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SOLAR RADIATION OBSERVATION STATIONS
WITH
COMPLETE LISTING OF DATA ARCHIVED BY THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA
AND
INITIAL LISTING OF DATA NOT CURRENTLY ARCHIVED

Center for Environmental and Energy Studies

The University Of Alabama In Huntsville

(NASA-CR-150177) SOLAR RADIATION OBSERVATION STATIONS WITH COMPLETE LISTING OF DATA ARCHIVED BY THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA AND INITIAL LISTING OF DATA NOT (Alabama Univ., G3/92 13844

November 1976
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by
E. A. Carter
R. E. Wells
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AND ENERGY STUDIES
The University of Alabama in Huntsville
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Huntsville, Alabama
35807

November 1976

prepared for:

THE UNITED STATES ENERGY RESEARCH
AND DEVELOPMENT ADMINISTRATION
DIVISION OF SOLAR ENERGY
UNDER CONTRACT NAS8-31293
SOLAR RADIATION OBSERVATION STATIONS

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Reviewed and Approved by:

David L. Christensen, Research Associate Principal Investigator, NASA Contract NAS8-31293 The University of Alabama in Huntsville Huntsville, Alabama
FOREWORD

This document presents the results of work performed by the Center for Environmental and Energy Studies, The University of Alabama in Huntsville, under Contract NAS8-31293. Mr. E. A. Carter is the UAH Task Team Leader and Mr. O. L. Smith is the NASA Task Coordinator. Mr. David L. Christensen is the Principal Investigator of the contract. Mr. Fred Koomanoff is the ERDA Technical Coordinator.

ACKNOWLEDGEMENT

The authors acknowledge the help and cooperation from many organizations listed herein and appreciate the willing support of individuals who provided information for this report. Particular thanks are expressed to Mr. Fred Koomanoff and Mr. Michael Riches of the ERDA Division of Solar Energy; Mr. Edwin Flowers of the NOAA, Boulder, Colorado; and Mr. Frank Quinlan of the National Climatic Center, Asheville, North Carolina, for their direct support and participation.

NOTICE

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The National Climatic Center (NCC) is re-evaluating the solar radiation data of the National Weather Service (NWS) which has been collected over the past 25 years and stored at the NCC, Asheville, North Carolina. Appendix A is a listing of these data from 150 solar radiation stations.

Hourly data from twenty-six stations in the contiguous United States are being rehabilitated and a standard year will be established for these stations. This work should be completed in December 1976. Daily solar radiation data for an additional twenty-nine stations will be rehabilitated. The twenty-six stations plus the additional twenty-nine stations will then have a standard year established using daily solar radiation data.

The Energy Research and Development Administration (ERDA) is examining solar radiation data from areas of the U. S. not covered by the observations archived at the NCC. These data which can be rehabilitated will supplement the NCC data and augment the historical solar radiation data of the U. S.

The NWS is initiating a program to collect solar radiation data with better controls on maintenance of equipment and recording procedures. A new NWS solar radiation station network with thirty-four stations in the contiguous U. S. and one in Alaska will be in operation in the near future.

Various state government organizations, utilities, universities, and private companies are also measuring solar radiation, as well as the Energy Research and Development Administration (ERDA), the Environmental Protection Agency (EPA), and other Federal government organizations. This report lists these organizations, the 166 stations where solar radiation observations were taken, the type of equipment used, the form of the recorded data, and the period of operation of each station. With this broader knowledge of solar radiation data sources, an expanded data base can be established which should benefit all who are interested in solar energy.

This document was prepared with the support and cooperation of the Energy Research and Development Administration, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, and many other organizations. A source list of all organizations which participated in this survey is included herein.

