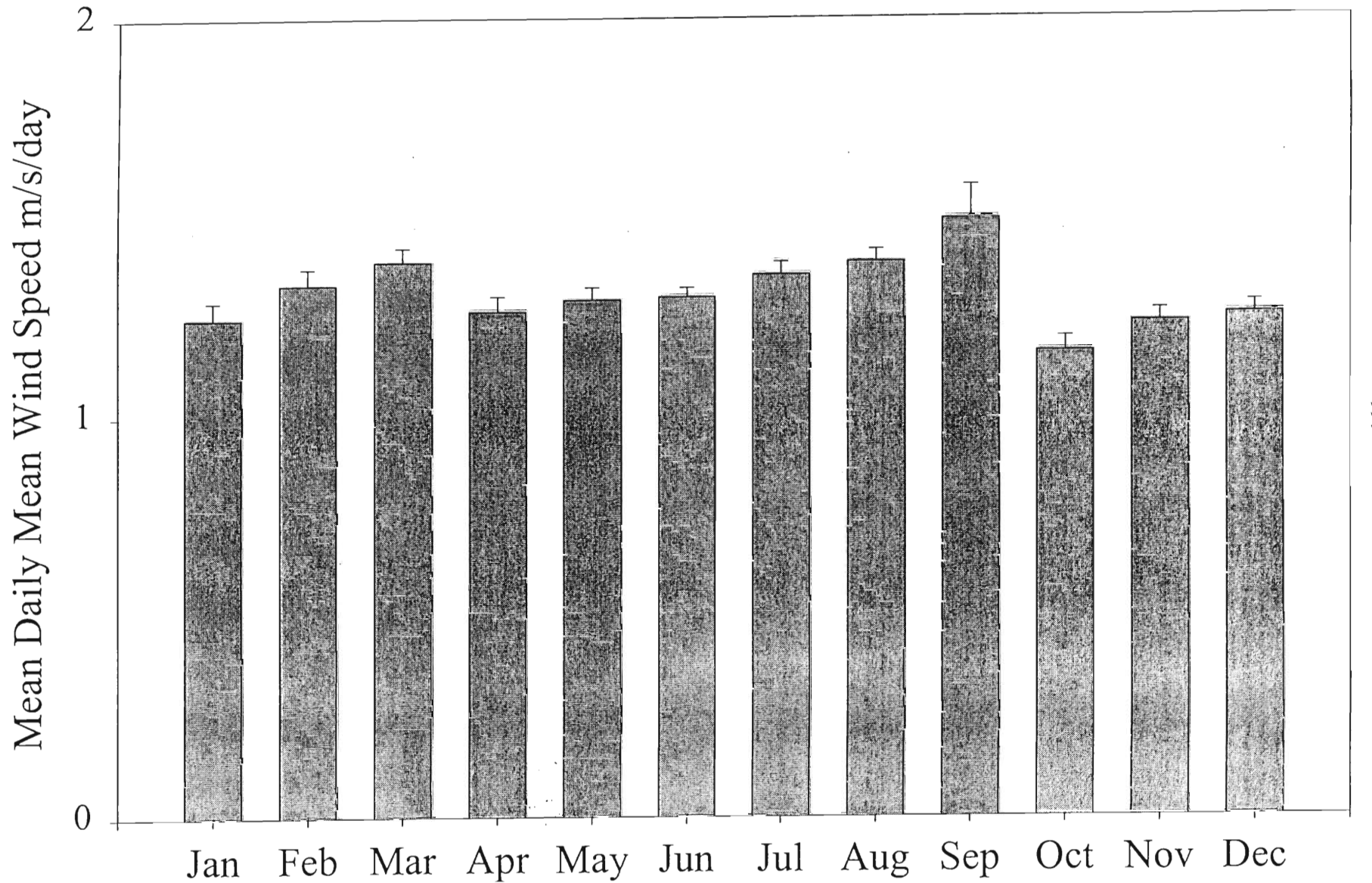
Max Temp  
Min Temp

Mean and standard error of daily totals by month

Bisley Tower Climate Station  
1993 to 1998

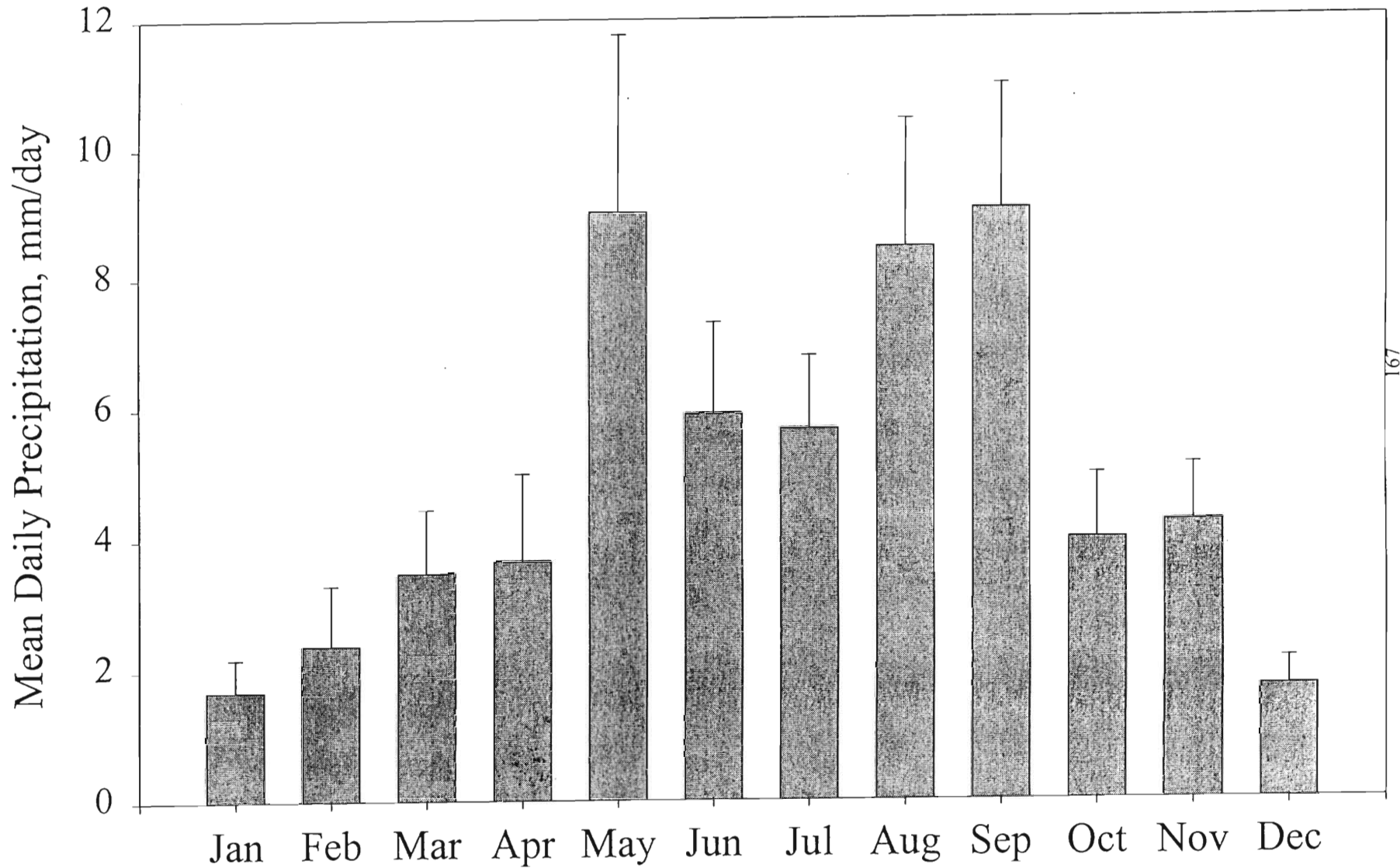


# Bisley Tower Climate Station 1993 to 1998



Mean and Standard error of daily values by month

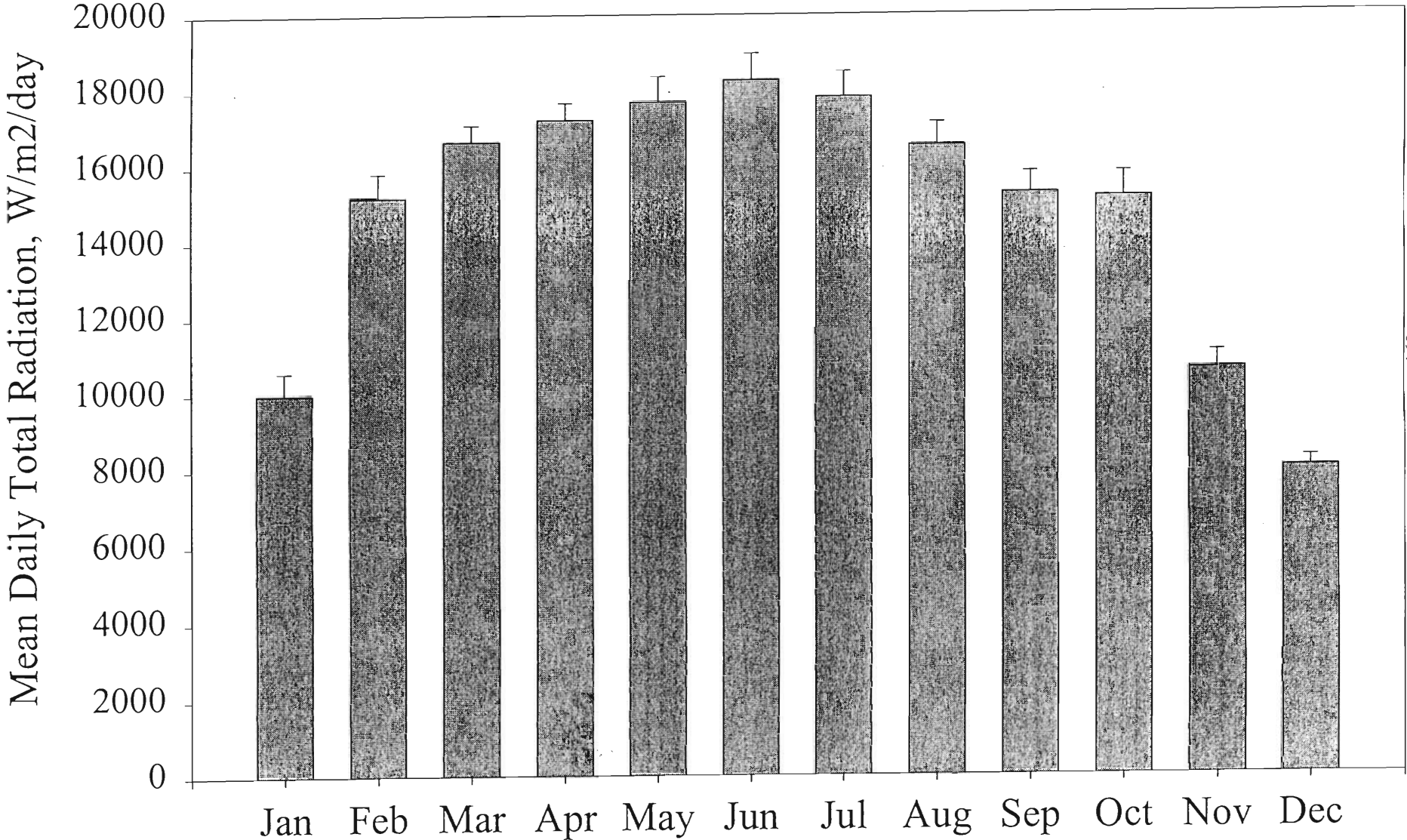
Bisley Ground Climate Station  
1993 to 1998



