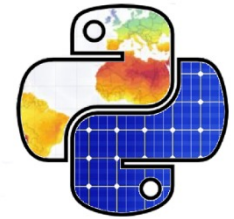
IEA PVPS

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

SOLCAST

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

SOLARGIS

Most reliable

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

SolarAnywhere® Data

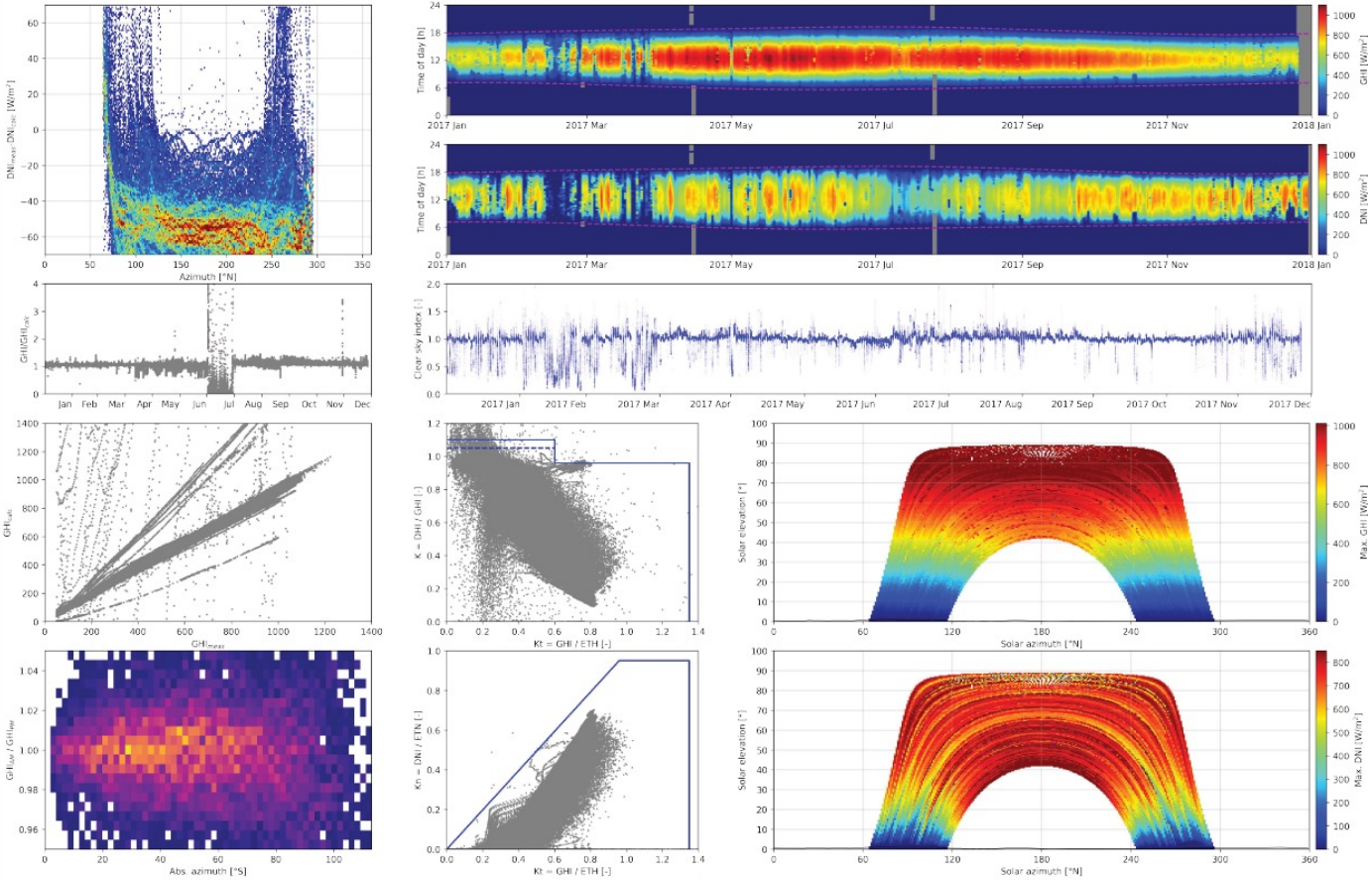
"SolarAnywhere is the **most trusted, accurate & validated** solar resource dataset available"