Much of the solar radiation data listed in this report was recorded for specific requirements and may not be applicable to solar energy projects. Careful consideration should be exercised during the process of selecting data which may be applicable. Also, this report does not include evaluations of the radiation observational data nor was actual data collected as part of this research effort.
Many changes should occur over the next few years in station locations, observational equipment, and recording techniques for solar radiation measurements. The assistance of the reader is respectfully requested in reporting these changes and in identifying any sources of solar radiation data not included in this report.
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I. INTRODUCTION

With the recent increased interest in uses of solar energy, there is a corresponding need for solar radiation data. While there have been programs for many years to collect such data, interest and support of the programs have been varied and generally short-lived. Until recently, the solar radiation data collection program maintained by the National Weather Service received only modest support because there was no urgent demand for the data, and organizations with local needs could establish their own programs. Some solar radiation data reached the National Weather Service (NWS) archives at the National Climatic Center (NCC) in Asheville, North Carolina, through the NWS Cooperative Program. However, if the solar radiation data was not recorded at or near a National Weather Service Station, it was not included in the standard NCC solar radiation card decks used for automated data processing.

The present urgent need for solar radiation data justified a project to locate as many additional solar radiation data sources as possible. This report is the documented results of the UAH efforts to locate such data and to record such potentially useful information. To make the report as complete as possible, locations where National Weather Service data have been recorded, stations which will have their data rehabilitated and a standard year established, areas under consideration by the Energy Research and Development Administration from which solar radiation data could be obtained to augment the historical data at NCC, and a map of the new National Weather Service solar radiation network are also included.

To keep this recorded information up to date and as useful as possible, it is hoped that those interested will provide any needed changes or comments and additional data for future publications. As a result of this project, the technical community may learn of the efforts and existence of solar radiation observations and possibly avoid expensive and time consuming duplication of such research activities.

This report does not attempt to evaluate solar radiation data nor confirm validity of any of the information provided by the various sources. Solar radiation observations generally have been taken to meet special local requirements and may or may not be appropriate for a new requirement. The National Climatic Center is currently re-evaluating solar radiation data and their advice should be sought for the use of the data. Comments on the quality of the National Weather Service pyranometer network data are included in Reference 1. The quality of any recorded solar radiation data should be carefully reviewed in order to use it properly.

Reports of summarized solar radiation data encountered during the preparation of this document are listed in the references. This listing is not intended to be comprehensive and the references are included for the reader's convenience.
The list of National Weather Service solar radiation stations with data archived at the National Climatic Center is organized by states in Appendix A and the locations of data stations in the contiguous U. S. are shown in Figure 1. The stations with data not archived at the National Climatic Center are listed in Appendix B, with sub-groupings to identify the sources. The locations of these stations are shown in Figure 2. ERDA will collect some of these data and evaluate the observations. If the solar radiation measurements can be rehabilitated, ERDA will add these data to the historical data at NCC. The stations under consideration are shown in Figure 4.

An addendum has been added to list those stations from which information was received after Appendix B was printed.

The information on most of the radiation observational stations listed in Appendix B was obtained by contacting the organization and requesting that a questionnaire be completed. A copy of the questionnaire form which was used is included as Appendix D. Announcements of the project with a request for pertinent information were published in the Bulletin of the American Meteorological Society and The Solar Engineering Magazine.

Some of the information in Appendix B was obtained from various publications and in the section, "List of Sources of Information on Solar Radiation Stations", the publication or office from which the information was obtained is indicated. Reference 15 is a comprehensive listing of solar radiation measuring equipment which may be helpful in determining the types and quality of equipment used at the various locations. This effort was also a related research activity performed by The University of Alabama in Huntsville, Center for Environmental and Energy Studies.
II. SOURCES OF DATA

National Weather Service

The National Weather Service data from both prime and cooperative stations provide the greatest assortment and geographical distribution of any solar radiation data available in this country (Figure 1 and Appendix A). Most of the data is stored on magnetic tape and is available for purchase from the National Climatic Center. Further details are included in References 1 and 2. The national solar radiation archives are being re-evaluated and considerable progress on improving quality is expected.

