



Climate services for energy production: are regional climate models reliable for future solar power generation scenarios?

Marcello Petitta (1), Mariapina Castelli (2,3), and Sandro Calmanti (1)

(1) ENEA, Roma, Italy, (2) DICA, University of Trento, Italy, (3) Institute for applied remote sensing, EURAC, Bolzano/Bozen, Italy

In this study we present an analysis of surface solar radiation from Regional Climate Models (RCMs) scenario simulations produced during the ENSEMBLES project in order to understand the relation between changes in atmospheric properties and variation of the energy produced by solar power plants.

Several studies have recently pointed out the inability and the scarce accuracy of IPCC models in capturing the past decadal variability of Surface Solar Radiation (SSR) (Wild 2009, Wild et al 2010). Most of these works compare observed and estimated SSR for the last 6-7 decades and show that only half of the models are able to reproduce partially the observed decrease (global dimming) and the increase (global brightening) in SSR which occurred respectively in the time intervals 1950-1980 and 1990-2000.

We focus on the Euro-Mediterranean area and we compare the SSR data for the period 1951-2000 in order to assess the error associated to the model ensemble. Furthermore we analyze the XXI century regional ENSEMBLES scenarios in order to quantify potential future changes of SSR. The preliminary results obtained so far confirm the findings of Wild et al. for the period 1950-2000. For the future, the analysis shows a positive linear trend over the Mediterranean region. On the other hand, most of the models predict a negative linear trend over Central Europe. We also discuss future energy strategies considering the variability of energy production from solar panels estimated by probabilistic climate change scenarios.