



A Global radiation dataset for the Piemonte area (Italy) over the 1990-2016 period

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Global radiation is a key element for the Global Energy Balance and the climate system. The scientific community is studying how it interacts with the other climatic variables (e.g., clouds, aerosols. . .) to investigate which are the processes underlying the variations observed in the last decades (“global dimming” and “brightening period”) and how it changes in space to obtain useful information for more applicative fields like agriculture and energy.

A homogenized dataset of global radiation instrumental time series has been set up recently for the first time over the Italian territory. This dataset encompasses 54 series with data for the period 1959-2013. However, a large amount of data can be still recovered from the different Italian regional services even if they cover a shorter period. The aim of the present work is to analyze the global radiation series available for the Piemonte area, a region located in the North-West of Italy. The dataset, recovered from Arpa Piemonte (www.arpa.piemonte.gov.it), encompasses 79 daily instrumental time series with data for the 1990-2016 period with elevation comprised between 77 and 4560m. All the series have been subjected to a detailed quality-control and homogenization procedure in order to remove non climatic-signals, transformed into seasonal and annual relative anomaly series and interpolated onto a regular grid. The obtained trends show a significant increasing tendency in all the seasons with the only exception of winter. The observed signal is stronger for the stations located at low elevations.

This dataset can be useful to increase the data availability during about the last 30 years in the already existing National dataset, helping to investigate more in detail the factors affecting global radiation variability during the “brightening period” in Italy.

The high number of series allow also to better study the spatial distribution of global radiation and to evaluate if the stations are affected by shading due to the surrounding mountains especially around sunrise and sunset and during the winter season. This issue can be particularly important for the stations located in areas with a complex orography like those considered in this dataset.