The data from twenty-six stations in the contiguous U.S. have been selected for rehabilitation and a standard year for hourly data and daily data will be established by December 1976. The stations are indicated in Figure 5. Daily solar radiation data for an additional twenty-nine stations will be rehabilitated. This will provide fifty-five stations which will have standard years established for daily solar radiation. The twenty-nine stations have not been determined as present.

Energy Research and Development Administration (ERDA)

ERDA and the National Oceanic and Atmospheric Administration (NOAA) are cooperating in the upgrading of solar radiation measurements. ERDA and the National Climatic Center of NOAA are coordinating the rehabilitation of solar radiation data and expansion of the data base. Locations with solar radiation stations have been selected to supplement the NWS stations which have data archived at NCC (Figure 4).

The rationale used in the selection of these locations was: (1) basic network of NWS did not have a solar radiation station in the area; (2) climatic and solar radiation maps indicated the weather regime of the area was different from weather in surrounding areas where solar radiation stations were located; (3) a study by The University of Alabama in Huntsville had determined that a solar radiation station existed at the location with data which could possibly be rehabilitated using the same basics as used by NCC to rehabilitate NWS data. Appendix C gives more detail on methodology used to screen possible additional archival sites. These data will supplement and expand the data base and augment the historical solar radiation data of the United States.

State Organizations

Various state departments have recorded and/or compiled solar radiation measurements. Some state organizations have published summaries of their state's climatic conditions and solar radiation measurements. References 3, 4 and 5 are examples.

The Department of Water Resources, Division of Resources Development for the State of California, has compiled an extensive collection of solar radiation observations which were taken in and near California (Reference 6).
The Atmospheric Science Research Center, State University of New York at Albany, has published a report of solar radiation measurements with summaries of radiation conditions for New York State (Reference 7).

Agriculture experiment stations have been recording solar radiation data for many years. Because these data were being used in conjunction with crop experiments and monitored closely, they probably represent the most reliable long-term records available. Many of the agricultural experiment stations have been part of the National Weather Service Cooperative Network with most of them operated in conjunction with state agricultural colleges and universities. Colleges and universities have frequently published solar radiation summaries. References 8 and 9 are examples.

Environmental Protection Agency

In recent years, the National Environmental Protection Agency (EPA) and some state and local environmental protection agencies have been measuring solar radiation because of its role in the formation of photochemical smog. Some of these data measurements recorded only ultraviolet radiation, with wavelengths of approximately 0.295 - 0.385 Microns. The most comprehensive data recorded by EPA has been in the St. Louis, Missouri, area, but EPA radiation studies include the administration of an atmospheric turbidity network of 80 stations (50 in the U.S. and 30 in other countries) to provide information on the earth's optical quality as it may relate to the distribution of the aerosol and gaseous pollution of the atmosphere (Reference 10).

Power Companies and Tennessee Valley Authority (TVA)

Most power companies that record solar radiation data have started to do so only in the past few years. The initial purpose was for determining solar radiation effects on emissions and atmospheric thermal effects. TVA has a network of ten solar radiation and meteorological measuring stations, and several stations have been in operation for about ten years.

Universities

Solar radiation measurements at universities have been recorded for a variety of uses, from instruction to serious research. The records, therefore, vary widely in quality. Those supporting agricultural experiment stations are the most consistent, although their equipment was not intended for high resolution.

Other Organizations

The following organizations have been identified as having recorded some solar radiation data, but the observations have been generally sporadic, covering short periods for specific test purposes.

1. National Aeronautics and Space Administration
   a. Marshall Space Flight Center
   b. Jet Propulsion Laboratory
   c. Flight Research Center
   d. White Sands Test Facility
2. Department of Defense
   a. U. S. Army
   b. U. S. Navy


4. U. S. Forest Service

5. U. S. Bureau of Reclamation

Private companies and organizations, some of which have provided data to the National Climatic Center for inclusion in the National Weather Service data tape, include:

- Smithsonian Institution
- Eppley Laboratories
- Desert Sunshine Exposure Tests, Inc.
- Scripps Institute of Oceanography