Benchmarking in IEA PVPS Task 16

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

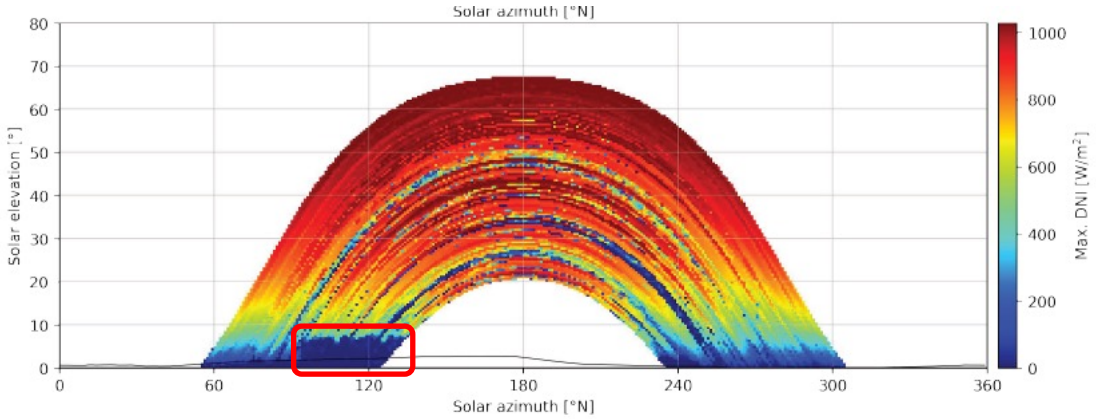
PVPS

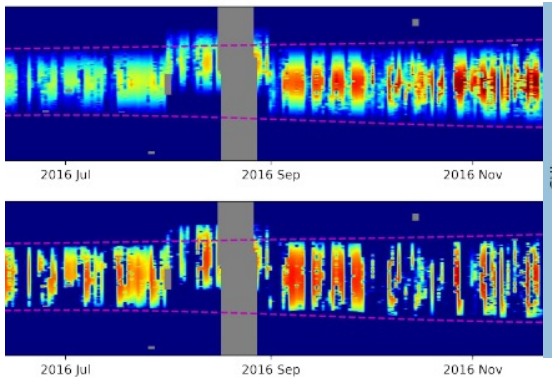
Quality control of solar irradiance data

