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## A new dataset of visibility observations for the 1951-2014 period over Italy

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Visibility is defined as the maximum distance at which the outlines of a target can be recognized against the horizon as background. Passing through the atmosphere, the light is reduced by the interaction with atmospheric gases and aerosol particles which can absorb or scatter the light. Therefore, a change in visibility is connected to a variation in all the scattering and absorbing mechanisms occurring in the atmosphere due to gases and particles. Moreover, the influence of other meteorological variables like relative humidity, wind and precipitation, is also fundamental. In literature, for Europe a significant decrease in the frequency of low-visibility days is reported after the 1980s which is spatially and temporally correlated with a decrease in sulfate emissions. Differently, a reduction of the visibility is observed in developing countries.

The aim of this work is to present the preliminary results of a new dataset of visibility observations over Italy and to test how it can be used to obtain information about changes in the transparency of the atmosphere. The series were recovered from the national air force meteorological and climatological service (Servizio Meteorologico Aeronautica Militare) and the final database encompasses 122 stations with data for the 1951-2014 period. The series consist of sub-daily observations (8 values per day).

The main effort has been done to check the quality of the data (e.g., consistency of the used codes between the different stations during the whole considered period) in order to obtain reliable climate time series. The obtained regional trends, calculated considering the observations at midday (time during which the influence of other factors like relative humidity is minimum), depend on the considered period and season. Specifically, they show a decrease until the 1970-1980s and an increase in the subsequent period in according with the aerosol concentration emissions reported for Europe. The observed signals are more pronounced in spring and summer and for the stations located at low elevations.