**Special Data Collections**

Some organizations are compiling electronic tapes with weather and solar radiation data for special uses such as input for computer simulations. Examples include the following:

1. Sandia Laboratories is collecting previously recorded solar radiation data into three samples. Copies of these will be available through the Argonne Data Center, Argonne National Laboratories, Lemont, Illinois.
   a. The first sample consists of readings of direct-normal intensity and global intensity recorded at ten-minute intervals for the year 1962 for Albuquerque, New Mexico.
   b. The second solar data sample consists of four weeks of data from each of three locations in the country. These four weeks of data samples are representative of the four seasons at each of the locations. The locations are: Omaha, Nebraska; Blue Hill, Massachusetts; and Albuquerque, New Mexico. Each data sample consists of readings of direct-normal intensity and global intensity at ten-minute intervals.
   c. The third solar data sample consists of hourly readings of global radiation at eight locations spread throughout the U. S. for the years 1962 and 1963. This data sample also contains estimates of hourly readings of direct-normal intensity for these same locations and years. The relevant surface weather observations are included on the same computer tape.

2. The Solar Energy Laboratory, University of Wisconsin, Madison, Wisconsin, has compiled a data tape with eight years of Madison, Wisconsin, solar radiation data and relevant surface weather data. Also, one year of "representative data" is included for Albuquerque, New Mexico; Miami, Florida; Boulder, Colorado; Charleston, South Carolina; and Blue Hill, Massachusetts.
3. The Aerospace Corporation has compiled data tapes for 32 locations in the contiguous United States using the 1962 and 1963 hourly National Climatic Center data. Where observational data were inadequate, statistical procedures were used to estimate the hourly direct and global insolation. The Blue Hill, Massachusetts, and Albuquerque, New Mexico, data were used to obtain substantially independent measurements of direct and global solar radiation.
III. CONCLUSIONS AND RECOMMENDATIONS

The recent increase in the interest of solar energy to aid the nation's energy demands has produced a corresponding interest in the measurement of solar radiation. Many changes are occurring in locations of solar radiation stations, the type of equipment used, and methods of recording and evaluating the data.

Appendix A includes 150 solar radiation measuring stations and Appendix B and the Addendum includes 166 for a total of 316 stations. This is not a complete listing of past and present solar radiation stations. Some stations with a short period of operation or with data of limited use are not included in the listing, and there are some which were not directly contacted.

By collecting, evaluating, and rehabilitating the data from selected stations, the NCC and ERDA will expand and strengthen the historical data base of the United States. Then, by storing these data in a retrievable form, a valuable source of historical information will be provided.

The National Weather Service is establishing a new network of 35 solar radiation stations (Figure 3). To expand our knowledge of this basic energy resource, solar radiation observations from locations other than these 35 stations need to be taken. By upgrading the equipment and developing more strict standards for obtaining and evaluating solar radiation observations, many non-NWS solar radiation stations could have their data processed and added to the national data base.

Considering the climatology of the states, the data from at least 35 additional solar radiation stations could be added to the basic NWS network for solar radiation coverage. This is assuming that areas with similar weather patterns will have similar solar radiation patterns. Of course, there will be variations in detail, and some requirements will demand a micro network.

This report attempts to inform those in the research and engineering fields, who are interested in solar energy, of the past historical records which are available, the locations of the present and future solar radiation stations, and to understand the observational and evaluative procedures of solar radiation measurements. By making the past records and present activity in solar radiation measurements available to the community active in solar energy, the duplication of efforts should be prevented, thereby saving money, manpower, and materials.
Figure 1. Location of Solar Radiation Stations with Data Archived at the National Climatic Center, Asheville, N. C. Numbers indicate more than one station in area.
Figure 2. Location of Solar Radiation Stations with Data Not Archived at the National Climatic Center, Asheville, N. C. Numbers indicate more than one station in an area.
Figure 3. New National Weather Service Solar Radiation Station Network (Station at Fairbanks, Alaska, not indicated)
Figure 4  Stations with Solar Radiation Observations to Augment the Historical Data at NCC
Figure 5  NWS Stations with Rehabilitated Solar Radiation Data and with an Hourly and Daily Standard Year Established
LIST OF SOURCES OF INFORMATION
ON SOLAR RADIATION STATIONS

