



Uncertainties in solar radiation ECMWF data at high latitude

Bilal Babar and Tobias Boström

Department of Physics and Technology, The University of Tromsø - The Arctic University of Norway, Tromsø, Norway
(bilal.babar@uit.no)

The solar radiation potential is a very important parameter for photovoltaic and solar thermal installations. Pyranometers can be used to physically measure the incoming solar radiation and is considered as the most reliable source. However, the availability of pyranometer radiation data from meteorological centers worldwide is very low, especially at high latitudes, as in the case of Scandinavia. Other sources of radiation data includes estimations provided by software such as Meteonorm and PVGIS. Both programs use primarily geostationary satellites for the solar radiation estimation. However, these estimations become ineffective at high latitudes because of the flat viewing angle of the geostationary satellites. Reanalyzed data by European Centre for Medium-Range Weather Forecasts (ECMWF) provide radiation estimates along with other climatological entities. In this study, we used the shortwave downward radiation data from ECMWF and compared it with the ground-measured data at 7 stations in Norway and Sweden. The areas analyzed lie at varying latitudes from 59 to 69 degrees north. It was observed that the error in the reanalyzed data drastically increases with latitude. In both Norway and Sweden, a very similar trend in the errors was observed. The strong error biases at high latitudes suggest that reanalyzed data needs rectification for above 60 degrees north areas.