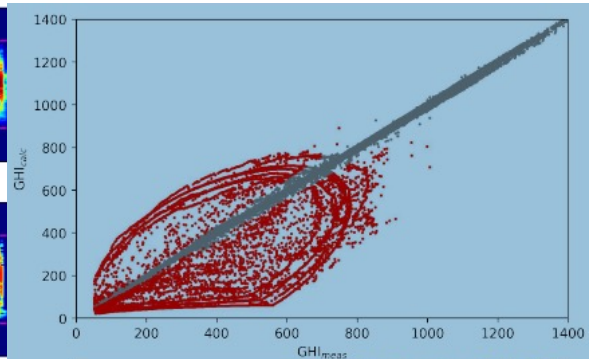


Gallery of possible errors

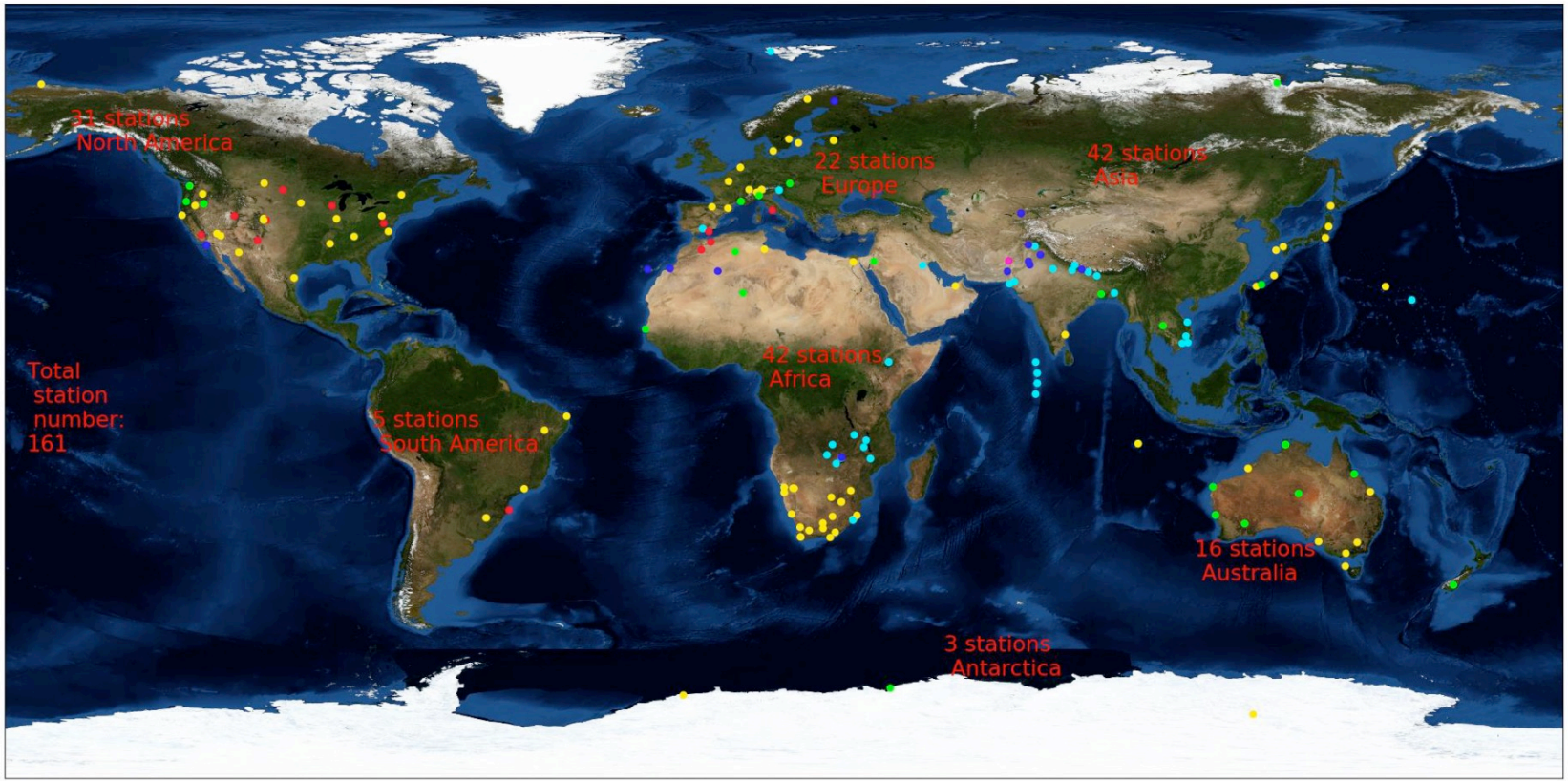
- Soiling
- Tilted sensors
- Tracker off
- Tracker misalignment
- Obstructions
- Incorrect time-zone







