



Development of gridded solar radiation data over Belgium based on Meteosat and in-situ observations

Michel Journée, Gilles Vanderveken, and Cédric Bertrand

Royal Meteorological Institute of Belgium, Brussels, Belgium (m.journee@oma.be)

Knowledge on solar resources is highly important for all forms of solar energy applications. With the recent development in solar-based technologies national meteorological services are faced with increasing demands for high-quality and reliable site-time specific solar resource information. Traditionally, solar radiation is observed by means of networks of meteorological stations. Costs for installation and maintenance of such networks are very high and national networks comprise only few stations. Consequently the availability of ground-based solar radiation measurements has proven to be spatially and temporally inadequate for many applications. To overcome such a limitation, a major effort has been undertaken at the Royal Meteorological Institute of Belgium (RMI) to provide the solar energy industry, the electricity sector, governments, and renewable energy organizations and institutions with the most suitable and accurate information on the solar radiation resources at the Earth's surface over the Belgian territory. Only space-based observations can deliver a global coverage of the solar irradiation impinging on horizontal surface at the ground level. Because only geostationary data allow to capture the diurnal cycle of the solar irradiance at the Earth's surface, a method that combines information from Meteosat Second Generation satellites and ground-measurement has been implemented at RMI to generate high resolution solar products over Belgium on an operational basis. Besides these new products, the annual and seasonal variability of solar energy resource was evaluated, solar radiation climate zones were defined and the recent trend in solar radiation was characterized.