Geophysical Research Abstracts
Vol. 20, EGU2018-15635, 2018
EGU General Assembly 2018

A spatial analysis of shortwave radiation over Ireland

Eadaoin Doddy (1,2), Conor Sweeney (1,2), Frank McDermott (1,3)

(1) UCD Energy Institute, University College Dublin, Dublin, Ireland, (2) UCD School of Mathematics and Statistics, University College Dublin, Dublin, Ireland , (3) UCD School of Earth Sciences, University College Dublin, Dublin, Ireland

Unlike conventional power stations that can operate anywhere continuously to meet demand, solar technologies are fundamentally location dependent time-varying sources of energy. Spatial analyses of shortwave radiation (SW) is essential in the planning of viable locations for solar energy generation. Reanalysis datasets are often used to represent climatology, especially in regions where SW observations are sparse (e.g. Ireland). There is a clear and anticipated variation in SW in the north-south direction caused by the earth-sun orbit. However, it has also been observed that there is a variation in the east-west direction in the region surrounding Ireland. This is highlighted by the contrast in SW values over land and sea. Orography may account for some of this contrast, however regions with relatively flat orography still show a strong contrast. This spatial pattern has been studied in different seasons and is more pronounced in summer.

This study uses two low-resolution global reanalyses, ERA-Interim and MERRA2, and two high-resolution regional reanalysis datasets, MÉRA and a WRF-downscaled version of ERA-Interim to map the spatial pattern of daily total SW over Ireland. The accuracy of reanalysis data has been assessed by comparison with observed SW data in Ireland for up to 30 years. As there are no SW observations over the sea, satellite-derived products are used. This spatial pattern is present in the satellite derived product and the high-resolution reanalysis, MÉRA. It is also captured by ERA-Interim, however, the pattern is absent in MERRA2. An analysis will be presented which explores reasons for the different land/sea SW spatial patterns in these datasets.