ALABAMA

Auburn University
Agricultural Meteorological Station
Environmental Study Service Center
Auburn, AL 36830
ATTENTION: Mr. D. R. Davis, Meteorologist-in-Charge

Tennessee Valley Authority
River Oaks Building
Muscle Shoals, AL 35660
ATTENTION: Dr. T. L. Montgomery, Chief, Air Quality Branch

Commander, U.S. Army Missle Command
Redstone Arsenal, AL 35809
ATTENTION: Dr. O. M. Essenwanger, DRSMI-RRA

Lockheed-Huntsville
4800 Bradford Dr. NW
Huntsville, AL 35807
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ALASKA

Smithsonian Radiation Lab - See MARYLAND

NOAA-Air Resources Lab - See COLORADO

ARIZONA

Arizona State University
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ATTENTION: Robert W. Durrenberger

Motorola Corp.
4039 E. Raymond Street
Phoenix, AZ 85040
ATTENTION: Mr. William Bailey
ARIZONA cont.

Desert Sunshine Exposure Tests, Inc.
P. O. Box 185
Black Canyon Stage
Phoenix, AZ 85020

Northern Arizona University, Physics Dept.
P. O. Box 6010
Flagstaff, AZ 86001
ATTENTION: Mr. William G. Delinger

Lake Mojave
Yuma
(Data from California Department of Water Resources, reference 6)

Castle Creek
Seven Springs
Fort Huachucha
G. M. Proving Grounds
(Data from Solar Energy Commission of Arizona, reference 12)

Solar Energy Commission
State Capitol
Phoenix, AZ 85007
ATTENTION: Mr. Robert M. Handy

CALIFORNIA

University of California
Davis, Station at Coon Creek (reference 6)

University of California
Extension Service
Blythe (reference 6)

Scripps Institute of Oceanography
La Jolla (reference 6)

Metropolitan Water District of Southern California
Los Angeles (reference 6)
CALIFORNIA cont.

California Department of Water Resources
Alturas
Arvin Frick
Bakersfield
Berenda
Buttonwillow
Covelo
Cummings Valley
Finley
Gerber
Glenburn
Guadalupe
Kerman
Los Banos Equip. Yard
Maze Bridge
McArthur
(Data from California Department of Water Resources, reference 6)

Bay Area Pollution District
Fremont
Oakland
Pittsburg
Redwood City
Richmond
San Jose
(Data from California Department of Water Resources, reference 6)

Department of Agriculture
Brawley
Lompoc
(Data from California Department of Water Resources, reference 6)

U.S. Department of Reclamation
Coachella (reference 6)

Department of Interior
Barrett Reservation
Salton Sea
Sandy Beach
San Vicente
Challenge
(Data from California Department of Water Resources, reference 6)

U.S. Army
High Point
Jolon
Soda Springs Sno Lab
(Data from California Department of Water Resources, reference 6)

U.S. Navy
Point Mugu (reference 6)
CALIFORNIA cont.

California State Resources
Department of Water Resources
Division of Resource Development
State Capitol
Sacramento, CA 95814
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Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
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COLORADO

United States Air Force Academy
Department of Civil Engineers
United States Air Force Academy, CO 80840
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National Radiation Laboratory/ERL-NOAA
Boulder, CO 80302
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COLORADO cont.

