# Validation of the second edition of CM SAF surface radiation dataset over China

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High-quality SSR (Surface Solar Radiation) data is vital for an accurate estimation of variations in surface energy and the related environmental implications. The basic data source is from ground observations, which however have a too limited spatial representation to meet the various needs of research. Satellite products with a much wider spatial coverage offer an alternative to overcome the spatial limitation of ground observation. The newly released second edition of the CM SAF (Satellite Application Facility on Climate Monitoring) surface radiation dataset is derived from the AVHRR sensors onboard the polar orbiting NOAA and METOP satellites, providing global information on SSR from 1982 to 2015 with a spatial resolution of $0.25°\times0.25°$. The accuracy and stability of this dataset is tested against a homogenized ground dataset over China, one of the air pollution hotspots. Our preliminary result shows a general overestimation of SSR by the CM SAF product as compared to the ground observations possibly due to an underestimation of the aerosol optical depth used in the satellite retrieval. The estimated bias (12 W/m2) and mean absolute bias (18 W/m2) are slightly larger than derived for other regions in the world. The CLARA-A2 data have been useful to identify potential inhomogeneities in the surface-based measurements and to reduce uncertainties in the calculation of changes and trends. The brightening trend in ground-observed SSR over China since the 1990s can also be detected by the CM SAF product, especially in spring and summer, while an opposite CM SAF SSR trend is shown in winter, possibly related to the limited coverage of snow-covered surfaces of the CM SAF product.