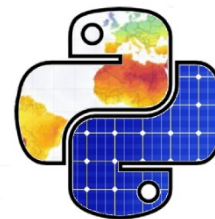




AssessingSolar.org



Benchmarking of Solar Irradiance Data

Adam R. Jensen

IPC-XIII – October 12th 2021

DTU Solar Monitoring Station in Copenhagen



- DTU operates the only two stations with solar trackers
- Operation since 1990
- No funding
- Upgrade: SMP22s, ventilators, CR1000X



Benchmarking solar radiation datasets



"Produce highly accurate historical irradiance estimates with the **lowest uncertainty available on the market.**"



Most reliable

"Multiple independent studies have found Solargis to be the **most reliable solar database**"



"SolarAnywhere is the **most trusted, accurate & validated** solar resource dataset available"

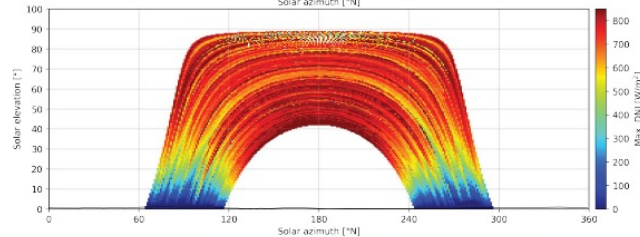
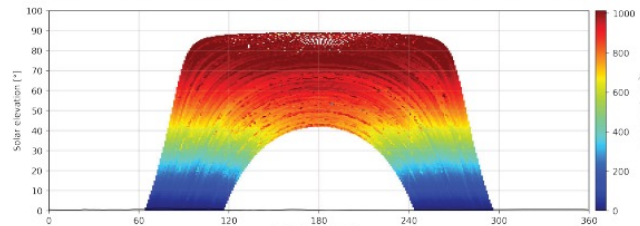
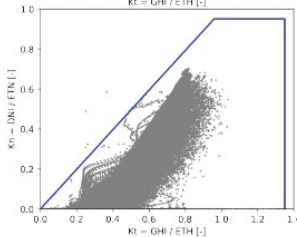
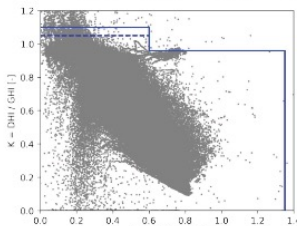
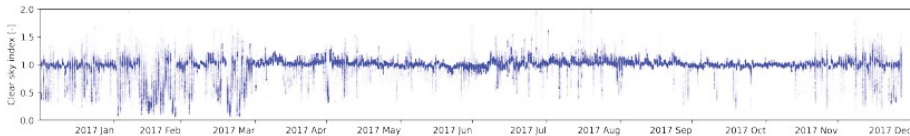
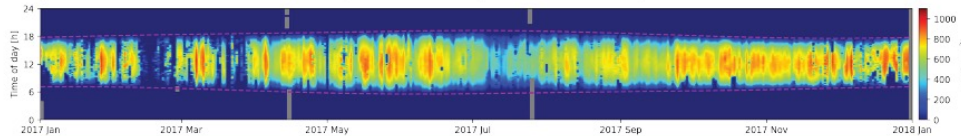
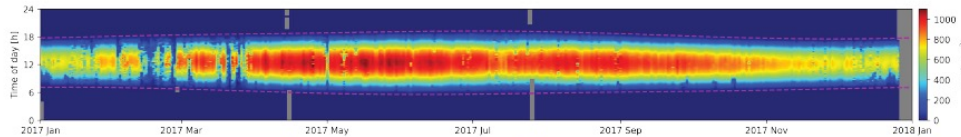
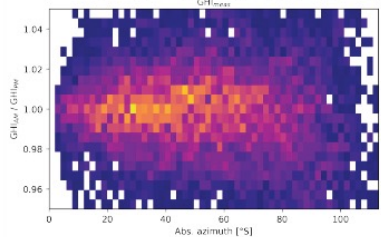
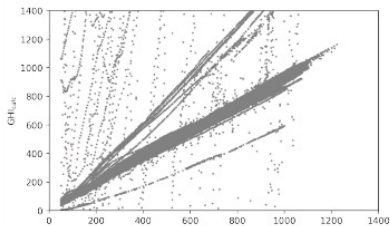
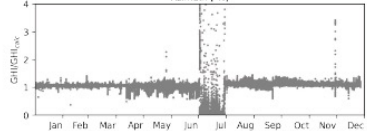
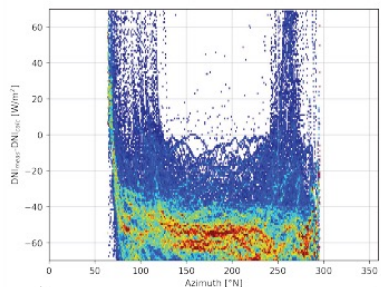
Benchmarking in IEA PVPS Task 16