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Colorado Springs, CO 80433
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Air Resources Lab RF 329
Boulder, CO 80302
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Institute of Energy Conversion
Newark, DE 19711
ATTENTION: Dr. Fredrick A. Costello, Mechanical Engineering Department

FLORIDA

IN-OMO-2
NASA-KSC, Data Branch
J. F. Kennedy Space Center, FL 32899
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University of Florida Experiment Station
Quincy, FL

University of Florida
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NWS Office for Agriculture
Agronomy Department
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KENTUCKY

TVA - See ALABAMA

MARYLAND

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Mr. William Bandeen

University of Maryland
College Park, MD 20742
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Smithsonian Radiation Biology Laboratory
12441 Parklawn Drive
Rockville, MD 20852 (reference 11)
MASSACHUSETTS

Grover Cleveland School - See PENNSYLVANIA
(General Electric)

MICHIGAN

The University of Michigan
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2455 Haywood
Ann Arbor, MI 48105
ATTENTION: Dr. Dennis G. Baker

Smith, Hinchman & Grylls Associates, Inc.
455 W. Fort Street
Detroit, MI 48226
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MINNESOTA

University of Minnesota
Agriculture Experiment Station
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MISSOURI

Environmental Protection Agency (reference 10)

NEBRASKA

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4421 Superior Street
P. O. Box 4425
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NEW YORK

Cornell University
Aurora (reference 7)

Cornell University
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State University of New York at Albany
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NEW YORK cont.

State University of New York at Albany
Whiteface Mountain (reference 7)

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    Fonda
    Mamaroneck
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P. O. Box E
Oak Ridge, TN 37830
ATTENTION: Mr. Detlef R. Matt

TVA - See ALABAMA

TEXAS

Environmental Studies Service Center
Room 161, Bizzel Hall, TAMU
College Station, TX 77843
ATTENTION: Mr. Ray L. Jensen or Professor John Griffiths

Lawrence Berkeley Laboratory - See CALIFORNIA

UTAH

Utah State University
Logan, UT 84322
ATTENTION: Mr. Inge Dirmhirn

VIRGINIA

NASA/Langley Research Center
Mail Stop 261
Hampton, VA 23665
ATTENTION: Mr. I. L. Hamlet
VIRGINIA cont.

Wallops Flight Center
Wallops Island, VA 23337
ATTENTION: Mr. J. Holland Scott or Robert L. Krieger

Intertechnology Corporation
100 Main Street
Warrenton, VA 22186

WASHINGTON

Washington State University
Department of Agronomy
Pullman, WA 99163
ATTENTION: Professor Gaylon S. Campbell

Battelle
Pacific Northwest Laboratories
P. O. Box 999
Richland, WA 99352
ATTENTION: Mr. W. A. Stone

WISCONSIN

University of Wisconsin
Solar Energy Laboratory
Engineering Research Building
1500 Johnson Drive
Madison, WI
ATTENTION: Dr. Jack Duffy

WASHINGTON, D. C.

Smithsonian Radiation Laboratory (reference 11)
See MARYLAND

ANTARTICA HAWAII SAMOA

NOAA - Air Resources Lab - See COLORADO
REFERENCES


8. Anon. - "Auburn University 1974 Micrometeorological Data", NOAA; NWS, Environmental Study Service Center, Auburn University, Auburn, Ala. Agricultural Weather Series No. 12, October 1975. (Similar reports for prior years).

9. Kish, Alex J. "Clemson University and South Carolina Agricultural Experiment Stations 1974 Climatological Data", NOAA in conjunction with Clemson University, Clemson, S.C., Agricultural Weather Research Series no. 44, January 1975. (Similar reports for prior years, some out of print).


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APPENDIX A
SOLAR RADIATION OBSERVING STATIONS
WITH DATA ARCHIVED AT THE
NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA

Explanation:

- Stations with data ending as of July 1976 probably are continuing to operate, but because changes are occurring in the National Weather Service solar radiation data program, data after 1975 should be verified by contacting the National Climatic Center, Asheville, N. C.

- When two stations are listed in the same location, the hourly magnetic tape deck 280 may contain data from both stations.

- "TO DATE" is valid as of July 1976.

- "X" prefix in the Station Number indicates a cooperative station.
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<th>STATION LOCATION</th>
<th>TYPE</th>
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<th>HOURLY DATA END</th>
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**NOTE:**

(A) HOURLY DATA TABULATED BUT NOT ON MAG TAPE.