Mean and standard error pf daily totals by month

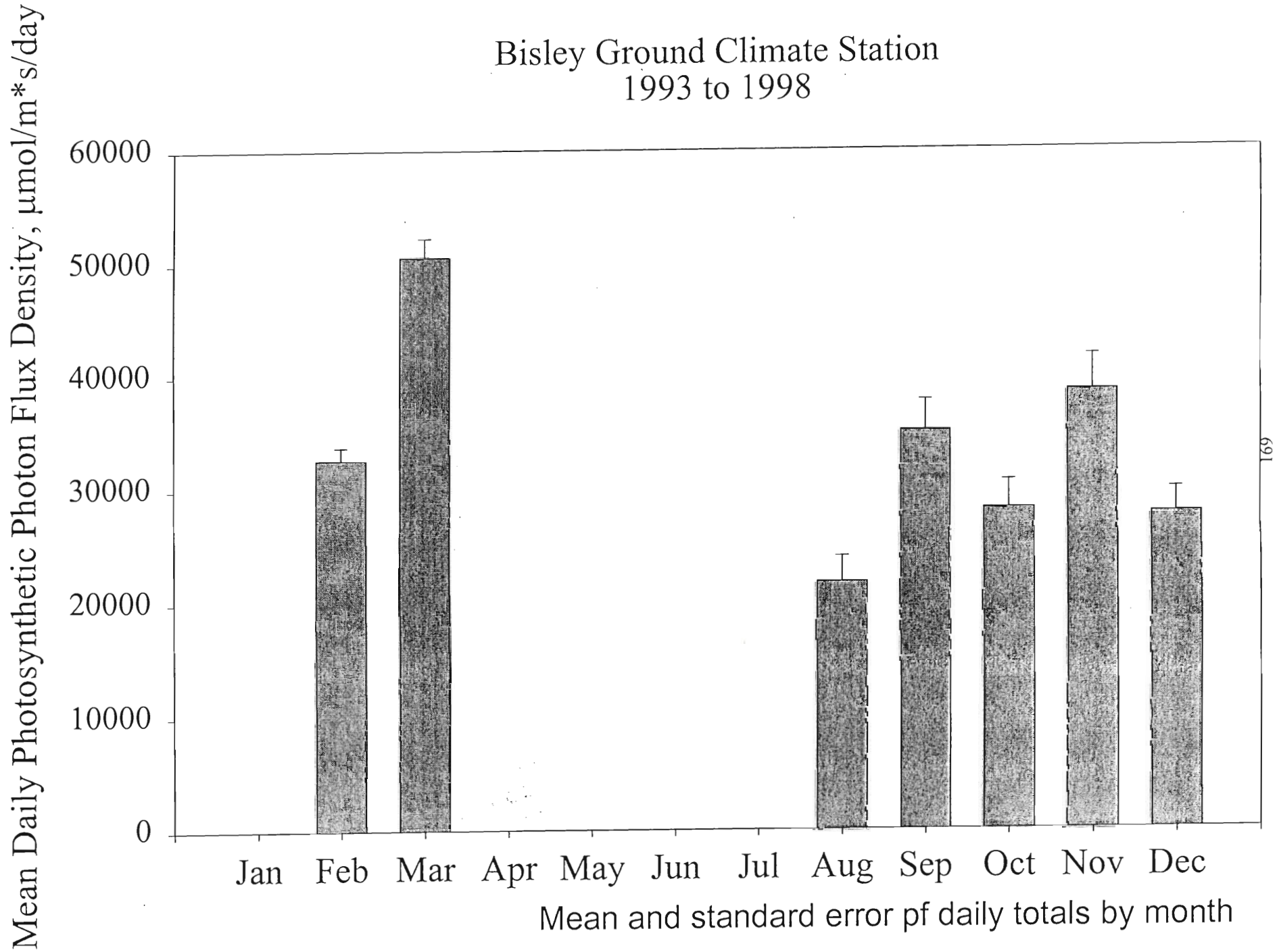


Bisley Ground Climate Station  
1993 to 1998

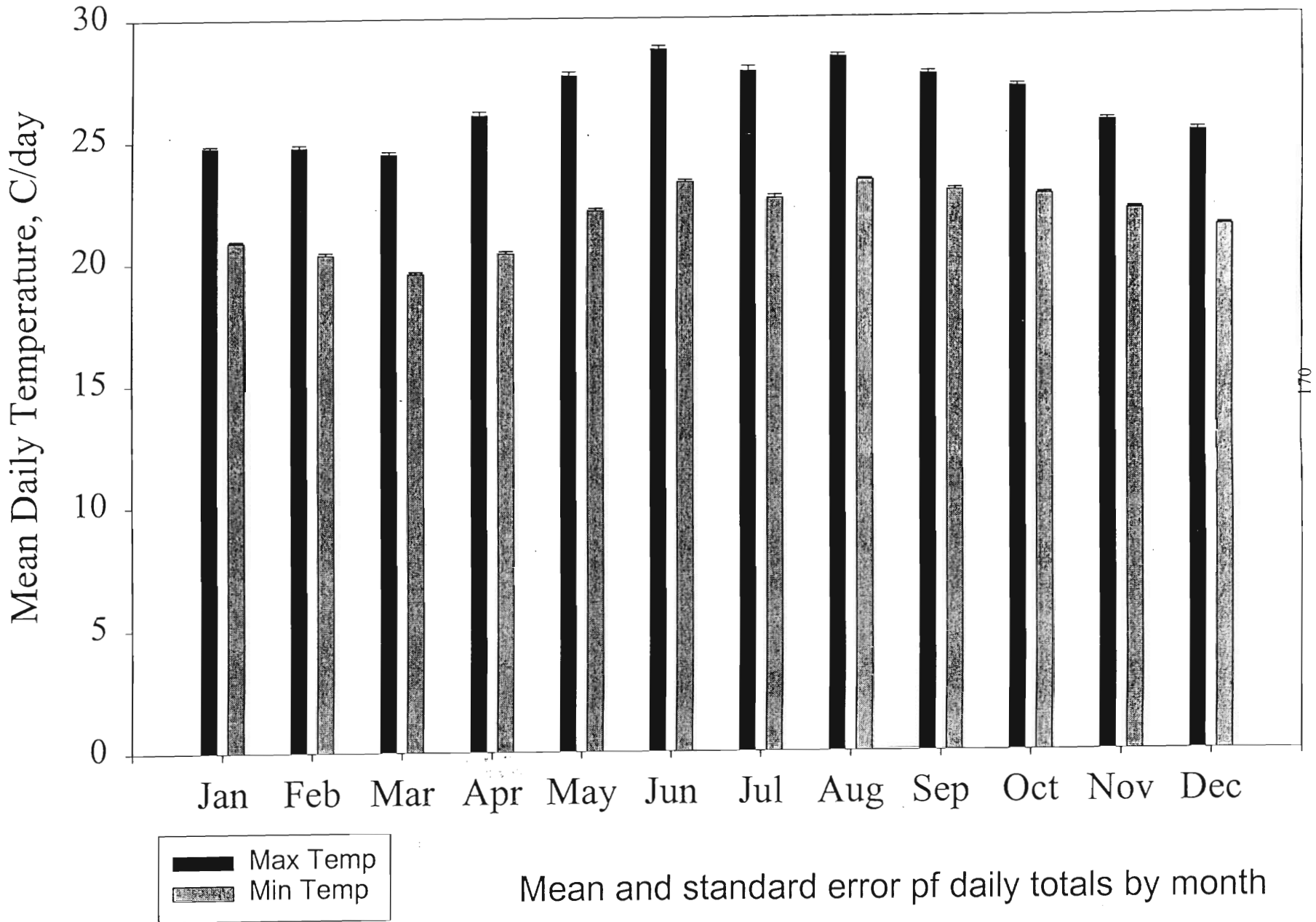


Mean and standard error pf daily totals by month

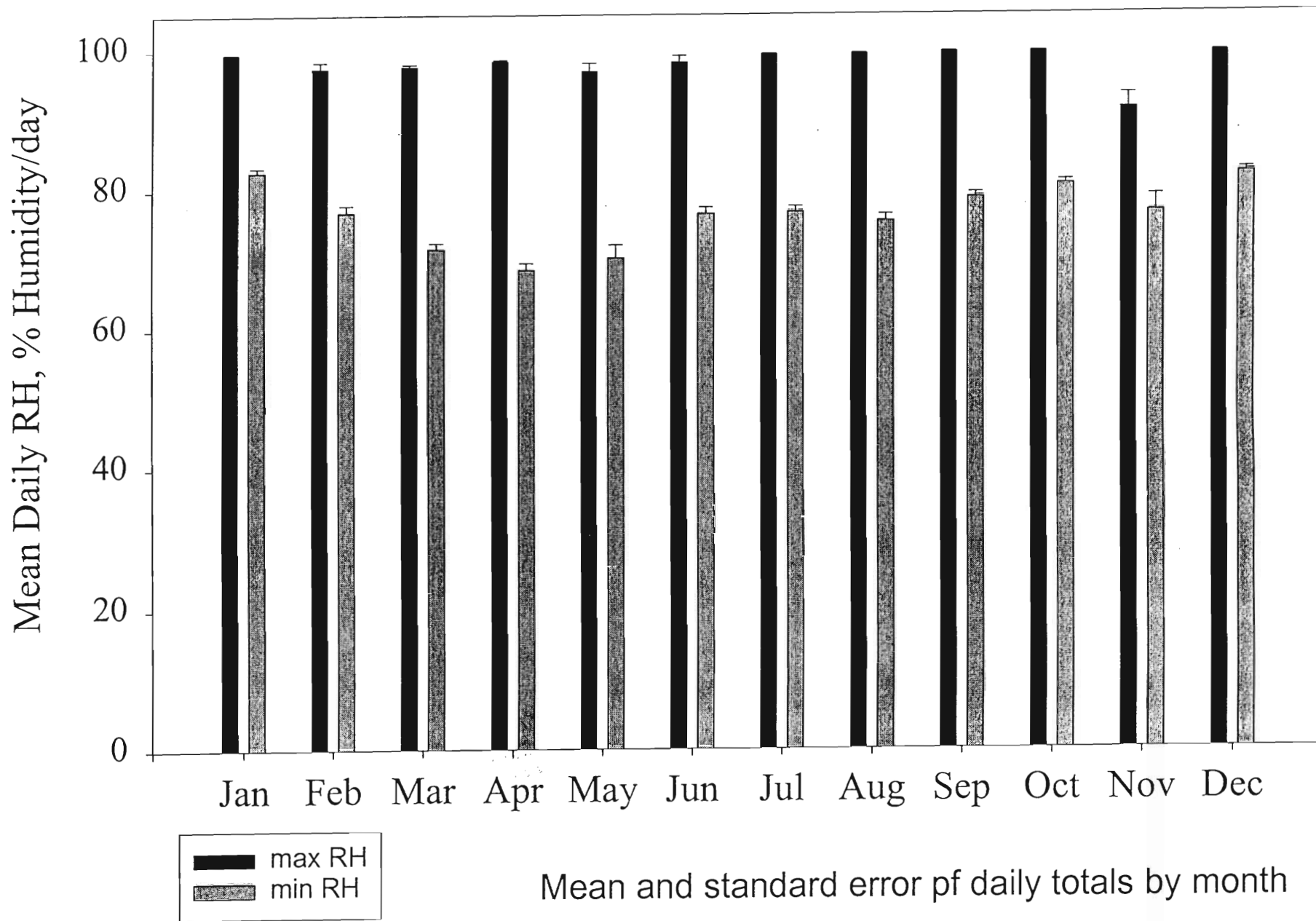
Bisley Ground Climate Station  
1993 to 1998



