



Towards a new aerosol climatology to improve the SPECMAGIC algorithm to retrieve surface solar irradiation from MVIRI and SEVIRI

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The Satellite Application Facility on Climate Monitoring (CM SAF) provides long-term climate datasets of surface solar radiation for more than 30 years retrieved from MVIRI and SEVIRI instruments on board the METEOSAT first and second generation satellites, respectively. The surface solar radiation is retrieved using the SPECMAGIC algorithm. The SPECMAGIC method is composed of the Heliosat approach to calculate the cloud transmission and a clear sky model. The Heliosat approach as well as the SPECMAGIC method will be described in the presentation “The SPECMAGIC algorithm for the retrieval of spectrally resolved surface radiation, overview and applications” by R. Müller in this session.

The clear sky model SPECMAGIC consists of look-up tables calculated with the radiative transfer model libradtran for the consideration of aerosol as well as water vapour and ozone.

The effect of four different state of the art aerosol data sources on the accuracy of surface solar radiation derived with SPECMAGIC is evaluated. The respective results are compared with calculations assuming constant aerosol (0.15) and zero optical depth.

The SPECMAGIC calculations using the different aerosol information are compared to measurements of stations of the Baseline Surface Radiation Network (BSRN).

The results indicate that in regions with a low frequency of clouds and enhanced variability of aerosol optical depth the climatologies investigated lead to large underestimations of the surface solar radiation, indicating that high aerosol optical depth provided by these climatologies are overestimated. As a consequence the best performing aerosol climatology investigated is modified in such a way very high AODs are cut down, which leads to promising results in the surface solar radiation retrieval.