(B) ADDITIONAL HOURLY DATA ON PUNCH CARDS BUT NOT ON MAG TAPE.

(C) CHARTS ARE IN THE NCC BUT HOURLY DATA UNWORKED.

(D) HOURLY DATA DISCONTINUED IN 1967. CHARTS CAN BE WORKED.
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**NOTE:**
- (D) HOURLY DATA DISCONTINUED IN 1967. CHARTS CAN BE WORKED.
- (E) HOURLY DATA UNWORKED AND CHARTS ARE CONSIDERED UNRELIABLE.
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NOTE: (A) HOURLY DATA TABULATED BUT NOT ON MAG TAPE.

(B) ADDITIONAL HOURLY DATA ON PUNCH CARDS BUT NOT ON MAG TAPE.
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**NOTE:**  
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(C) CHARTS ARE IN THE NCC BUT HOURLY DATA UNWORKED.
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U. S. NAVY
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### APPENDIX B

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* Energy Research and Development Administration Center

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<td>STRIP CHART &amp; MAG TAPE</td>
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<td>MAUNA LOA</td>
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B-13
ADDENDUM TO APPENDIX B

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<td>LOREN W. CROW</td>
<td>2422 SOUTH DOWNING STREET</td>
<td>DENVER, COLORADO 80210</td>
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APPENDIX C

METHODOLOGY USED TO SCREEN SOLAR RADIATION SITES FOR DATA TO AUGMENT THE HISTORICAL DATA AT NCC

1. A meeting between ERDA, NOAA and UAH representatives was held at the University of Alabama in Huntsville 19-23 July 1976. One of the studies of this working group selected additional solar radiation sites whose data may be a valuable adjunct to the presently archived data. Figure 4 in this report shows the stations selected as a result of this screening. The methodology used to select these stations included:

- Examination of the locations from which data are currently archived.
- Consideration of the new 35 station NOAA network.
- Overlays of climatic maps to identify climatic regions which were not well represented by archived data and planned locations.
- Detailed examination of the UAH list of stations with data not currently archived. This included examining the type of equipment used and length of record and reaching a preliminary decision that the data was acceptable for a reasonable confidence level.
- Considering the locations where the users were most likely to need the data.
- Weighing all of the preceding factors and selecting the most promising locations.

2. It was agreed that the data from the stations selected would require additional screening, and the following guidelines would be used in this screening:

- Select a representative sample of the data.
- Determine its quality for computer reduction to hourly or daily data.
- Perform quality control of the data by comparing representative records with computed solar noon radiation data.
- Arrive at a confidence factor for the data.

3. The data which met all of the preceding requirements at an acceptable confidence level would be prepared in standard NOAA formats for storage and retrieval for use in solar energy projects.
APPENDIX D

QUESTIONNAIRE TO IDENTIFY SOLAR RADIATION DATA

If you have Solar Radiation Data, please complete this form and mail to:

The University of Alabama in Huntsville (UAH)
Center for Environmental and Energy Studies
P. O. Box 1247
Huntsville, Alabama 35807
Attn: E. A. Carter

Location where Solar Radiation was recorded: Lat.N. _______°
(Use separate form for each recording site) Long.W. _______°

Instrument Elevation, MSL______Ft. or ______Meters

Description of recording site (urban, rural, grass, rooftop, horizontal surface, etc.)

<table>
<thead>
<tr>
<th>Period(s) of Record</th>
<th>Type of Equipment</th>
<th>Manufacturer</th>
<th>Model Number</th>
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</thead>
</table>

Calibration Schedule for System

Form of Record (disc, strip chart, tabulated, units)

Type of Data (direct, global, spectral, inclined, etc.)

Hourly Data

Other Meteorological Data Available

Daily Data

Published Data

Copies Attached

Will you release copies of the data to UAH or Marshall Space Flight Center for use in the Solar Energy Projects?

Reporting Organization, Name of Custodian of Records

Mailing Address

Telephone Number