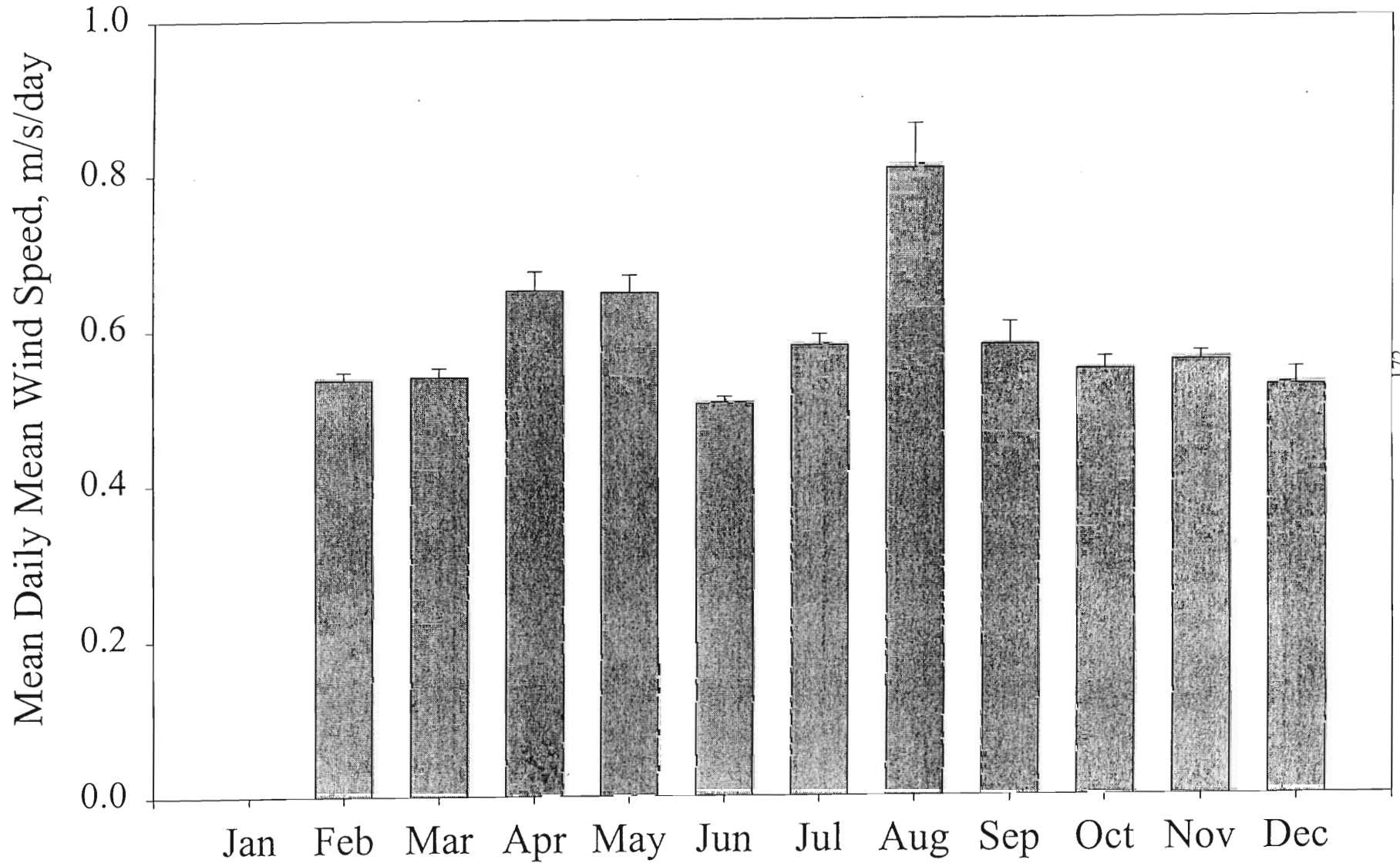
Bisley Ground Climate Station  
1993 to 1998



# Bisley Ground Climate Station 1993 to 1998

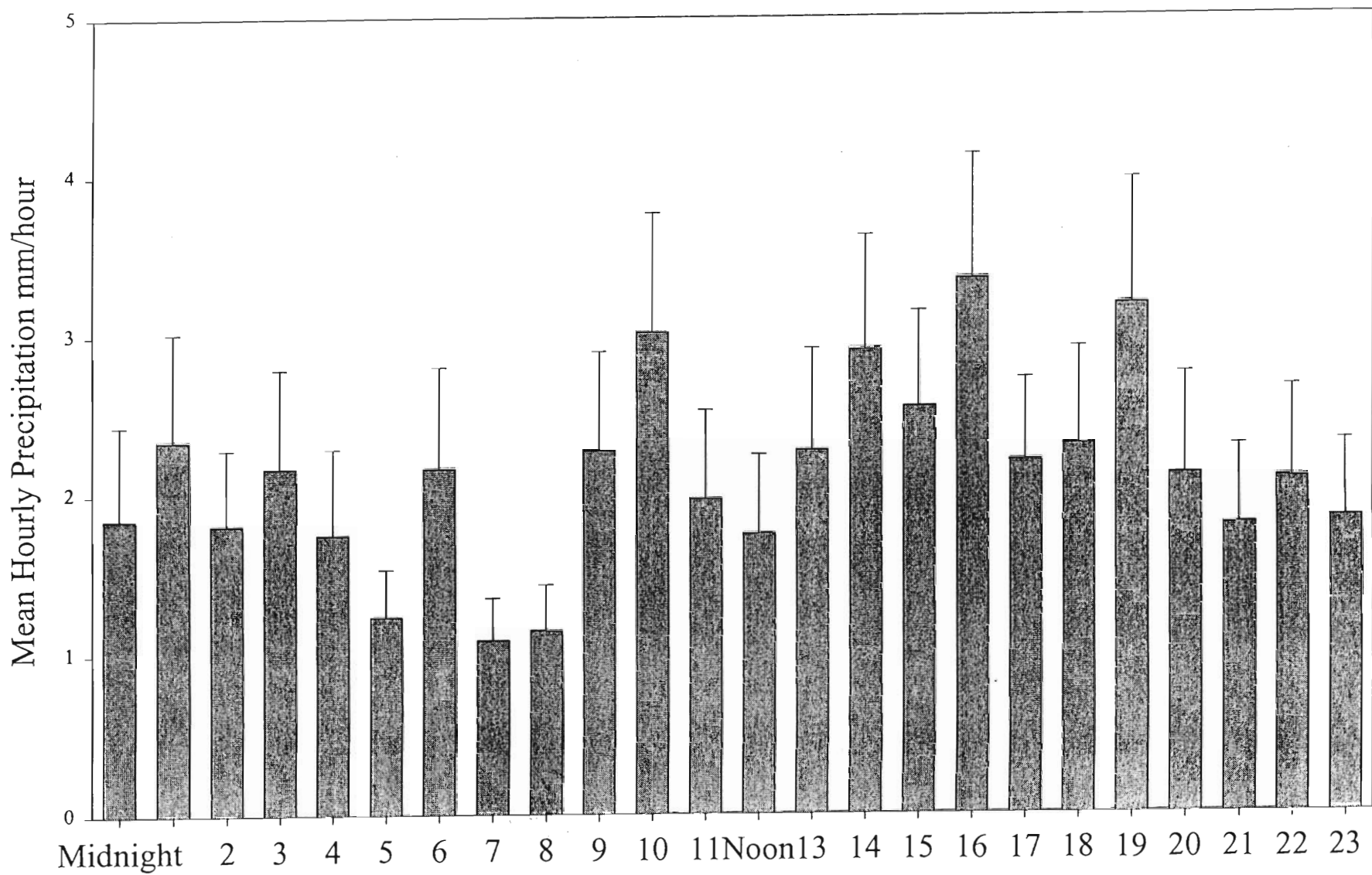


Bisley Ground Climate Station  
1993 to 1998



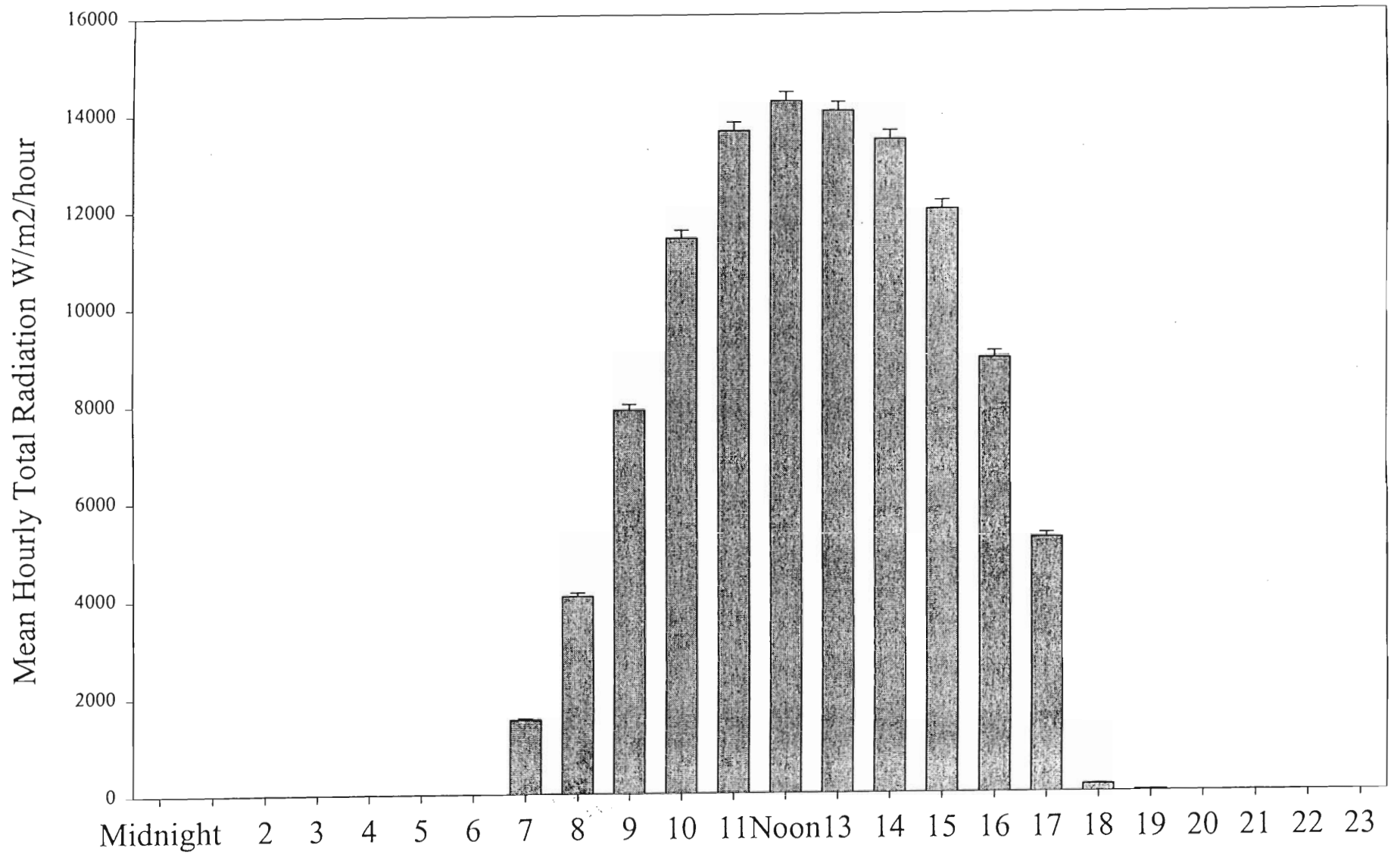
Mean and standard error pf daily totals by month

