

Solar radiation measurements

Solar radiation measurements are established at the BCO since March 2015. The typical setup for a measurement station consist of a sun tracker with 3 sensors installed on a table (one shaded pyranometer for diffuse radiation, one not-shaded pyranometer for global radiation and a shaded pyrgeometer for longwave radiation). Aside mounted a heliometer is pointing directly into the sun. The date is recorded with a resolution of 1 sec.



Two sets of sensors are used and exchanged approx. every two years.

- Set 1: CMP21 #140337, CMP21 #140356, CGR4 #140034, CHP1 #140059
- Set 2: CMP21 #160654, CMP21 #160653, CGR4 #150139, CHP1 #160388

Exchange dates are:

- 16.04.2017
- 12.01.2020

Calibration of our sensors is done by the DWD in Lindenberg.

DATA ACCESS

The data is available at

`/pool/OBS/BARBADOS_CLOUD_OBSERVATORY/Level_1/K_Radiation/`

and

```
/pool/data/OBS/BARBADOS_CLOUD_OBSERVATORY/Level_1/K_Radiation/
```

on levante.dkrz.de.

The measurements are available since 2015 and a detailed overview about the data availability is given here: http://bcoweb.mpimet.mpg.de/systems/data_availability/DeviceAvailability.html

EXAMPLE

```
import os
import matplotlib.pyplot as plt
import pandas as pd
import xarray as xr

fileformat =
'/pool/OBS/BARBADOS_CLOUD_OBSERVATORY/Level_1/K_Radiation/%Y%m/Radiation__De
ebles_Point__DownwellingRadiation__ls__%Y%m%d.nc'
dates = pd.date_range('2020-02-01', '2020-02-04')

def create_filelist(dates, fileformat):
    """
    Create list of files

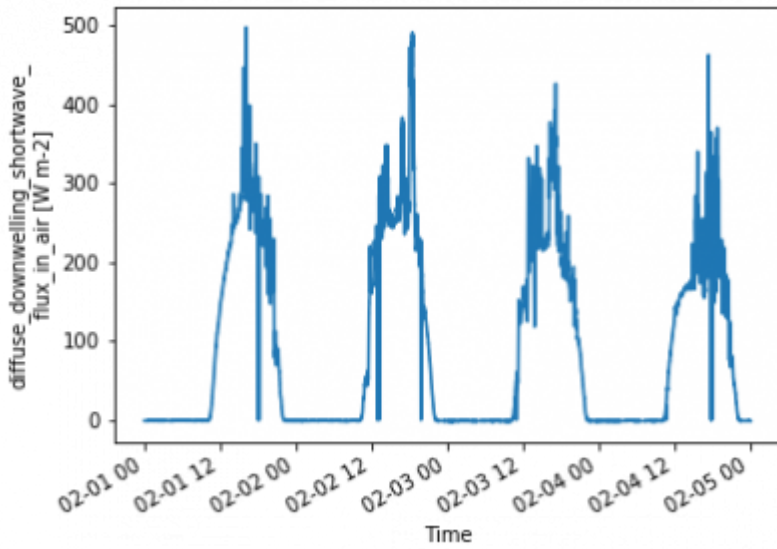
    Returns list of existing files for
    the given dates and fileformat

    Input
    -----
    dates : datetime-like
        List of dates that are of interest
    fileformat : str
        Fileformat of files incl. full path

    Returns
    -----
    files : list
        List of files that could be found
    """
    files = []
    for date in dates:
        fn = date.strftime(fileformat)
        if os.path.exists(fn):
            files.append(fn)
    return files

files_available = create_filelist(dates, fileformat)
ds_radiation = xr.open_mfdataset(files_available)
```

```
ds_radiation.SWdown_diffuse.plot();
```



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