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Temporal Trends in Sunshine Duration over Italy (1936-2013)

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A new dataset of Italian long-term sunshine duration records has been set up collecting data from the former national central office for meteorology (now CRA-CMA), the national air force meteorological and climatological service and the national agrometeorological database: it consists of 104 daily series with at least 10 years of available data in the 1936-2013 period.

The records have been quality checked; then monthly average records have been calculated and normalized by means of the corresponding exo-atmospheric sunshine duration. The normalized records have then been subjected to an homogenization procedure. Finally, each monthly record has been completed on the basis on the neighboring records.

The completed records have been projected onto a regular grid (1° X 1° resolution) covering the whole Italian territory with 68 cell. The gridded records have been subjected to Principal Component Analysis with the objective of dividing the Italian territory into areas with similar sunshine duration variability. Two main regions were identified: Northern Italy and Southern Italy. The records of these areas were averaged in order to get the corresponding regional records. They were analyzed, together with the national record, in order to search for temporal variability and long-term trends.

This dataset will be presented and the sunshine duration temporal evolution will be discussed. The most evident signal concerns summer. In this season the series show a negative trend (ranging from -5% to -3%) from the end of the 1950s to the early 1980s followed by a positive trend (ranging from 2% to 5%) up to the end of the 20^{th} century, which correspond to the "global dimming" and the subsequent "brightening" described for other regions in international scientific papers.

Beside sunshine duration temporal trends comparison between sunshine duration records, cloud cover and daily temperature range records will be discussed.