# Bisley Tower Climatic Station 1993 to 1998



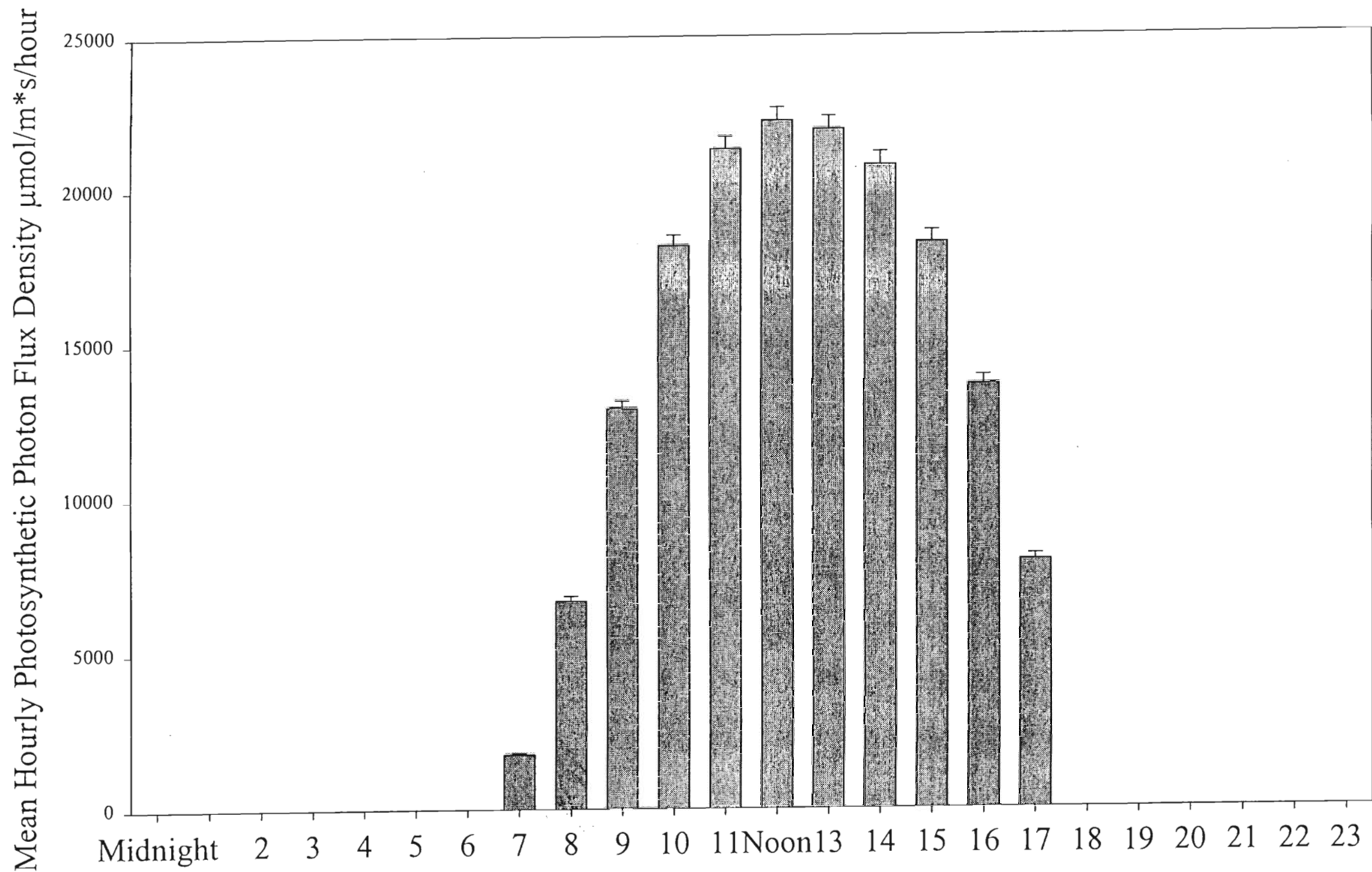
Mean and standard error of hourly values

# Bisley Tower Climatic Station 1993 to 1998



Mean and standard error of hourly values

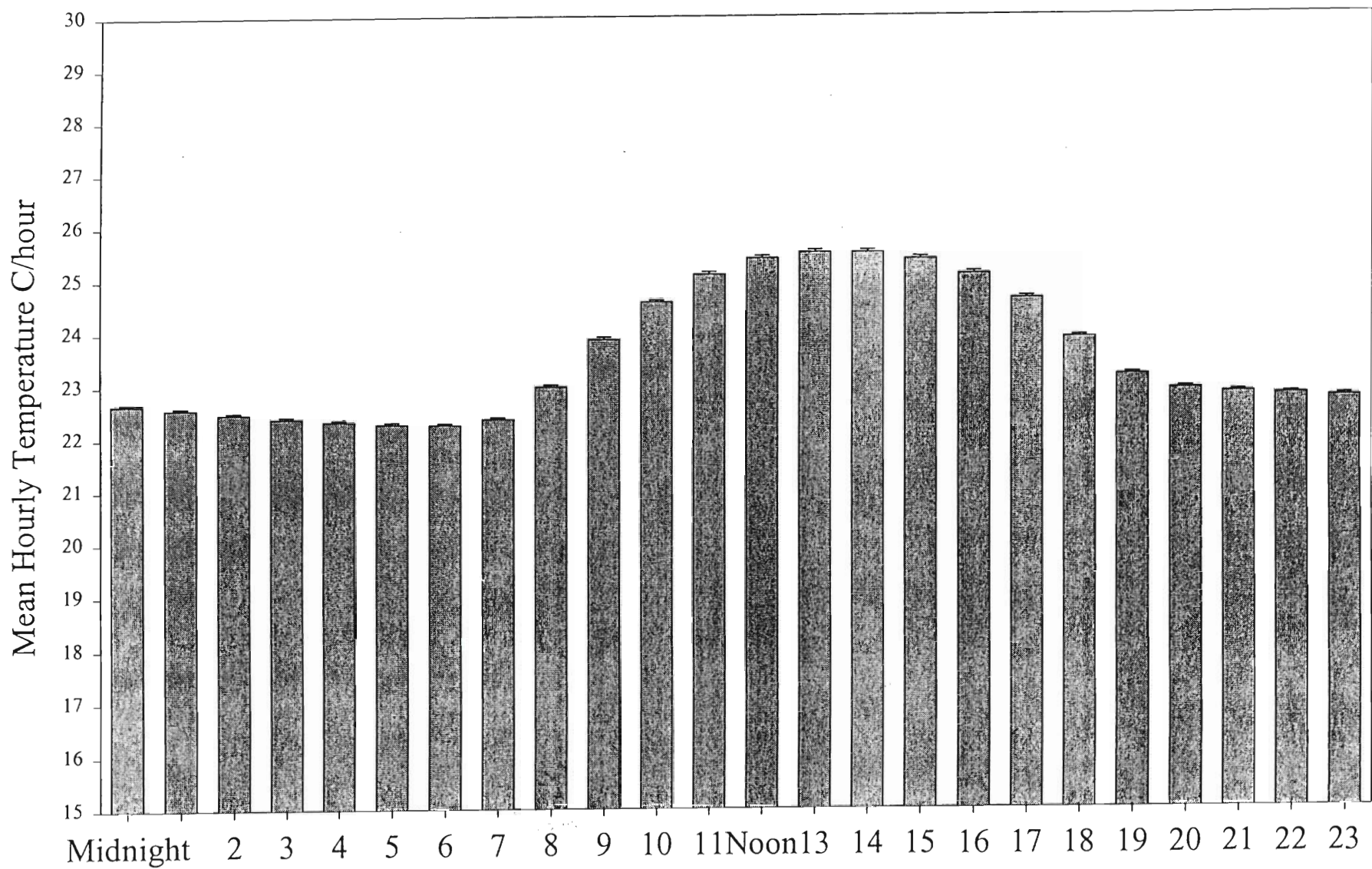
# Bisley Tower Climatic Station 1993 to 1998



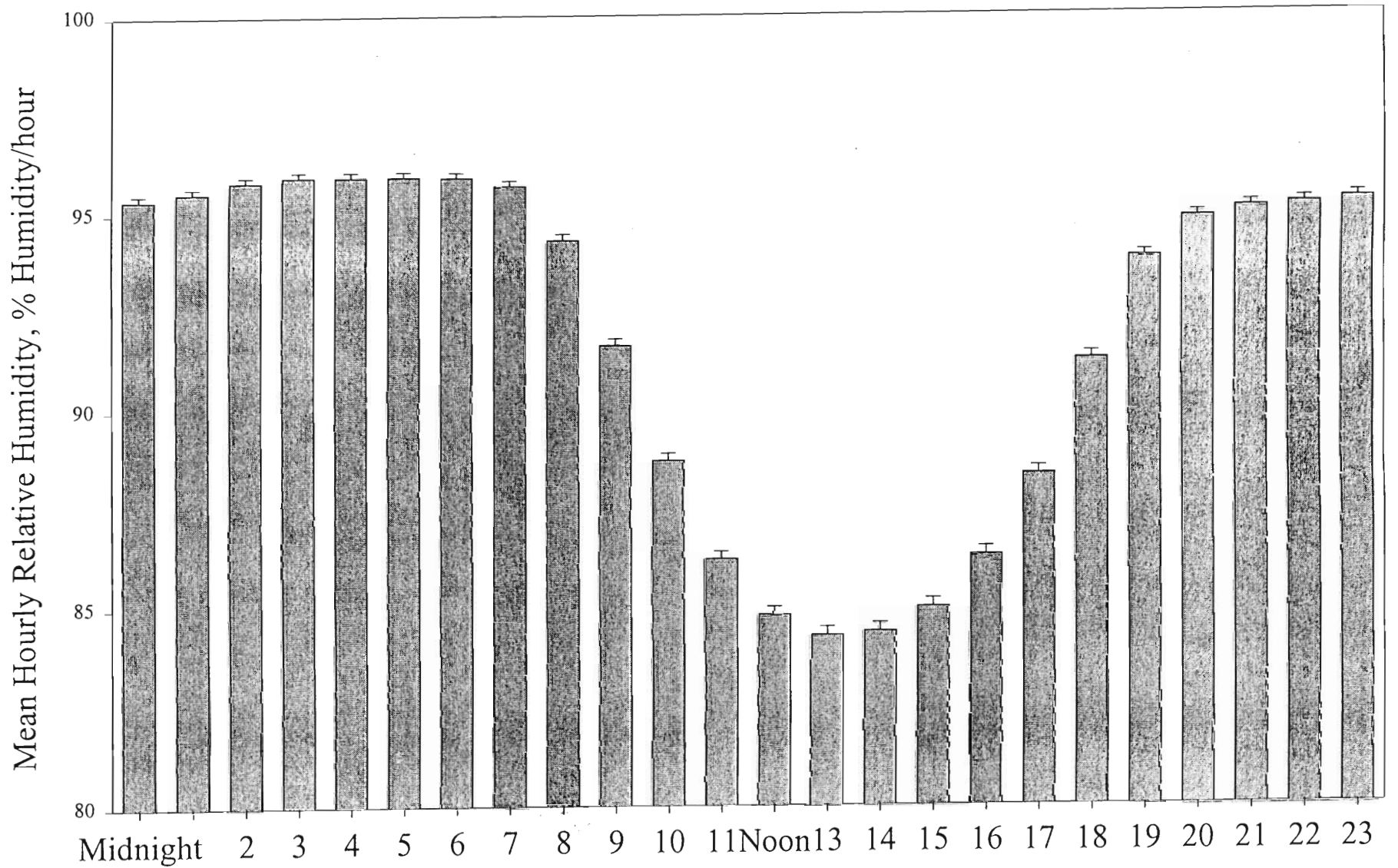
Mean and standard error of hourly values



