June 24, 2019

A comprehensive dataset for the accelerated development and benchmarking of solar forecasting methods

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Description

This repository contains a comprehensive solar irradiance, imaging, and forecasting dataset.

The goal with this release is to provide standardized solar and meteorological datasets to the research community for the accelerated development and benchmarking of forecasting methods.

The data consist of three years (2014-2016) of quality-controlled, 1-min resolution global horizontal irradiance and direct normal irradiance ground measurements in California.

In addition, we provide overlapping data from commonly used exogenous variables, including sky images, satellite imagery, Numerical Weather Prediction forecasts, and weather data.

We also include sample codes of baseline models for benchmarking of more elaborated models.

Data usage

The usage of the datasets and sample codes presented here is intended for research and development purposes only and implies explicit reference to the paper:

Pedro, H.T.C., Larson, D.P., Coimbra, C.F.M., 2019. A comprehensive dataset for the accelerated development and benchmarking of solar forecasting methods. Journal of Renewable and Sustainable Energy 11, 036102. https://doi.org/10.1063/1.5094494

Although every effort was made to ensure the quality of the data, no guarantees or liabilities are implied by the authors or publishers of the data.

Sample code

As part of the data release, we are also including the sample code written in Python 3.

The preprocessed data used in the scripts are also provided.

The code can be used to reproduce the results presented in this work and as a starting point for future studies.

Besides the standard scientific Python packages (numpy, scipy, and matplotlib), the code depends on pandas for time-series operations, pvlib for common solar-related tasks, and scikit-learn for Machine Learning models. All required Python packages are readily available on Mac, Linux, and Windows and can be installed via, e.g., pip.

All time stamps are in UTC (YYYY-MM-DD HH:MM:SS). About Help All irradiance and weather data are in SI units.

Developers

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Publication date:

June 24, 2019

Keyword(s):

solar irradiance forecasting

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Related identifiers:

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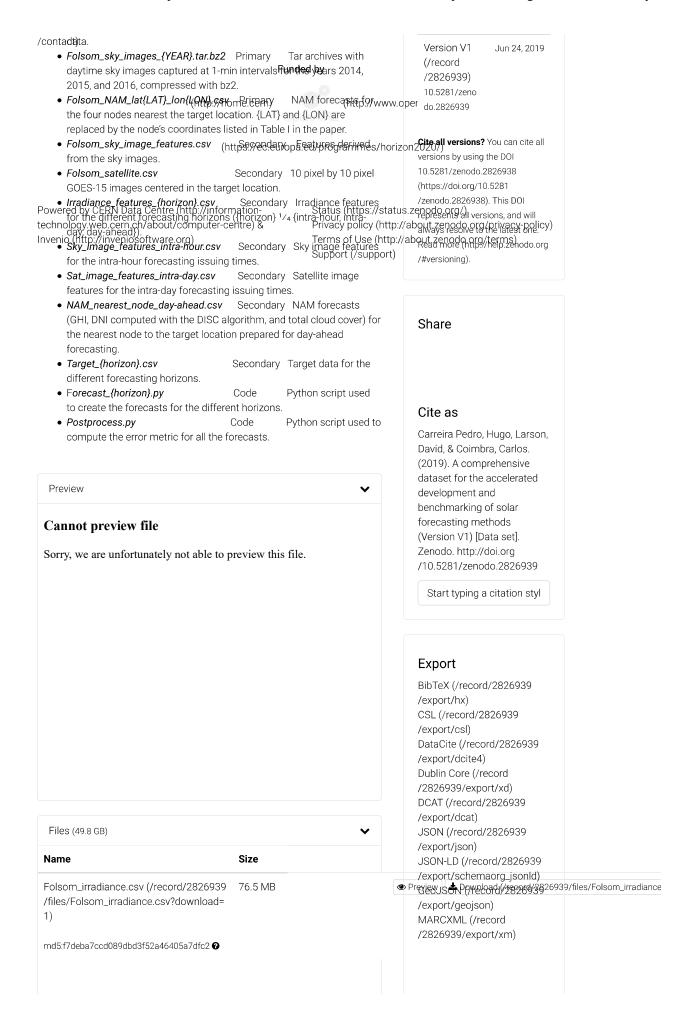
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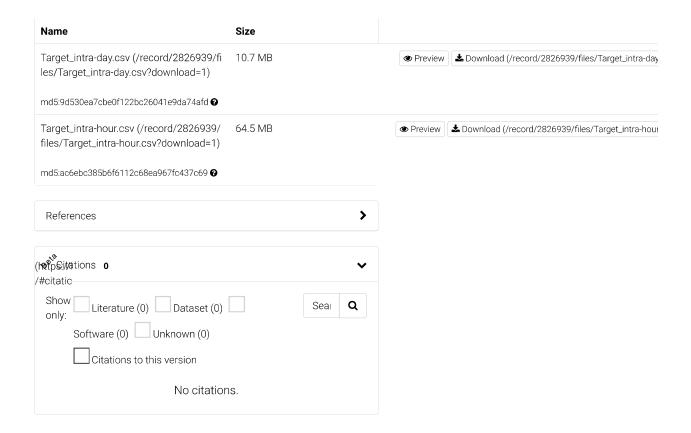
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