



Global solar radiation: comparison of satellite and ground based observations on monthly time scale

Petr Skalak (1,2), Piotr Struzik (3), Pavel Zahradníček (2,1), Aleš Farda (2,1)

(1) Czech Hydrometeorological Institute, Department of Climatology, Na Šabatce 17, 14306 Praha, Czech Republic (skalak@chmi.cz), (2) Global Change Research Centre AS CR, Bělidla 986/4a, 60300 Brno, Czech Republic, (3) Institute of Meteorology and Water Management, P. Borowego 14, Krakow, Poland

We analyze monthly and annual values of downwelling solar shortwave flux (DSSF) derived by the EUMETSAT Land Surface Analysis Satellite Applications Facility (LandSAF) from that data measured by the SEVIRI instrument on the operational MSG satellites. The satellite LandSAF data are evaluated against ground measurements of global solar radiation (GLBR) carried out on 16 meteorological stations of the Czech Hydrometeorological Institute. Our aim is to find out whether DSSF monthly data could potentially serve as an alternative source of information on GLBR outside of the meteorological station network.

We test a validation approach by taking either one, the nearest satellite grid box to a station or group of neighboring satellite grid boxes spatially averaged. The preliminary results suggest a high correlation of monthly GLBR and DSSF data. Error of monthly DSSF for individual stations is usually within ± 30 MJ/m². While in summer months this corresponds to $\pm 5\%$ of relative error (computed as $DSSF-GLBR/GLBR$), in the winter half-year relative errors can exceed $\pm 20\%$. The magnitude of error does not depend on a distance among a station and grid points. Annual mean error and RMSE of individual stations show a dependence on altitude, with more elevated stations having a higher negative annual mean error.

Acknowledgement

Supported by the project P209-11-0956 of the Czech Science Foundation.