# Bisley Tower Climatic Station 1993 to 1998

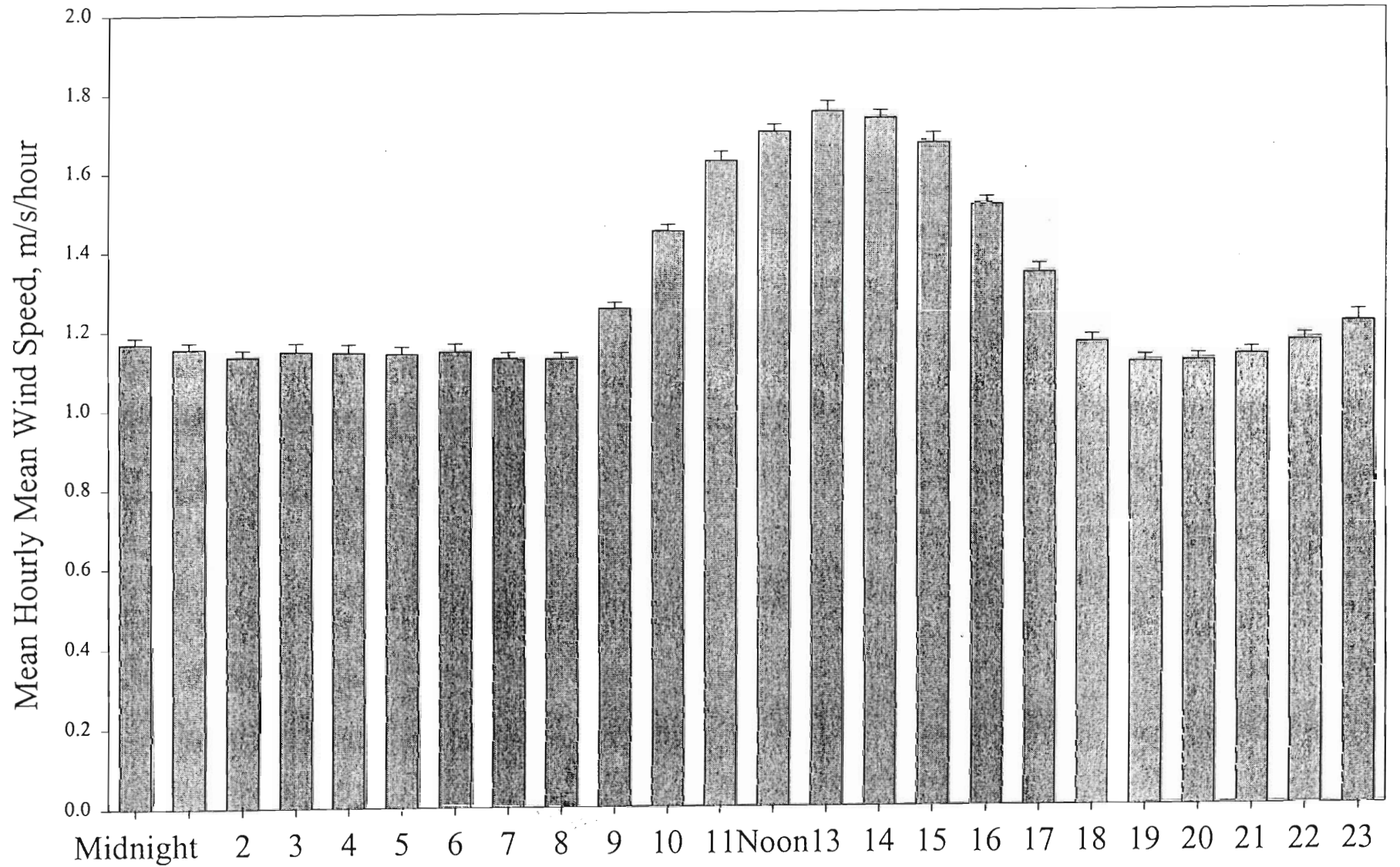


# Bisley Tower Climatic Station 1993 to 1998



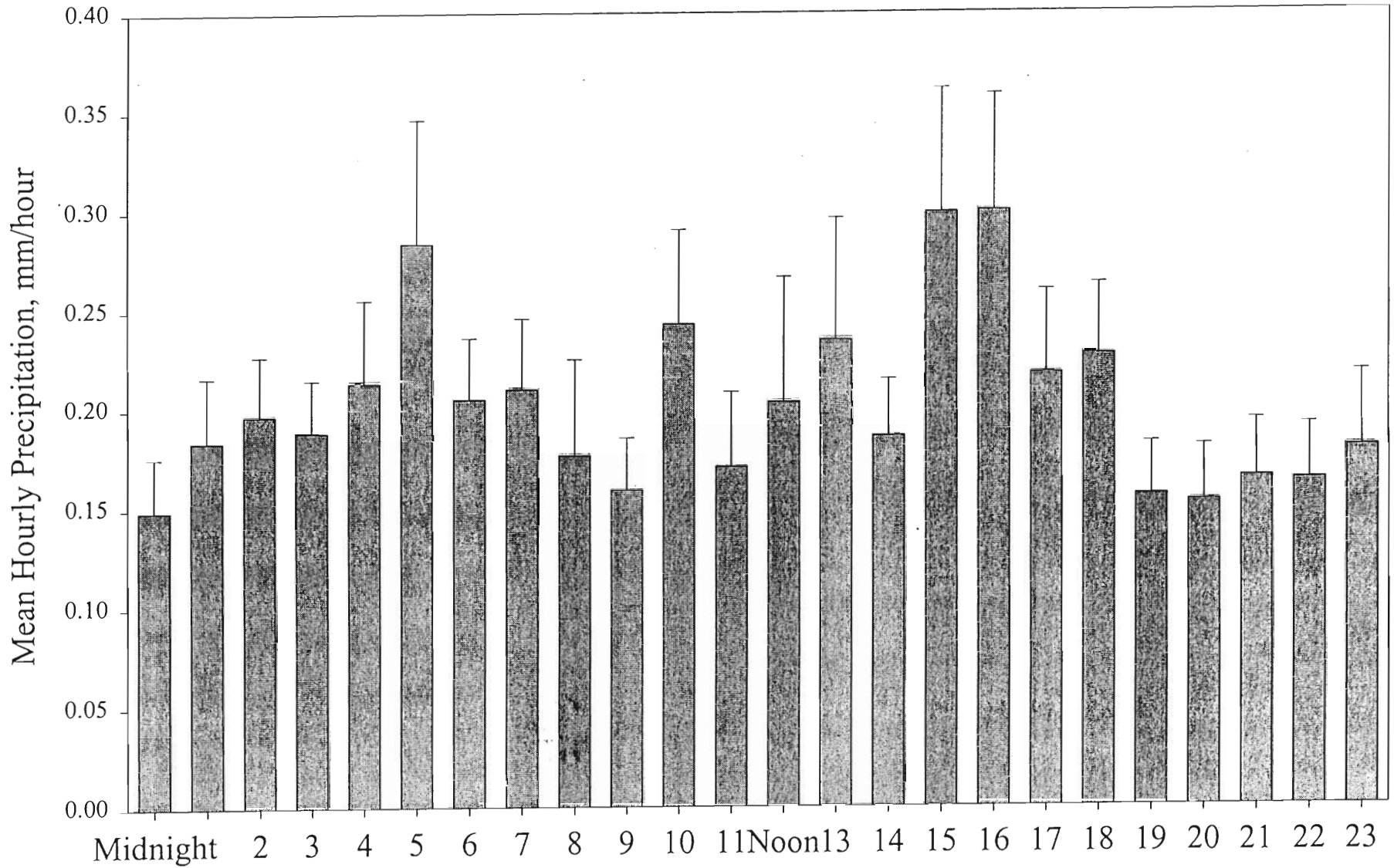
Mean and standard error of hourly values

