EMS Annual Meeting Abstracts
Vol. 12, EMS2015-181, 2015
15th EMS / 12th ECAM

Solar energy availability for Slovenia – spatial and temporal variability

Boštjan Grašič, Primož Mlakar, Marija Zlata Božnar, and Dragana Kokal
MEIS d.o.o., Šmarje - Sap, Slovenia (info@meis.si)

Slovenia is a country with several very different climate regimes. Solar energy is explored in photovoltaic solar plants in a relatively small amount.

A study has been done about solar energy availability for Slovenia. The study takes into account the space and time variability. Firstly the global solar radiation over Slovenia has been calculated for a longer period (3 years) using a WRF NWP model in a spatial resolution of 4km and a time resolution of half hour. The results have been elaborated in detail for monthly averages and the average daily patterns for each month. The results were presented as 2D maps. The data was validated with measurements on several locations.

In the second step a model was developed for calculating the expected diffuse part of global solar radiation based on other meteorological values forecasts. The model gives the possibility of estimating the diffuse solar radiation for each evaluated location in the same time resolution as the meteorological forecast. The model is based on Perceptron artificial neural networks. The new model is based on our previous experience of more than two decades about using this mathematical tool in the field of solar radiation and in the field of air pollution.

Based on both available components of global solar radiation, direct and diffuse, a realistic estimation of the energy produced by photovoltaic solar power plants can be estimated.

Examples of real life usage for long term statistical evaluation and for on-line use of the system for calculating the available solar energy will be presented.