Typical Meteorological Year Dataset

Description of Data

The Typical Meteorological Year (TMY) dataset available on www.marcoernst.net is a derivative created by Marco Ernst and based on the Australian Bureau of Meteorology One Minute Solar and Weather data (BOM data). The BOM data was processed using the procedure published in *M. Ernst and J. Gooday, "Methodology for Generating One Minute Resolution Typical Meteorological Year Data for Accurate Photovoltaic Energy Yield Modelling", Solar Energy* **189**, *299–306 (2019)*. Please cite this publication if you are using this TMY dataset.

The TMY dataset is available for seven locations in Australia:

BOM Station Number	Station Name	Latitude (°)	Longitude (°)
003003	Broome Airport (WA)	-17.9475	122.2353
014015	Darwin Airport (NT)	-12.4239	130.8925
015590	Alice Springs Airport (NT)	-23.7951	133.889
023034	Adelaide Airport (SA)	-34.9524	138.5204
039083	Rockhampton Aero (QLD)	-23.3753	150.4775
072150	Wagga Wagga AMO (NSW)	-35.1583	147.4575
086282	Melbourne Airport (VIC)	-37.6655	144.8321

The input BOM data includes typical weather and solar measurements, such as ambient temperature, relative humidity, wind speed and wind direction, as well as three types of solar radiation measurements: global horizontal irradiance, direct normal irradiance and diffuse horizontal irradiance.

Gaps in the data are filled and consistency checking is performed using following procedure:

1. Night time gaps: If the sun is below the horizon, gaps in the irradiance data are filled with 0 W/m^2 for any length.
2. Monthly raw data files which hold less than 90% of data are discarded.
3. Consistency checking: Measured GHI values are compared to the GHI calculated from measured DNI and DHI values. If the difference exceeds 50 W/m^2 the values are removed.
4. Gap Filling: Gaps in weather data columns are interpolated for gaps of maximum 60-minute duration. Solar radiation data is not interpolated.

After the gap filling and consistency checking, the one-minute TMY dataset is generated using an approach similar to the ISO 15927-4 method. The generation of a TMY dataset for a station requires that at least one of the calendar months contains data from at least 10 different years.

Additionally, average datasets with 5, 10, 15, 30 and 60-minute are generated. Note that the timestamp in averaged datasets (5, 10, 15, 30 and 60-minute resolution) is at the beginning of each interval.

The TMY data available here was processed from the source BOM data including data until April 2018. The start dates for the BOM data and the period over which the stations have carried out solar observations vary from station to station.

Provided Data Formats

The Typical Meteorological Year (TMY) dataset is made available in three text-based formats:

1. Typical Meteorological Year files with 1, 5, 10, 15, 30 and 60-minute resolution. These datasets include most columns of the source BOM data.

2. SAM CSV for use with NREL SAM. It is a comma-delimited (.csv) format (format description https://sam.nrel.gov/sites/default/files/content/documents/pdf/wfcsv.pdf). Data is available in 1, 5, 10, 15, 30 and 60-minute resolution.

3. PVsyst standard format for hourly meteo data for use with PVSyst. It is a comma-delimited (.csv) format (format description http://files.pvsyst.com/help/pvsyst_standard_format.htm) with 60-minute resolution.

Note: The timestamp in averaged datasets (5, 10, 15, 30 and 60-minute resolution) is at the beginning of each interval. The datasets may include 29 February, depending on the selected year based on the method.

Source Data

The Bureau of Meteorology One Minute Solar and Weather data (BOM data) includes a range of solar and weather statistics, including ambient temperature, relative humidity, wind speed and wind direction, as well as three types of solar radiation measurements: global horizontal irradiance, direct normal irradiance and diffuse horizontal irradiance.

The Bureau of Meteorology has been measuring a number of solar and weather parameters for several decades. Data was recorded at 29 sites, but not all stations have data for the entire period since 1993.

The BOM data is not based on a real-time product. Data is processed by the Bureau of Meteorology nominally at one to two monthly intervals. The source data of the processed TMY data includes updates to the BOM data until April 2018.

The Bureau of Meteorology does not endorse this derivative data.

Detailed information about the One Minute Solar data, including a list of the observation stations, can be found here:

http://www.bom.gov.au/climate/data/oneminsolar/about-IDCJAC0022.shtml

If Users want to obtain the raw, unprocessed BOM data with the latest updates, they should contact the Bureau of Meteorology – Climate Information Services:

http://www.bom.gov.au/climate/data-services/

Updates

The update of the typical meteorological annual data with newer One Minute solar and weather data is planned approximately every one to two years.

With updates and changes to the processing method, the source data may be reprocessed. The current TMY version is TMY2019.01-a.

Data Custodian

This Typical Meteorological Year (TMY) dataset is based on data from the One Minute Solar and Weather Observations, for which the Bureau of Meteorology is the data custodian.

The Bureau of Meteorology provides Australians with environmental intelligence for safety, sustainability, well-being and prosperity. It aims to promote informed safety, security and economic decisions by governments, industry, and the community through the provision of information, forecasts, services and research relating to weather, climate and water.

Acknowledgement. Licensing, Terms & Conditions

The One Minute Solar and Weather Observation data is sourced from the Bureau of Meteorology (BOM). The Typical Meteorological Year (TMY) dataset available on www.marcoernst.net is made available for research only and attributed to the Commonwealth of Australia acting through BOM.

Please cite the following reference if using this TMY dataset: *M. Ernst and J. Gooday, "Methodology for Generating One Minute Resolution Typical Meteorological Year Data for Accurate Photovoltaic Energy Yield Modelling", Solar Energy **189**, 299–306 (2019)*

If visitors to this website are interested in obtaining the One Minute Solar and Weather Observation source data from which the TMY data is derived, they should contact BOM directly:

http://www.bom.gov.au/climate/data-services/

Below is an extract from 'Bureau Licence Agreement and Licensing Schedule' between the Commonwealth of Australia acting through the Bureau of Meteorology (the "Bureau") and the User (The Australian National University).

2. The Bureau grants the User a non-transferable, non-exclusive worldwide licence to use, copy, modify (subject to clause 3) and supply (subject to clause 4) the Material for the Purpose set out in the Licence Schedule only. This licence continues indefinitely unless terminated under clause 9.

4. If not excluded in the Licence Schedule, the User may supply Material to third parties. Any supply may only be as part of a User product. The User must acknowledge the Bureau prominently in that product in accordance with the Required Acknowledgement set out in the Licence Schedule.

Additional Licence Restrictions from the Licence Schedule: Despite clause 4 of the Express Licence Agreement, the Material may be supplied in its original form to third parties collaborating with the User in conducting the research, and when required to meet obligations of transparency or publication.