# LONG PRECIPITATION AND TEMPERATURE TIME SERIES - RELATED CLIMATE INDICES FOR PIEDMONT (NW ITALY)

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The study of the temperature and precipitation deserves great attention because being part of a recent past, they allow us to analyse in detail the variations which have occurred and their causes. In order to correctly study these variations we must have at our disposal some homogeneous series. Unfortunately, most of the series don't present climatic factors that may hide the real changes. The discontinuity can be due to a change in the location of the station, to a replacement of the instruments or to a variation in the surrounding environment.
In this report, we have studied the daily thermo-pluviometric series of 15 meteorological stations in Piedmont that have measured continuously for 95 years, from 1914 to 2008.
As a first step, we have done a historical research (concerning each station) which has allowed us to determine the variations due either to the location or to the replacement of the equipment. Subsequently we have reconstructed some monthly amounts for creating a complete series (no missing data). We have chosen four different methods of spatial interpolation. These are defined as the 1) normal ratio method (NR), 2) simple inverse distance weighting (IDW), 3) multiple regression (MR) and 4) median of the previous three methods (MED). Then we have applied an implementation of well-known Standard Normal Homogeneity Test (SNHT) to the monthly series. This method, realised by the Climate Change Research Group (URV, Tarragona, Spain), allows to estimate and individuate the gradual or sudden change of the average value of a particular series comparing it to the reference series which has been obtained by evaluating the result of the adjacent series and which is considered homogeneous. In this way we have obtained the homogeneous series on which trends have been computed and the non-parametric Mann-Kendall test has been used to understand the statistical meaning of the trend.
Finally, to illustrate the trend of temperature and precipitation average and extreme values, the indices proposed by "CCL/CLIVAR Working Group on Climate Change Detection" have been calculated over WMO 30-year periods (1951-80, 1961-90, 1971-2000). In order to better understand the consequences of climate variations on our environment and society, we have calculated the climate indices (number of frost days, days with no thaw, tropical days, dry and wet days, rainy days, density of precipitation) over the time and also the use of thermograms, pluviometric regimes and ombrothermal diagrams underline differences among the three 30-year periods.
The values of temperature and precipitation have also allowed to begin the climatic analysis aiming at defining the principle local climates in Piedmont.