- 9 satellite products
- 2 reanalysis products
- 161 ground stations
- Independent

Quality control of solar irradiance data



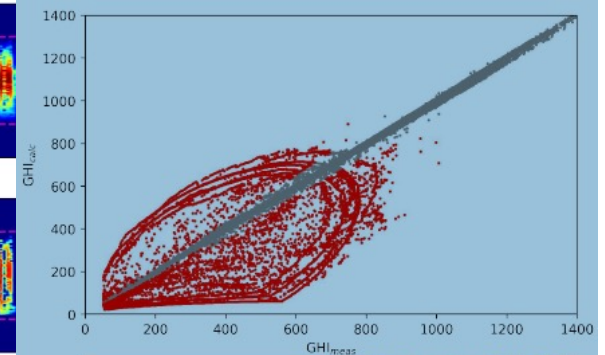
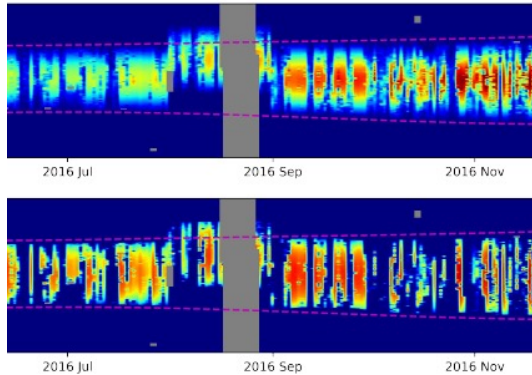
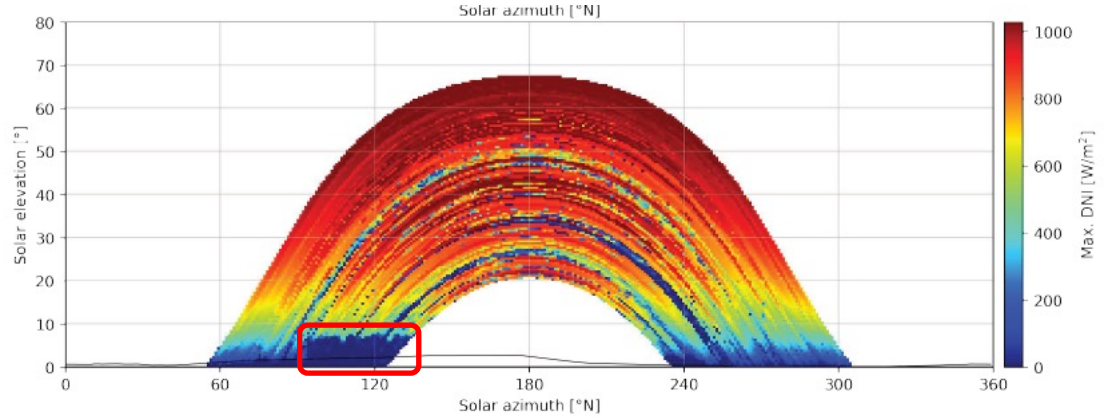
PVPS