# Bisley Tower Climatic Station 1993 to 1998

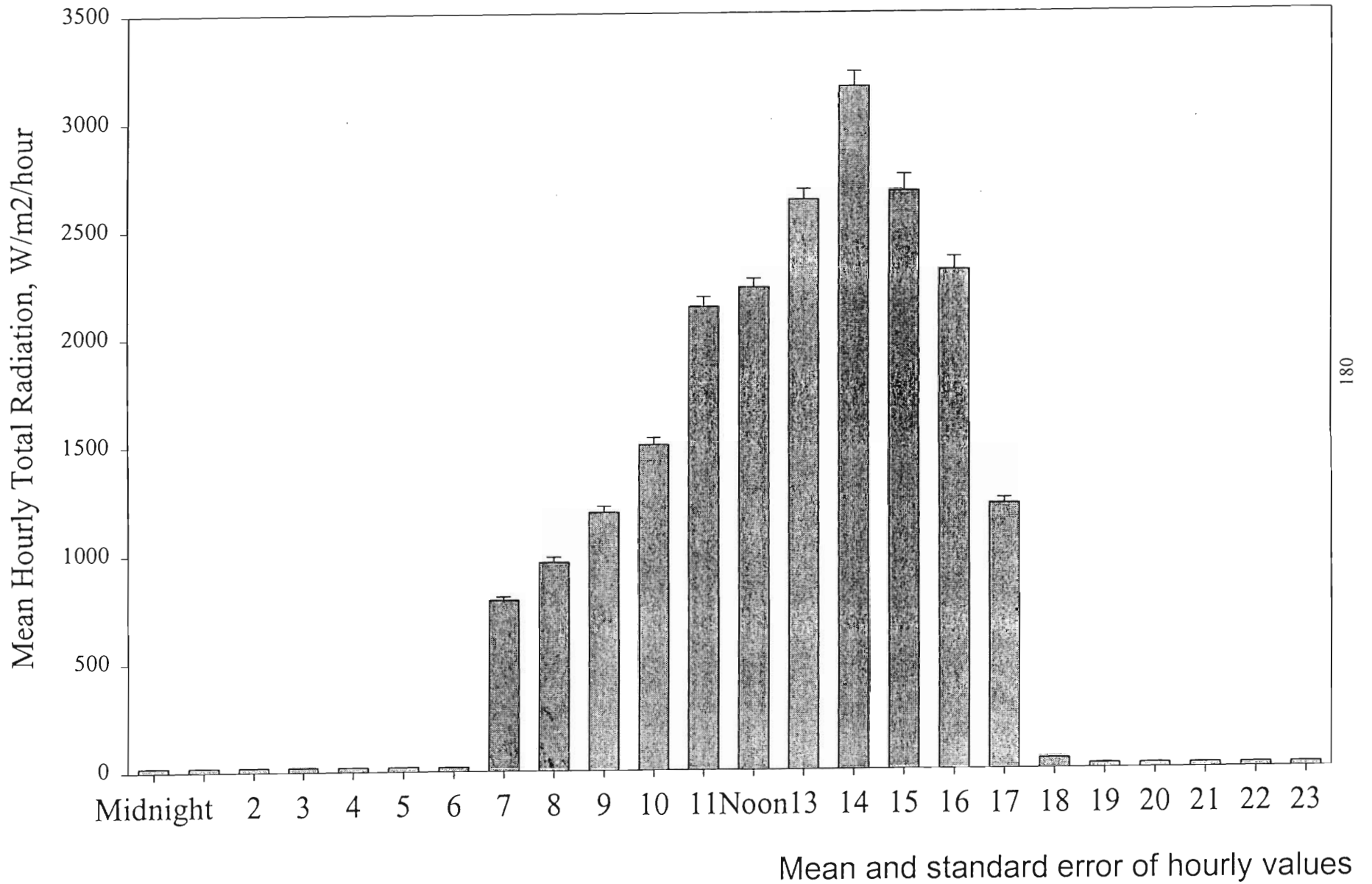


Mean and standard error of hourly values

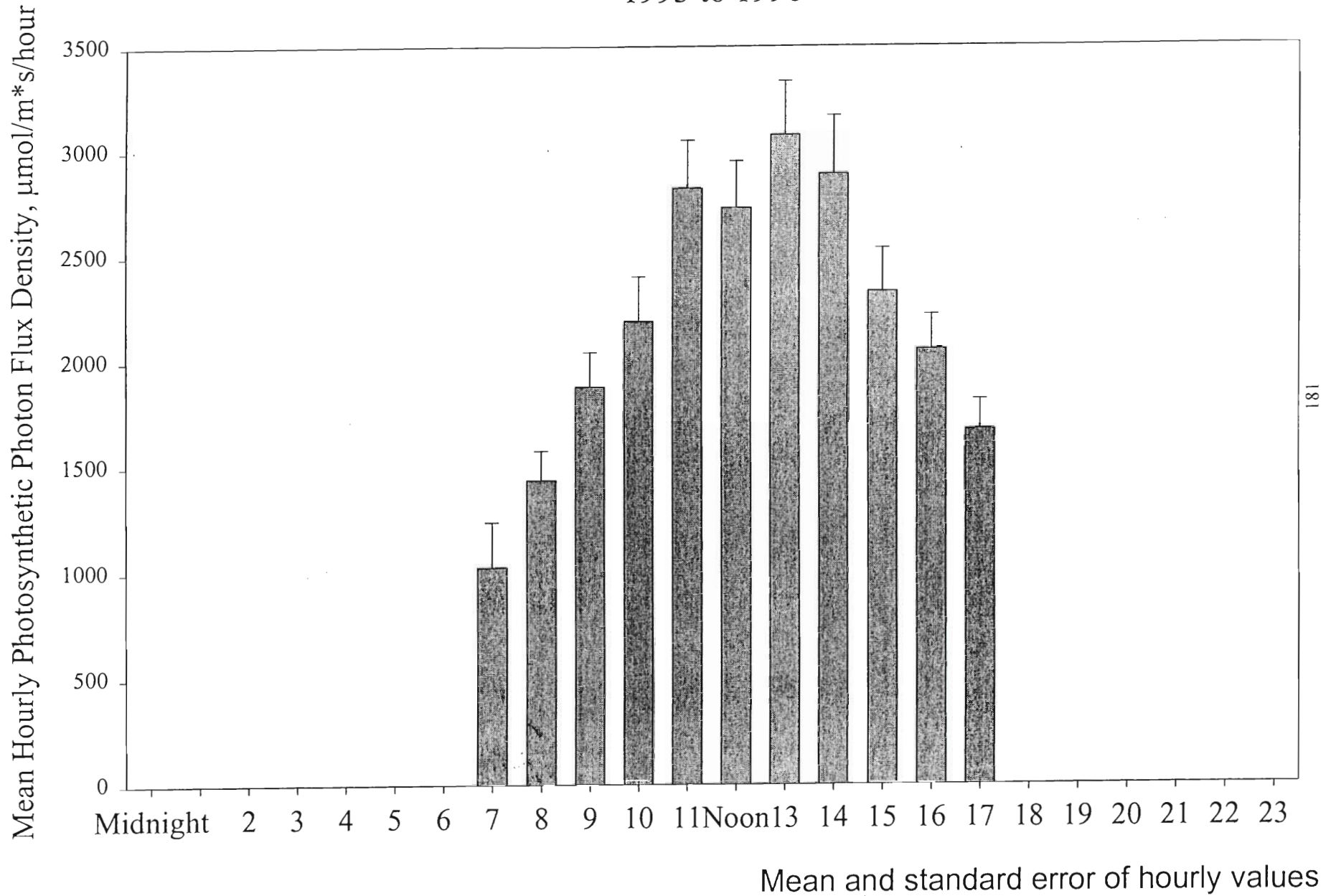
Bisley Ground Climatic Station  
1993 to 1998



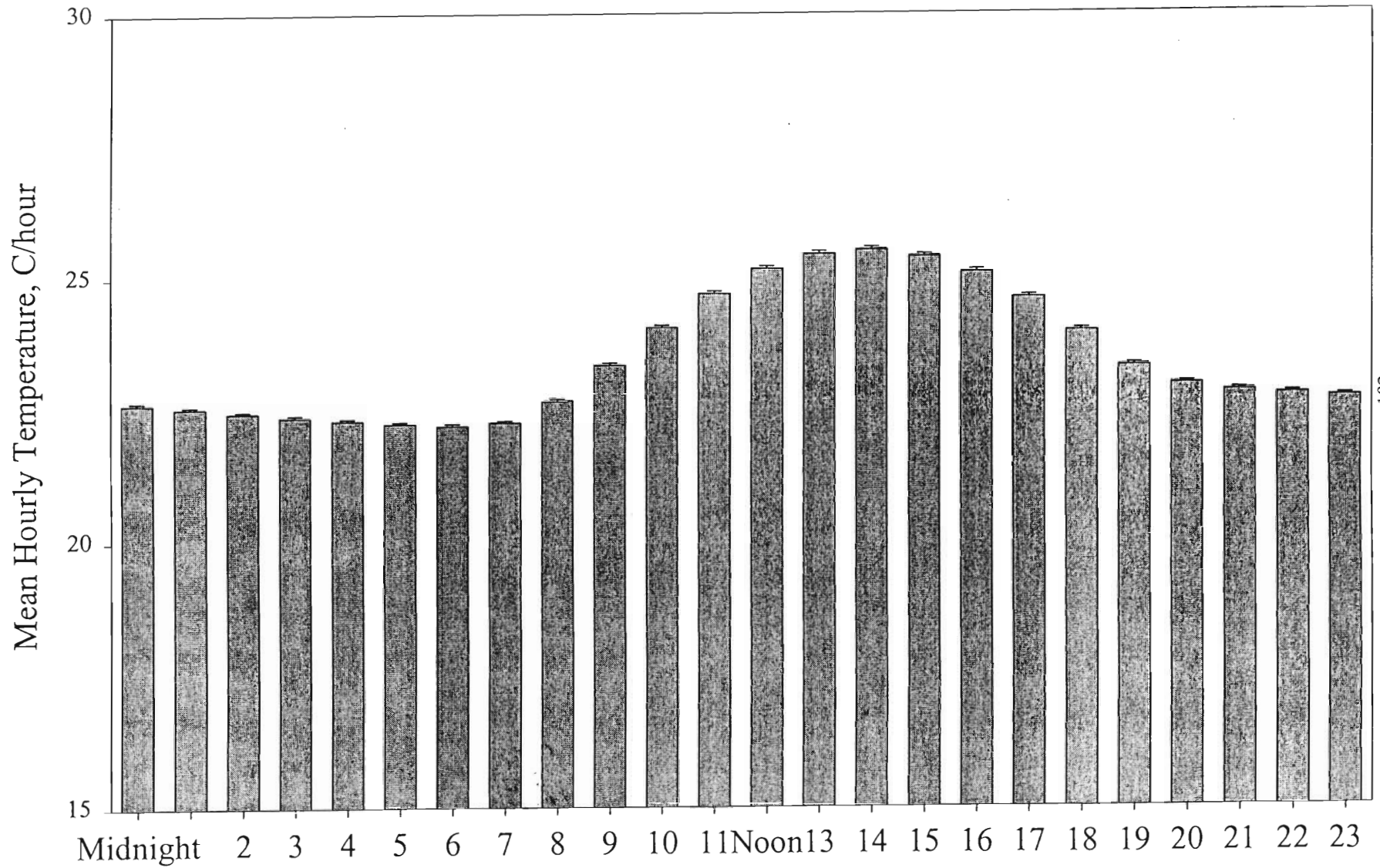
# Bisley Ground Climatic Station 1993 to 1998



