



Variability of solar radiation in a Mediterranean city (Lecce, Southern Italy)

Riccardo Buccolieri (1), Alessandro Rizzo (1), Silvana Di Sabatino (2), and Piero Lionello (1)

(1) University of Salento, DISTEBA, Lecce, Italy (piero.lionello@unisalento.it), (2) University of Bologna, DIFA, Bologna, Italy

The analysis of solar radiation data is of great importance in the environmental field as it allows, among others, the development of predictive models useful for the exploitation of solar energy. The total amount of solar radiation reaching the ground strictly depends on the attenuation processes, such as absorption and scattering by various components (atmospheric gases, dust, water vapour etc.). Further, in urban areas, it is also affected by pollution caused by traffic, industrial and domestic activities.

Here we investigate the variability of global solar radiation in the city of Lecce (southern Italy) by analysing solar radiation data measured by a solar station, operating since late seventies, located on the outskirts of the city and installed close to a full meteorological station. The solar station, initially equipped with one pyranometer, since 2006 records data from ten pyranometers working at different spectral bands. The whole time series provide the potential for reconstructing simultaneously solar radiation and meteorological conditions over a more than 30-year long period.

Our initial data analysis of two periods, i.e. years 1979-1982 (period 1) and 2010-2011 (period 2), shows that global incident solar radiation decreased from period 1 to period 2, suggesting a local change in the transparency of the atmosphere. This decrease can have both local and remote causes. Possible explanations are (i) an increase in locally emitted pollutant concentration levels due to the increase in land use and construction of new buildings in the last thirty years, which enhanced local traffic and industrial emissions; (ii) an increase in the concentration of pollutants coming from industrial centres located in near cities, such as Taranto and Brindisi; (iii) variation of circulation regimes responsible for advection of natural components such as marine aerosol and Saharan dust from remote areas.