



Validation of surface solar radiation of gridded data records on the global scale using surface measurements

Uwe Pfeifroth, Jörg Trentmann, Roswitha Cremer, and Martin Stengel

Deutscher Wetterdienst, Climate and Environment, Offenbach, Germany (uwe.pfeifroth@dwd.de)

The solar radiation reaching the Earth's surface determines our climate and is therefore important to be monitored as consistent and complete as possible. Even though surface reference measurements of surface solar radiation are available (e.g. from the Baseline Surface Radiation Network (BSRN)), their density remains low and large areas, like the oceans, remain poorly covered. To fill the gaps, satellite-based data records (like those from the EUMETSAT Climate Monitoring Satellite Application Facility (CM SAF) or ESA Climate Change Initiative (ESA-CCI)) and model-based reanalysis data records can be used. They deliver surface solar radiation data with global coverage, which is needed to understand its distribution and variability from the regional to the global scale.

The quality of satellite-based and reanalysis data sets is variable and partly unknown, but should be assessed in order to avoid its deficiency usage. Here we present a validation of surface solar radiation given by satellite-based and reanalysis data sets on the global scale by using a data base of hundreds of surface measurements over land and ocean, collected from different sources (incl. BSRN, GEBA, WRDC, and buoy networks).

This study will bring new insights about the quality and uncertainty of available satellite-based and reanalysis data records for climate studies, and helps to improve future releases of such data records.