



Daily precipitation variability in the Italian Alps over the last century

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Precipitation climatology in mountainous areas is characterized by high spatial variability, for instance total yearly mean values can change by hundreds of millimeters in the space of few kilometers. A dense network of rain gauges is then necessary to completely assess past changes in the hydrological cycle. Such networks are indeed operative on Italian territory since the 1920s, but the quality of this large amount of data needs to be carefully checked, especially for the presence of inhomogeneities.

In this work we present an homogenized high-resolution dataset composed by more than 150 daily precipitation series spanning the last 90 years, located over an area centered on the Trentino-Alto Adige region (central-eastern part of Italian Alps). Missing data have been filled by using an advanced technique based on multi-linear regression and preserving the probability density function.

On monthly and seasonal basis we analyzed trends of total precipitation, wet days and average intensity; for an easier understanding of geographical patterns we created a gridded dataset in terms of anomalies, with a spatial resolution of 0.1 degrees.

For a more detailed analysis, daily precipitation amounts of each station have been classified into different intensity categories, based on the percentiles of the distribution, and the evolution of the number of events and of the total precipitation amount falling into each category have been studied.

All the statistics have been analyzed for trend over the entire period spanned by the data and on sub-periods of variable length.

Comparison with previous low-resolution studies on the same area underlines the importance of an high-resolution dataset in characterizing all aspects of climatic changes.