Bisley Ground Climatic Station  
1993 to 1998

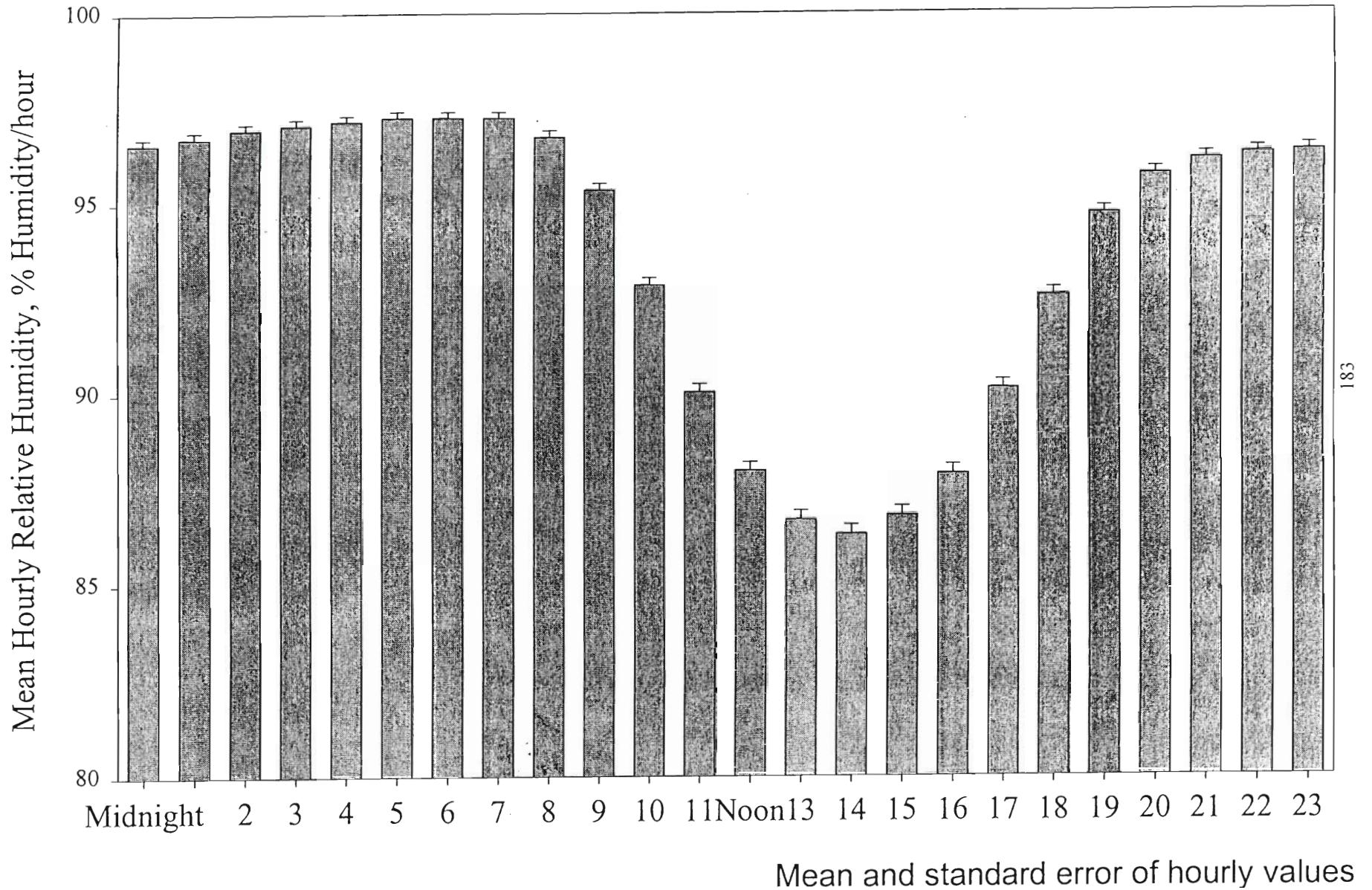


Bisley Ground Climatic Station  
1993 to 1998



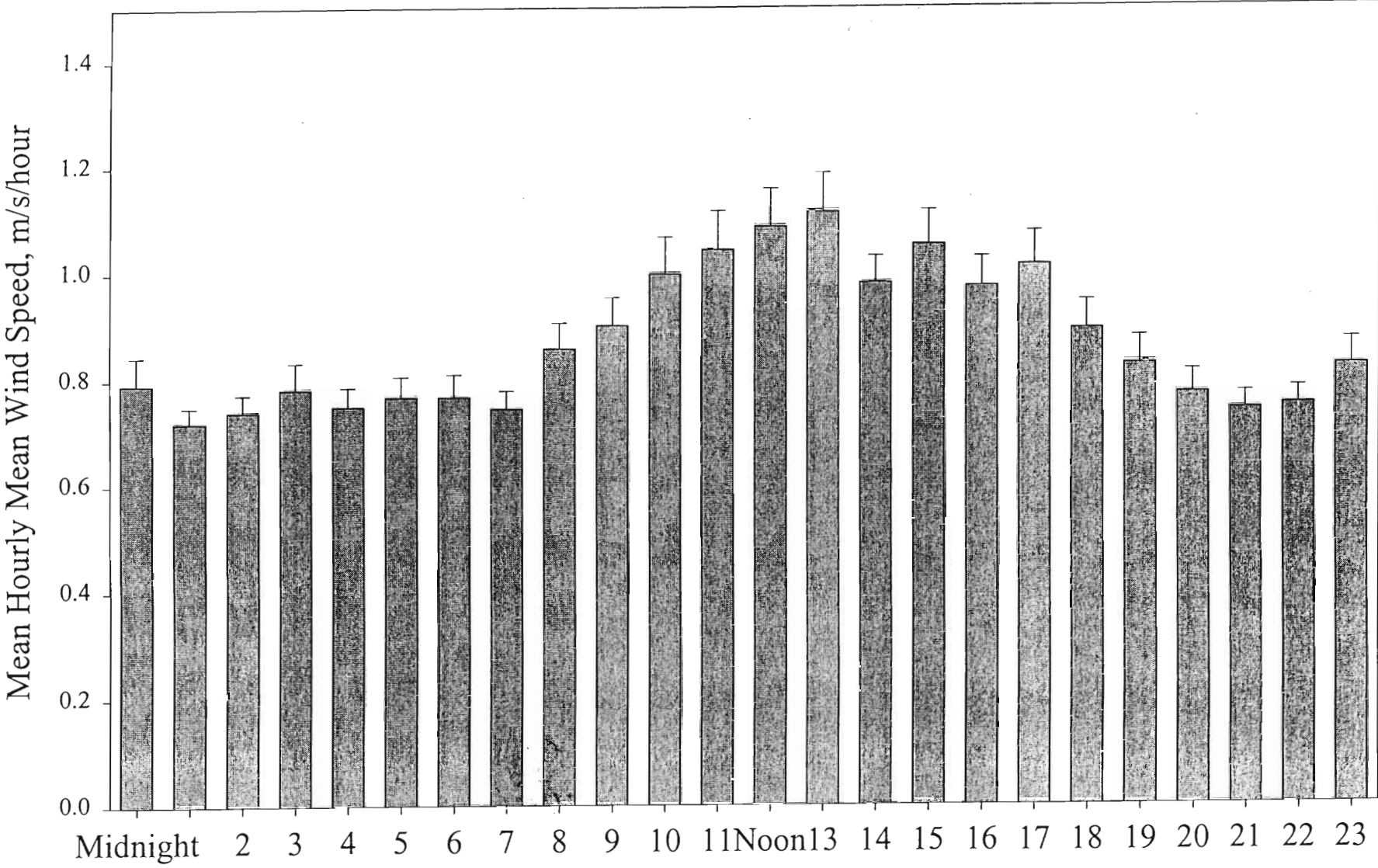
Mean and standard error of hourly values

Bisley Ground Climatic Station  
1993 to 1998





Bisley Ground Climatic Station  
1993 to 1998



Mean and standard error of hourly values



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*Best Viewed in 800 x 600 resolution*

This page created in April/May 1999 by [Eric White](#), [Michelle Lutz](#), and [Andre Freeman](#), Worcester Polytechnic Institute

## Welcome to the Bisley Experimental Watersheds Climate Page



[Download Daily Climatic Data](#)



[Download Hourly Climatic Data](#)



[LEF Air and Soil Temperature Data](#)



[Bisley Weekly Rainfall and Throughfall Data](#)



[VAMPS, a model of Vegetation-AtMosPHERE-Soil water flow](#)



[Frequently Asked Questions](#)



[Tables, Graphs, and Other Information](#)



[Write Us](#)



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## **Bisley Experimental Watersheds Luquillo Experimental Forest, Puerto Rico Daily Climate Data**

To download the entire daily data set from the tower station, click [here](#)

To download the entire daily data set from the ground station, click [here](#)

To only download data from:

Which station do you want the data from?  Tower Station  Ground Station

What form do you want the data in?



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## **Bisley Experimental Watersheds Luquillo Experimental Forest, Puerto Rico Hourly Climate Data**

To download the entire hourly data set from the tower station, click [here](#)

To download the entire hourly data set from the ground station, click [here](#)

To only download data from one year:

Which Station do you want the data from?  Tower Station  Ground Station

What form do you want the data in?



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## Frequently Asked Questions

Frequently asked questions about the El Yunque Rainforest  
and the Bisley Climate data

Question: What is a rainforest?

Answer: A rainforest is a forest that receives a minimum of 100 inches (2500 mm) of rain per year. Most rainforests receive more than 100 inches of rain.

Q: What is the Luquillo Experimental Forest (LEF)?

A: The Luquillo Experimental Forest is a USDA Forest Service Research forest in northeastern Puerto Rico and is the only tropical rainforest in the U.S. National Forest System. The LEF is also known as the Caribbean National Forest and El Yunque by local residents.

Q: What is the International Institute of Tropical Forestry (IITF)?

A: IITF is a part of the United States Department of Agriculture Forest Service located in Puerto Rico. IITF has been doing tropical forestry research for sixty years.

Q: What are the Bisley Experimental Watersheds?

A: The Bisley Experimental Watersheds are a series of instrumented watersheds in the LEF that are used for monitoring and scientific study.

Q: How large is the LEF and the Bisley Experimental Watersheds?

A: The LEF is 28,000 acres and occupies the upper elevations of the Luquillo Mountains. The Bisley Experimental watersheds occupy an area of about 150 acres.

Q: What are the elevation range of the Luquillo Mountains and the Bisley watersheds?

A: The Luquillo Mountains rise over 1000 meters about sea level with its highest peak rising 1075 meters above sea level. The Bisley watersheds rise from approximately 200 m to 450 m.

Q: How much rain does the LEF receive each year?

A: On average the LEF receives between 3500 and 4800 mm/yr. dependent on the elevation.

Q: What types of forests are found in the LEF and in the Bisley Experimental Watersheds?

A: There are four forests types in the LEF. Each occurs in a different climate and elevation. The four types are Tabonuco, Colorado, Palm and Dwarf. The Tabonucc

forest is located in elevations below 600 meters and is dominated by the Tabonuco tree. The Colorado forest is located at elevations between 600 and 900 meters and is dominated by the Colorado tree. The Palm forest occurs on steep windward slopes, riparian areas, and areas with poor drainage. The Dwarf forest is only located on the highest mountain peaks above 900 meters. Most trees in the Dwarf forest are short and twisted. Tabonuco forests are found in the Bisley Experimental Forest.

Q: What does the LEF do for the people of Puerto Rico?

A: The forest provides recreation and is the source of six major rivers: Rio Mameyes, Rio Fajardo, Rio Espiritu Santo, Rio Grande de Loiza, Rio Blanca, and Rio Sabana. These rivers supply over 600,000 people with water.

Q: What sort of animals are found in any rainforest around the world?

A: In most rainforests one can find a large number of animals such as jaguars, tigers, monkeys, bats, butterflies, birds, sloth, frogs and lizards.

Q: What animals are found in the LEF?

A: El Yunque has a smaller variety in their wildlife population than some other rainforests. In the LEF one can find birds, frogs, lizards, and bats.

Q: What species of birds are likely to be found in the Luquillo Experimental Forest

A: One is likely to find sixty-six species of birds depending on the time of year. Eleven of these species occur only in the Caribbean and nine only occur in Puerto Rico.

Q: What bird species are only found in the Caribbean?

A: The Puerto Rican Screech-Owl and the Puerto Rican Flycatcher can be found on different islands of the Caribbean. The Puerto Rican Parrot, Puerto Rican Lizard-Cuckoo, Green Mango, Puerto Rican Emerald, Puerto Rican Tody, Puerto Rican Woodpecker, Elfin Woods Warbler, Puerto Rican Tanager, and the Puerto Rican Bullfinch can only be found in Puerto Rico.

Q: What is unique about the Puerto Rican Parrot?

A: The Puerto Rican Parrot is an endangered bird with about 35-40 left in the wild. There is no zero missing from these numbers! The parrot is green with blue wing tips that are usually only visible in flight.

Q: What types of frogs are there?

A: The coqui is the dominant frog in the LEF. There are 16 species of coqui, with 13 of these species occurring only in the LEF. These frogs are unique in they never go through there life as a tadpole. The female lays eggs and when the egg hatch miniature adult coquis emerge. Several species that can be heard are antillian coqui, whistling coqui, grass coqui, forest coqui, common coqui, web-footed coqui, tree-hole coqui, cricket coqui, warty coqui, wrinkled coqui, mottled coqui, ground coqui, and burrow coqui.

Q: Why are they called coqui and why can they only be heard?

A: Coquis get there name from the most commonly heard coqui in their family which makes the sound "ko-kee." Coquis are nocturnal and very small making them very hard to see but they can be heard a long ways off.

Q: What climate variables are measured in the Bisley Experimental watersheds?

A: [Click here](#)

Q: What instruments are used to measure climate in the Bisley Experimental watersheds?

A: [Click here](#)

A *Unique Fact* about the LEF:

Silt and dust from the Sahara desert can be found at the top of the Luquillo Mountains in a section called the Elfin Cloud Forest, a type of rainforest.



