Metadata

Dataset Title:

Uv2021.csv

Cary Environmental Monitoring Program UVB Solar Radiation Data 2021

Abstract

This dataset is a contribution to the Cary Institute of Ecosystem Studies Environmental Monitoring Program. This program is a long-term data collection program designed to understand how the environment changes over time. The program includes monitoring of climate including temperature and precipitation, as well as variables related to air pollution, such as acid deposition and ozone, and water pollution and other streamwater chemistry. Our program also includes solar radiation monitoring, which includes diffuse and global photosynthetically active radiation (PAR), diffuse and global shortwave radiation, net radiation and UV. Long-term monitoring of solar radiation provides us with an understanding of atmospheric energy dynamics, which can affect natural and human systems.

Data provided in this dataset include 3-minute summaries of ultraviolet radiation variables.

The Cary Institute of Ecosystem Studies, Environmental Monitoring Program furnishes data under the following conditions: The data have received quality assurance scrutiny by our program, and, although we are confident of the accuracy of these data, Cary Institute will not be held liable for errors in these data. Data are subject to change resulting from updates in data screening or models used. Data citation: The following is a standard citation for referencing data from the Cary Institute of Ecosystem Studies, Environmental Monitoring Program:

Cary Institute of Ecosystem Studies, Environmental Monitoring Program. 2020 (or current year). Cary Institute of Ecosystem Studies, Box AB, Millbrook, NY 12545, www.caryinstitute.org.

Those wishing to publish data from Cary Institute of Ecosystem Studies, Environmental Monitoring Program are encouraged to contact data manager Vicky Kelly, kellyv@caryinstitute.org.

Investigators

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Keywords

Cary Institute, meteorology, climate, solar radiation, UV, ultraviolet radiation, UVB

Timeframe

The data in this file start 1 January 2000 and end 31 December 2020. Data collection is ongoing.

Geographic location

The meteorological and solar radiation instruments are located in a flat, open field in Millbrook, NY at an

elevation of 128 m. GPS coordinates are N41.785823 W073.741447.

Methods

Meteorological and solar radiation data are collected using a Campbell Scientific, Inc. datalogger (21X 1M 1987-14 September 1993, 21XL 14 September 1993- 12 October 1999, 23X 12 Oct. 1999-December 2011, CR3000 Dec. 2011-present). UV sensors are sampled every 2 seconds and all data are summarized every 3, minutes. Time units are Eastern Standard Time (EST), where 1118 is 11:15 to 11:18 a.m. EST.

The instruments, their accuracy and our recommendation for the number of significant figures to use:

Please note that significant figures may be reported beyond the accuracy of the instruments. Data are reported in this manner to maintain the capability of backing out calculations from the raw measurements. Instrument notes including calibration, malfunctions, repairs and anecdotal information is available upon request. The instruments, their accuracy and our recommendation for the number of significant figures to use are:

Ultraviolet Radiation, March 1999 - present, Yankee Environmental Systems, Inc. Model UVB-1, sensitivity + 1.97 watt/m-2 / volt of total UV-B irradiance, spectral response 280-320 nm, cosine response + 5% for 0-60 degree solar zenith angle, recommended significant figs. 4. Location of sensors: 2 m above a mowed grass surface (1988-July 2002), 2.5 m above mowed grass surface (July 2002-present).

METEOROLOGICAL DATA QUALITY ASSURANCE AND QUALITY CONTROL PARAMETERS AND METHODS

The quality of meteorological data collected as part of the Cary Institute Environmental Monitoring Program is assured and controlled at several levels. Instruments are returned to manufacturers for audits and calibration as recommended by the manufacturer or as needed. If an instrument is known to have malfunctioned or if it is not in place for any reason, data are either removed from the database and replaced with missing values, or are replaced with data from a known working instrument. The New York State Department of Environmental Conservation has an air monitoring site co-located at the Cary Institute. Temperature data from the DEC program were sometimes used when Cary Institute instruments malfunctioned or were unavailable.

Data are checked for accuracy at several levels. Meteorological data are collected using a Campbell Scientific datalogger. The datalogger assigns out-of-range data a value of either 6999, 9999 or -9999. Data are downloaded from the datalogger on a daily basis and imported into a SAS database. The SAS program used to import data contains range-checking steps. These steps produce a temporary dataset that put out-of-range data and data that are beyond a reasonable range equal to missing values. These data are then checked and missing values are reviewed. At the end of each year, a line graph of raw data is produced together with data from previous years to check for data points that may be outliers. All outliers are checked and, if for any reason the value is suspected to be unreal, the value is replaced with a missing value code.

Instrument notes including calibration schedule, malfunctions and repairs, new instrumentation, anecdotal information etc. can be made available on request.

The quality of meteorological data collected as part of the Cary Institute Environmental Monitoring Program is assured and controlled at several levels. Instruments are returned to manufacturers for audits and calibration as recommended by the manufacturer or as needed. If an instrument is known to have malfunctioned or if it is not in place for any reason, data are either removed from the database and replaced with missing values, or are replaced with data from a known working instrument.

Meteorological and solar radiation data are collected using a Campbell Scientific, Inc. datalogger. All

sensors are sampled every 2 seconds and all data are summarized every 24, 60, 15 and 3 minutes. Data are checked for accuracy at several levels. Data are downloaded from the datalogger on a daily basis and imported into a SAS database. The SAS program used to import data contains range-checking steps. These steps produce a temporary dataset that put out-of-range data and data that are beyond a reasonable range equal to missing values. These data are then checked and missing values are reviewed. At the end of each year, a line graph of raw data is produced together with data from previous years to check for data points that may be outliers. All outliers are checked and, if for any reason the value is suspected to be unreal, the value is replaced with a missing value code.

Data Table

Column name	Description	Unit or code explanation or date format	Empty value code
DATE	Date in MM/DD/YYYY format where MM is month number, DD is date number and YYYY is year	MM/DD/YYYY	Empty cell
DATETIME	Datetime in MM/DD/YYYY hh:mm format where MM is month, DD is day, YYYY is year, hh is hour and mm is minute (EST)	MM/DD/YYYY hh:mm (Eastern Standard Time)	Empty cell
HOUR_MIN	Hour in hour_minute format in Eastern Standard Time. Note that data are from the preceding hour. For example, data for hour 0100 are from midnight to 1:00 a.m EST.	Eastern Standard Time	Empty cell
AVE_UVB	Average Diffey UVB in milliWatts per meter squared	mW/m^2	Empty cell
ALT	Maximum sun altitude in radians.	radians	Empty cell
DA	Day angle in radians	radians	Empty cell
DEC	Declination in radians	radians	Empty cell
HA	Hour angle in radians	radians	Empty cell
SZA	Solar zenith angle in degrees	degrees	Empty cell

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