



Comparison study of two independent precipitation networks in North West Italy

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Extreme weather and climate events have a deep impact on society. Climatologists are thus increasingly interested in studying changes in the intensity, frequency, duration and spatial distribution of such events. Unfortunately, long instrumental climate records are usually affected by non-climatic changes (inhomogeneities), which compromise such studies. The most direct way to study non-climatic biases relies on parallel measurements.

Two independent climate networks in North West Italy, offer the unique possibility to study such an inhomogeneity in the precipitation record. From this dataset we could identify 20 pairs of stations with up to 15 years of overlap, which can be used to study the influence of the transition to automatic precipitation measurements on the homogeneity of the precipitation record.

For each stations a continuous and accurate historical research is available that has allowed us to create, for every location, a metadata file. Then a manual quality control was carried out using the software RClimdex (Zhang et al., 2004). The program highlights obviously wrong precipitation data, such as negative values, and creates plots had allow the identification of outliers.

In order to make a direct comparison between the daily pluviometric series, missing values in one series were also set to be missing in its counterpart before computing monthly statistics. For the precipitation series we have analyzed the monthly precipitation sums and the number of rainy days, i.e. days with precipitation ≥ 1 mm.

Subsequently, from the monthly precipitation amounts, the series of their ratios have been calculated and for the rain days the series their difference. Over the new series a statistical analysis has been carried out and the extreme values, values that fall in the distribution tails, have been checked by examining the daily values of precipitation series. Moreover we have divided the daily precipitation in five precipitation classes. that allows us to compare if differences in the strength of precipitation events depend on the magnitude itself.

The work has shown most clearly that the inhomogeneity have affected for small precipitation amounts and the number of precipitation days, whereas strong precipitation is not much affected.