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## Tables, Graphs, and Other Information

To download the SAS program that was used in the quality control of the original data set:

Tower Daily

To view a table of all variables in the data sets click [here](#)

To view a table of important recent climatic events click [here](#)

Tower station graphs of mean values for:

For what data set?  Daily  Hourly

Ground station graphs of mean values for:

For what data set?  Daily  Hourly



## Table of Variables

Variable	Label	Unit	Measurement Range	Equipment
Year	YEAR	Years	1993 to 1998	
Day	DAY	Days	1 to 366	
Precipitation	PRECIP	mm	0 to 600	<a href="#">Tipping Bucket</a>
Total Radiation	TOTAL_RAD	watts/m <sup>2</sup>	500 to 30,000	<a href="#">Albedometer CM 7B</a>
Total Photosynthetic Photon Flux Density	TOTAL_PPFD	μmol/m <sup>2</sup> /s	9500 to 60,000	<a href="#">Albedometer CM 7B</a>
Global Radiation	GLOBALRAD	watts/m <sup>2</sup>	0 to 400	<a href="#">Albedometer CM 7B</a>
Reference Radiation	REFSRAD	watts/m <sup>2</sup>	0 to 100	<a href="#">Albedometer CM 7B</a>
Standard Global Radiation	STDGLORAD	watts/m <sup>2</sup>	0 to 400	<a href="#">Albedometer CM 7B</a>
Standard Deviation Reference Radiation	DEVREFSRAD	watts/m <sup>2</sup>	0 to 100	<a href="#">Albedometer CM 7B</a>
Maximum Wind Speed	MAX_WIND_S	m/s	0.5 to 50	<a href="#">Met-one 014a Anemometer</a>



Time of Maximum Wind Speed	TIME_MWS	Minutes	0 to 2400	<a href="#">Met-one 014a Anemometer</a>
Maximum Temperature	MAX_TEMP	Celsius	10 to 40	<a href="#">Temperature and Relative Humidity Probe</a>
Time of Maximum Temperature	TIME_MT	Minutes	0 to 2400	
Maximum Relative Humidity	MAX_RH	Percent Humidity	0 to 105	<a href="#">Temperature and Relative Humidity Probe</a>
Time of Maximum Relative Humidity	TIME_MRH	Minutes	0 to 2400	
Minimum Wind Speed	MIN_WIND_S	m/s	0.4 to 10	<a href="#">Met-one 014a Anemometer</a>
Time of Minimum Wind Speed	TIME_MIWS	Minutes	0 to 2400	<a href="#">Met-one 014a Anemometer</a>
Minimum Temperature	MIN_TEMP	Celsius	10 to 40	<a href="#">Temperature and Relative Humidity Probe</a>
Time of Minimum Temperature	TIME_MIT	Minutes	0 to 2400	
Minimum Relative Humidity	MIN_RH	Percent Humidity	0 to 105	<a href="#">Temperature and Relative Humidity Probe</a>
Time of Minimum Relative Humidity	TIME_MIRH	Minutes	0 to 2400	
Mean Wind Speed	MEAN_WS	m/s	0.4 to 50	<a href="#">Met-one 014a Anemometer</a>
Mean Wind Vector Magnitude	MEAN_WVM	Degrees	0 to 360	<a href="#">Met-one 024a Wind Vane</a>
Mean Wind Vector Direction	MEAN_WVD	Degrees	0 to 360	<a href="#">Met-one 024a Wind Vane</a>
Standard Deviation Wind Direction	SDWDIR		0 to 100	<a href="#">Met-one 024a Wind Vane</a>
Wind Rose 0-45 degrees	WR_0_45	m/s	0 to 10	<a href="#">Met-one 014a Anemometer</a>
Wind Rose 45-90 degrees	WR_45_90	m/s	0 to 10	<a href="#">Met-one 014a Anemometer</a>

Wind Rose 90-135 degrees	WR_90_135	m/s	0 to 10	<a href="#">Met-one 014a Anemometer</a>
Wind Rose 135-180 degrees	WR_135_180	m/s	0 to 10	<a href="#">Met-one 014a Anemometer</a>
Wind Rose 180-225 degrees	WR_180_225	m/s	0 to 10	<a href="#">Met-one 014a Anemometer</a>
Wind Rose 225-270 degrees	WR_225_270	m/s	0 to 10	<a href="#">Met-one 014a Anemometer</a>
Wind Rose 270-315 degrees	WR_270_315	m/s	0 to 10	<a href="#">Met-one 014a Anemometer</a>
Wind Rose 315-360 degrees	WR_315_360	m/s	0 to 10	<a href="#">Met-one 014a Anemometer</a>



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## User Feedback

First Name:

Last Name:

Email:

What is your profession?  Professor  Researcher  Graduate Student  
 Undergraduate Student  Businessman  Other

What is your area of expertise?

What habitat(s) and/or organism(s) do you study? (Check all that apply)

Forests  Streams  Agricultural  Tropical

Atmospheric  Plants  Animals  Other

What form did you download the data in?

For what time frame?

Questions or Comments?

This page looks great! You guys definetly deserve an A!! Nice Job!

From whitee@WPI.EDU Mon May 3 14:57:46 1999  
Date: Mon, 3 May 1999 15:00:31 -0400 (GMT-0400)  
From: whitee@WPI.EDU  
To: whitee@WPI.EDU  
Subject: FeedBack RESPONSE

On Mon May 3 15:00:29 1999,  
The following information was submitted:  
Host: 136.145.3.232  
first = Eric  
last = White  
submit\_by = whitee@wpi.edu  
profession = Undergrad. Student  
expertise = Computer Science  
for = Forests  
str =  
agr =  
tro = Tropical  
atm = Atmospheric  
pla =  
ani =  
oth =  
checkother =  
data = Both  
time = Daily  
other = Questions or Comments?

This page looks great! You guys definetly deserve an A!! Nice Job!

## CGI Script

```
#!/bin/perl

# fileget.cgi
# Programmed by Eric White
# April 1999
#
# This program parses an html form, then creates a URL, based on
# users selections in order to retrieve files.

##### Configuration #####

# $basedir is the directory where your files reside. (html)
$basedir = "/d1/netinfo/http/etc/htdocs/DATA/scatena/bisley/html/";

# $baseweb is the web address of the directory (not html file) where
# your files reside.
$baseweb = "http://sunceer.upr.clu.edu/DATA/scatena/bisley/";

##### You're done with configuration #####

##### THE ACTUAL PROGRAM #####

# Sends program into the parse subroutine, which collects
# and parses html form information.
&parse;

# The user is now ready to download the file.
# These lines assign inputs in the form to different
# values, so that will point it to the correct url.

#Adds numerical values taken from form to file name
$dir = "$FORM{'month'}$FORM{'year'}";

#Adds extension to file name
$extension = $FORM{'extension'};

#Adds 'h' or 'd' to file name depending on which data set
$time = $FORM{'time'};

#Makes first letter of file name a 'g' or 't' depending on which tower
$station = $FORM{'station'};

#used for tables, this is the variable that user selects
$variable = $FORM{'variable'};

#Used to download sas program
$programs = $FORM{'programs'};

#Value of subdirectory depending on if for tables or data sets
$path = $FORM{'path'};
```

```
# Combines form values to form valid url for script to hunt.
$url = "$baseweb$path$station$time$variable$dir$extension$programs";
```

```
# Sends browser to the download file.
&printurl;
```

```
# Tells the program the party's over.
exit;
```

```
##### END ACTUAL PROGRAM #####
```

```
##### PARSE SUBROUTINE #####
```

```
# Divides up fields of html form and
# puts it in a form the script can read.
```

```
sub parse
{
read(STDIN, $buffer, $ENV{'CONTENT_LENGTH'});
```

```
@pairs = split(/&/, $buffer);
```

```
foreach $pair (@pairs)
{
($name, $value) = split(/=/, $pair);
$value =~ tr/+ / /;
$value =~ s/%([a-fA-F0-9][a-fA-F0-9])/pack("C", hex($1))/eg;

$value =~ s/~! / ~!/g;
```

```
    $FORM{$name} = $value;
}
}
```

```
##### PRINTURL SUBROUTINE #####
```

```
# This subroutine actually prints the url into the browser in order
# to go to the desired location
```

```
sub printurl
{
print ("Location: $url\n");
print ("Content-type: text/html\n\n");
}
```

## APPENDIX H

### Instructions for Updating the SAS program for Quality Control Analysis of the Climatic Data

Before making changes to the program, check and make sure all variables are in the correct location. Sometimes the measuring equipment has failures and places values into the wrong column.

To check for the years, in which the data was collected, change the limits in the first line under year to the years that the data is from. Once this is done, if there is a leap year in the years collected, go to where the months are added and change the 1996 to the leap year in the data set. If 1996 is included along with a second leap year add the word OR between the years.

To add a variable, follow the format of the current variables. Make sure to place the variables name and ranges into the proper places. The variable must be less than eight characters (letters or symbols) long or it will not work, making sure that the variable is spelled correctly. The range of the variable may have to be adjusted depending on the instrument or known inaccuracy.

### Instructions for Updating the Web Page

Updating the Bisley Climatic Data Web Page is an easy task. The following is how it is done:

To add more data sets for different years to the page:

1. First, make sure you have the files in the proper format. You should have Database Files (DBF) and HTML files. These can be created with programs similar to the ones we used. (The program actually creates text files. To change these files to an HTML document, simply use the “ren \*.txt \*.htm” in dos.) Upload these files to sunceer.upr.clu.edu to the path /d1/netinfo/http/etc/htdocs/DATA/scatena/bisley/data . This can also be done by giving the files to Eda Melendez. The files’ name MUST follow the format td0898, where t is tower (station name, g would be ground), d is daily (time frame, h would be hour), 08 is august (“all” would be the whole year), and 98 is for 1998.
2. Next, in order to make the web page capable of selecting these files, additional changes to the page must be made to the select functions in the html. This is currently labeled. The comments may be taken out for the years that I have already added, otherwise follow the same scheme that is there currently, which is “<option value=’00’>2000</option>”. This statement would add the year 2000 to the web page selection.

To change the script to allow variables for other forms:

1. Simply follow the same format as commented in the script “fileget.cgi”. You name variable and match it with a field that is in the HTML form. For example, “\$extension = \$FORM{'extension'};” would create a variable named extension that gets its’ value from the field in the HTML form also called extension.
2. If this script is ever to be used on another server, the “baseweb” variable must also be changed in the script to correspond with the new server address.

To change response sent to users email address:

1. When the user sends in the feedback form, he/she is automatically sent a response in email thanking them for taking the time to complete the survey. To change this message, simply edit “mymessage.txt” located on the sunceer.upr.clu.edu server.\



## APPENDIX I

### Glossary

**Allometry:** The study and measurement of the relative growth of an organism in comparison with the whole.

**Asymmetric:** Not symmetrical; wanting proportion

**Biomass:** The total amount of living organisms in a particular volume or area.

**Fault-blocked:** Mountain formed by the displacement of rock along a fault.

**Geomorphic:** Pertaining to the shape of the earth, or an area's topography

**Herbaceous Species:** Species of, or having the nature of, an herb or herbs

**Hydrologic:** Pertaining to the science of water, it's properties, phenomena, and distribution over the earth's surface.

**Mean Value:** Average value for a particular set of values.

**Perennial:** Lasting or active through the year or through many years; perpetual; continually recurring.

**Petagram:** One billion metric tons

**Recovery Period:** Period of time it takes a process to return to its original form or state after an event.

**Regeneration:** The process of being reformed or reconstructed again.

**Regression:** The act of passing back or returning.

**Riparian:** of, on, or pertaining to the bank, of a natural course of water.

**Runoff:** Something that runs off, such as excess rain, which is not absorbed by the ground.

**Standard Deviation:** Measure of variability equal to the square root of the arithmetic average of the squares of the deviations from the mean.

**Stemflow:** The portion of rainfall that reaches the ground by running down the stems of vegetation

**Throughfall:** The portion of rainfall that reaches the ground through passing through the canopy and running down the stems of vegetation.

**Topographic:** Pertaining to the description of a particular place, or tract of land; especially, the exact and scientific delineation and description in minute detail of any place or region.

**Turnover period:** The period it takes a reservoir to lose its storage through a given event or discharges.

**Watershed:** A dividing ridge between two drainage areas or the region or area drained by a particular body of water.