



Systematic errors and time dependence in rainfall annual maxima statistics in Lombardy

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The hydrological service of ARPA Lombardia provides its users with information on the statistics of rainfall annual maxima. The operational choice is to make Depth-Duration-Frequency Curves (DDFC) available in every location within Lombardy, where topography is complex and prevalent weather phenomena differ in different sub-areas.

With the purpose of improving such information, parameters of the underlying extreme event distributions are estimated at points of a grid covering Lombardy, by making use of multiple, spatially distributed time series in a distance-weighted bootstrap approach. The impact of extremely rare events, that may occur at very few locations and result in unrealistic local peculiarities in DDF curves, is effectively reduced.

The issue of non-stationarity of the statistics is addressed by specifically investigating the presence of systematic errors that can affect the analysis, possibly leading either to over-estimation or to under-estimation of local effects of climate change. This is obtained by applying Cross-Validation tests to observational series belonging to the same homogeneous geographical areas.