Geophysical Research Abstracts
Vol. 20, EGU2018-18898, 2018
EGU General Assembly 2018

High resolution regional climatological datasets for the assessment of solar and wind energy resources in Europe

Frank Kaspar, Michael Borsche, Uwe Pfeifroth, Paul Becker, Andrea Kaiser-Weiss, and Jörg Trentmann
Deutscher Wetterdienst, Offenbach, Germany (frank.kaspar@dwd.de)

Recent progress in the development of high-resolution climatological datasets provides new opportunities to evaluate the variability of meteorological parameters with relevance for renewable energy resources at the continental (European) scale. With an increased share of solar and wind energy e.g. in the German and European energy systems it is becoming increasingly important to analyze the impact of fluctuations on the reliability of the energy system. For the assessment at climatological time scales on the continental scale, two types of data sources have the potential to provide information with high spatial and temporal details: Surface radiation data can be derived from meteorological satellites which have now provided observations for a few decades. Model-based reanalysis can provide information on wind conditions also in hub height of modern wind energy converters. Germany's meteorological service (DWD, Deutscher Wetterdienst) has ongoing activities that provide new datasets of both categories: (a) Within EUMETSAT's Satellite Application Facility on Climate Monitoring (CM SAF, hosted at Deutscher Wetterdienst) observations from the series of METEOSAT satellites have been used to generate a surface radiation datasets covering 1983 until today on a 30-min basis with a spatial resolution of 0.05° x 0.05°. (b) Global reanalysis data are an established tool for a wide range of applications. However, these frequently used datasets are of rather coarse resolution. In recent years, also regional reanalysis datasets have been developed based on regional numerical weather prediction models. One example is the regional reanalysis (COSMO-REA6) that was developed within the Hans-Ertel-Center of Deutscher Wetterdienst. It is based on the regional model of DWD, provides a dataset of several meteorological parameters for Europe at a spatial resolution of ∼6km and currently covers the period 1995 to 2015. The quality of the data has been evaluated by comparison against independent data sources as well as other model-based datasets. Because of the high relevance of such data for the energy sector, a strong focus of recent activities has been the evaluation of the quality of the wind data. Here we present a general overview over these datasets and provide application examples at the national and European scale. The combination of both data sources allows assessing variability of both parameters as well as the potential for balancing effects. One important question is the frequency, duration and spatial extend of meteorological situations when both energy sources only provide a low fraction of the installed capacity.