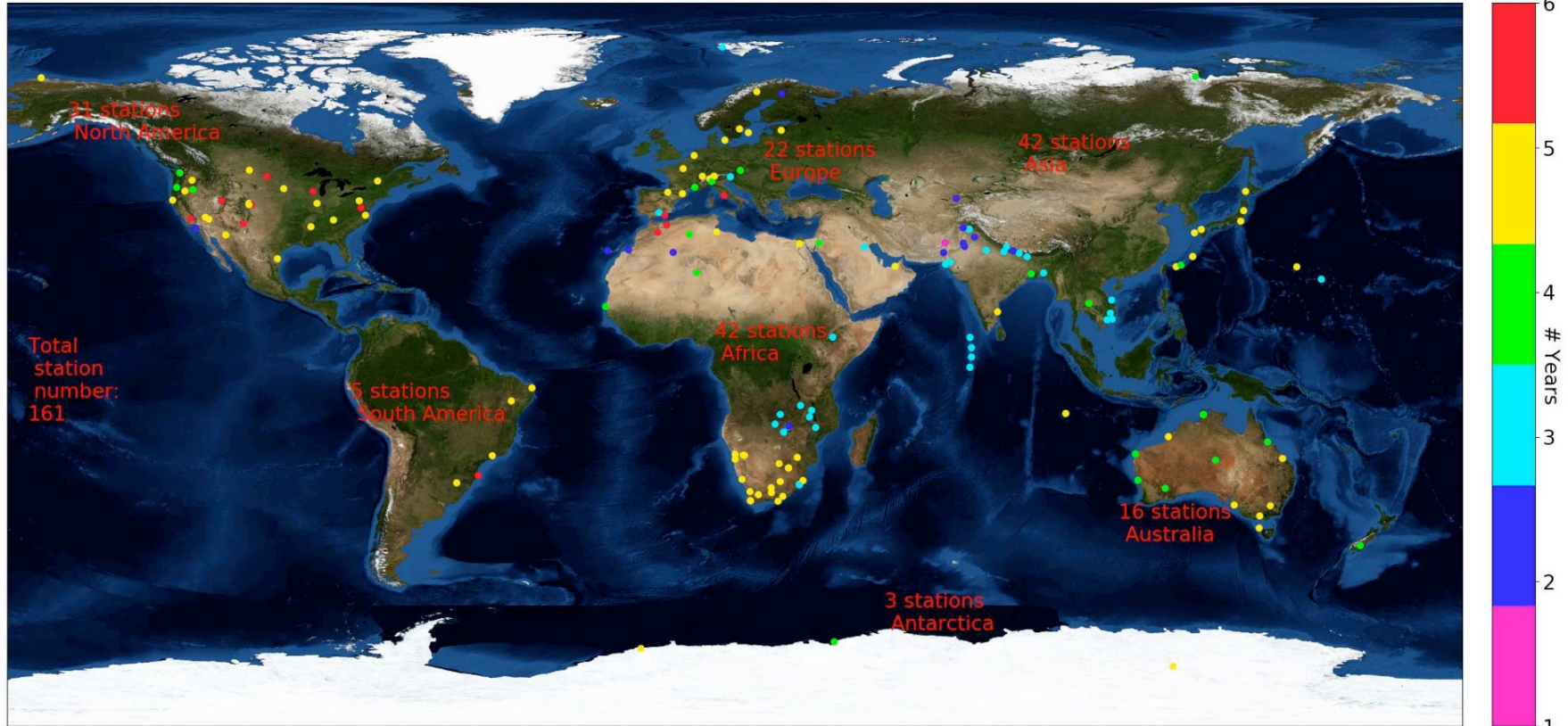
Gallery of possible errors



- Soiling
- Tilted sensors
- Tracker off
- Tracker misalignment
- Obstructions
- Incorrect time-zone



Reviewed stations






The screenshot shows a web browser window with the URL `solarstations.org/intro.html`. The page features a left sidebar with a search bar and a navigation menu. The main content area is titled "Introduction" and contains text about the value of ground measured solar irradiance data and a world map showing station locations. The map uses blue circles for active stations and red circles for inactive ones. A legend in the top-left corner of the map area identifies these markers. The page footer includes a scale bar (5000 km / 3000 mi) and the text "Leaflet | Data by © OpenStreetMap, under ODbL".

Introduction — SolarStations

← → ↻ 🔒 solarstations.org/intro.html



SolarStations

🔍 Search this book...

