Global solar radiation: comparison of satellite and ground based observations

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Abstract
We analyze 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 in the Czech Republic. Our aim is to find out whether DSSF data could potentially serve as an alternative source of information on GLBR outside of the meteorological station network. 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 ±5% of relative error (computed as DSSF-GLBR/GLBR), in the winter half-year relative errors can exceed ±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.

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