Solar Radiation Dataset at 5 km Resolution in the Belt and Road and Surround Region (2015)

The solar radiation dataset at 5 km resolution in the Belt and Road and Surround Region (2015) was developed based on the data integration among the MSTAT-2/Himawari-8 images governed by Japan Meteorological Agency, MSG2/MTG data from European space agency, FY2E/FY2F data from China, and MODIS atmospheric and land surface products (total precipitable water products of MOD05/MYD05, cloud products of MOD06/MYD06, aerosol products of MOD04/MYD04, as well as the 16-day composed land surface albedo of MCD43C2). In the data processing, firstly, the cloud detection procedure was performed to distinguish clear and cloudy sky for each pixel; secondly, the look-up tables (LUT) for solar radiation under clear sky and cloudy sky were generated separately based on the atmospheric radiative transfer model; and then, daily solar radiation was estimated based on the instantaneous solar irradiance; lastly, hourly and yearly solar radiation was accumulated from daily solar radiation. Daily solar radiation was evaluated from 12485 groups of observed data. The correlation coefficient between estimated daily DSR and the observations is 0.93, with bias error of 10.13 W/m² (5.86%) and RMSE of 35.83 W/m² (20.72%). The solar radiation in the Belt & Road area is between 3551 - 8583 MJ/m² in 2015, with an average value of 6400 MJ/m². Spatially, there are some high value areas of solar radiation in Africa, Western Asia, Southern Asia, and Oceania and low areas in east and north of China, most of Europe and Russia regions. The data is achieved in .tif data format with the compressed data size of 9.09 MB.