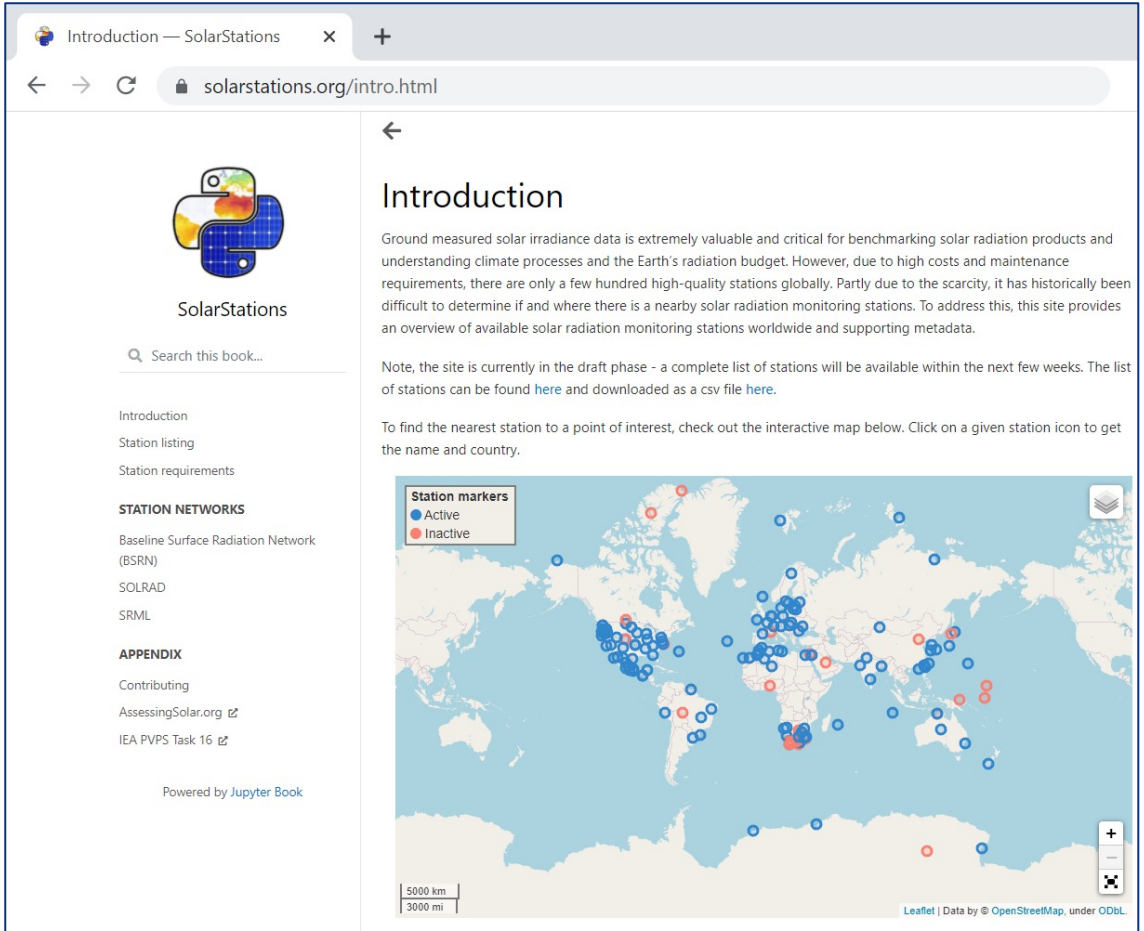
Reviewed stations



Map in background: Stöckli et al. 2005

PVPS

SolarStations.org



Data retrieval with pvlib

Existing functions

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

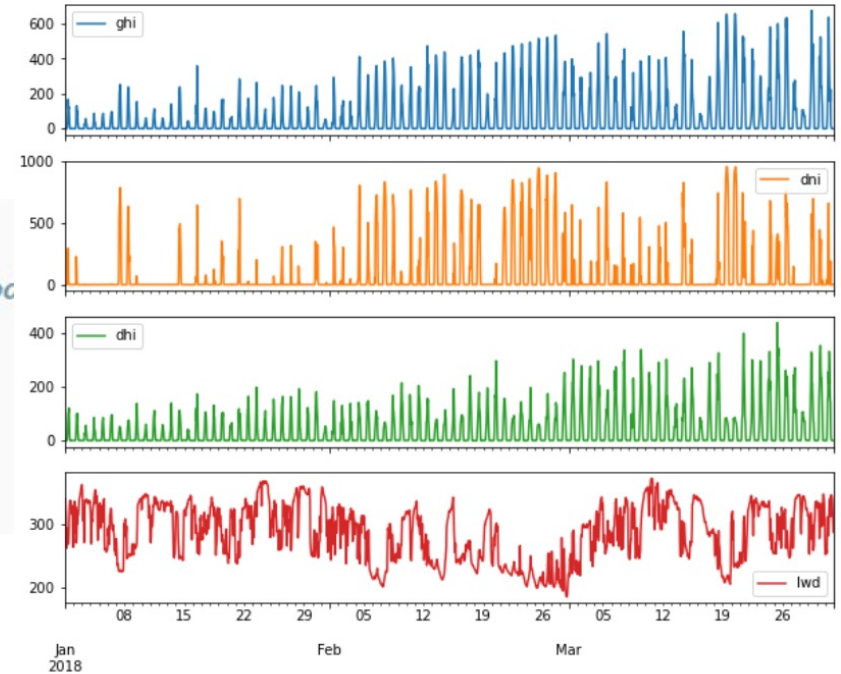
New functions

- **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 coc
    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))
```

PVPS

Thank you!

SolarStations.org

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