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Development of a gridded climatology of daily global solar radiation over the Benelux countries

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Abstract:
Appropriate information on solar resources is very important for a variety of technological areas, such as: agriculture, meteorology, forestry engineering, water resources and in particular in the designing and sizing of solar energy systems. Because ground-based measurements of solar radiation are usually scarce, several methods have been proposed to estimate the solar radiation incoming on a horizontal surface at ground level from images taken by satellites, and in particular by geostationary satellites.

In this contribution, we present a new climatology of surface incoming global solar radiation over the Benelux countries based on the first long time-series (1983-2005) of Meteosat-derived solar irradiance recently released by the CM-SAF and ground-based measurements. Merging ground and satellite data enables to take advantage of both the high accuracy of ground data and the global spatial coverage of satellite information. The derived climatology allows to quantify the mean amount and the variability of the surface incoming solar radiation for specific locations as well as spatially extended areas. In addition, distinct solar radiation zones in the Benelux countries were highlighted by cluster analysis.