

# Master thesis in Leipzig – Cooperation of TROPOS Leipzig and Solar Energy Meteorology at Uni Oldenburg

## Comparison of satellite based cloud products and surface irradiance estimates

The solar irradiance at the surface can be determined from satellite data using the Heliosat method, which is widely used for solar energy applications. It uses Meteosat Second Generation data of backscattered irradiance to determine the cloudiness of each pixel. Therefore it contains information on the subpixel cloud cover and the transmissivity. Operational satellite retrievals of CMSAF and KNMI derive different cloud properties such as fractional cloud cover and cloud optical density to estimate the surface insolation, assuming a homogeneous cloud in the pixel.

In this master thesis irradiance maps based on the Heliosat method shall be compared with operational CMSAF and KNMI cloud products and surface irradiance. All satellite retrievals will be compared to measurement stations (HD(CP)<sup>2</sup> measurement network and DWD stations). A detailed evaluation should give input for improving the Heliosat method, taking specific cloud types into account.

The master thesis can be supervised and written in German or English language. The workplace is at the TROPOS in Leipzig. Trips to the Uni Oldenburg are foreseen for exchange and presentation of the results.

Preconditions:

- Interest in meteorology, satellite remote sensing and solar energy
- Experiences with data handling and analysis
- Good programming skills (in Python, IDL or MatLab)

Earliest beginning: September 2014

For further information interested persons should contact:

**Dr. Hartwig Deneke ( [deneke\(at\)tropos.de](mailto:deneke(at)tropos.de) )**

**Dr. John Kalisch ( [john.kalisch\(at\)uni-oldenburg.de](mailto:john.kalisch(at)uni-oldenburg.de) )**