- Introduction
- Station listing
- Station requirements

STATION NETWORKS

- Baseline Surface Radiation Network (BSRN)
- SOLRAD
- SRML

APPENDIX

- Contributing
- AssessingSolar.org ↗
- IEA PVPS Task 16 ↗


Powered by Jupyter Book

← Introduction

Ground measured solar irradiance data is extremely valuable and critical for benchmarking solar radiation products and understanding climate processes and the Earth's radiation budget. However, due to high costs and maintenance requirements, there are only a few hundred high-quality stations globally. Partly due to the scarcity, it has historically been difficult to determine if and where there is a nearby solar radiation monitoring stations. To address this, this site provides an overview of available solar radiation monitoring stations worldwide and supporting metadata.

Note, the site is currently in the draft phase - a complete list of stations will be available within the next few weeks. The list of stations can be found [here](#) and downloaded as a csv file [here](#).

To find the nearest station to a point of interest, check out the interactive map below. Click on a given station icon to get the name and country.



Station markers

- Active
- Inactive

5000 km
3000 mi

Leaflet | Data by © OpenStreetMap, under ODbL



Existing functions

- **NREL PSM3** (*satellite*)
- **UoO SRML** (*ground*)
- **PVGIS TMY** (*satellite*)
- **SURFRAD** (*ground*)
- **NREL MIDC** (*ground*)

New functions

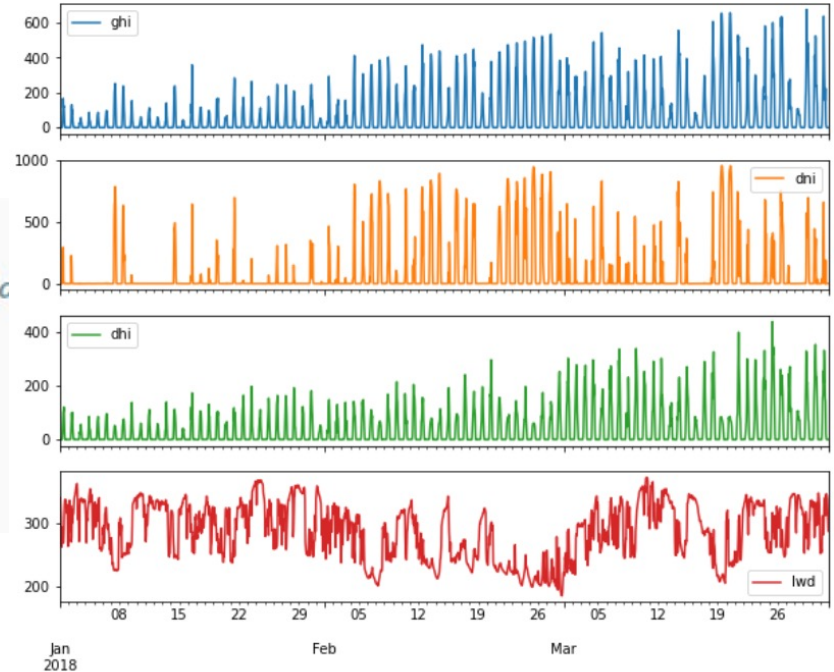
- **BSRN** (*ground*)
- **PVGIS Hourly** (*mixed*)
- **CAMS McClear** (*clear-sky*)
- **CAMS Radiation** (*satellite*)
- **ERA5** (*reanalysis*) *under review, [PR1274](#)
- **MERRA2** (*reanalysis*) *under review, [PR1264](#)

pvlib iotools – data retrieval example



- BSRN data is stored in station-to-archive format
- Freely available on FTP server

```
df, meta = pvlib.iotools.get_bsrn(  
    station='CAB', # three letter station code  
    start=pd.Timestamp(2018,1,1),  
    end=pd.Timestamp(2018,3,1),  
    username=bsrn_username,  
    password=bsrn_password,  
)
```



```
df[['ghi','dni','dhi','lwd']].resample('1h').mean().plot(subplots=True, sharex=True, figsize=(10,8))
```

Thank you!

SolarStations.org

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