Modelling solar irradiance from HRV images of Meteosat Second Generation

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Abstract

Knowledge of solar radiation at the earth's surface is a need in designing any solar energy application. In particular both photovoltaic and solar thermal systems required high accurate data of solar radiation components. Nowadays the use of satellite images as input to models for deriving solar irradiance time series is accepted as a reliable methodology with good accuracy. In this sense, there are several models aimed at this objective. Among them it can be pointed out the Heliosat-2 method, based upon the first generation of Meteosat satellites, which has been broadly used. Taken this approach as reference a modified model was proposed including additional independent variables to the cloud index, such as the moments of the cloud index distribution and the air mass. This model was successfully assessed with about 30 ground data sites in Spain showing a good response.

However, since 2006 the Meteosat Second Generation (MSG) is observing the earth-atmosphere system centred in zero longitude. This new satellite generation has improved technical characteristics compared to the former one, particularly those focused on radiometric, spectral, spatial and time resolutions. This work is aimed at describing the work to accommodate the former model based on Heliosat-2 to operate with the MSG images and characteristics. A comparison with the old model will be made in the overlapping period, 2006, and an assessment with available ground data will also be performed as well.