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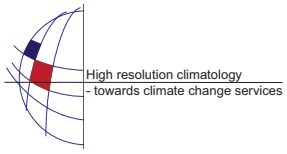

Non-stationarity of extreme precipitation in Switzerland

S. Fukutome and M. Liniger
MeteoSwiss, Climate Analyses, Zurich, Switzerland (sophie.fukutome@meteoswiss.ch)

Precipitation time series sometimes exhibit long-term non-stationarities that violate the assumptions of extreme value theory and are bound to affect the extreme value analysis. Indeed, the analyses performed over different time periods occasionally yield very different results, especially with regard to return levels. A question frequently arising in practice is which period should be used to determine return levels and return periods.

The purpose of the present study is to investigate these long-term non-stationarities in the precipitation time series of the Swiss Observational Network covering 100 to150 years.

The General Extreme Value Theory is applied to determine the distribution of yearly maxima of 1-day precipitation. In order to highlight the evolution of the distribution in time, the General Extreme Value (GEV) distribution is fitted to the data within a sliding window extending over 41 years. The GEV parameters, various return levels, as well as their confidence bounds are estimated separately for each window. The same procedure is repeated at several stations in the Swiss Plateau and the Alpine region. First results indicate that it would be meaningful to introduce time as a covariate in the estimation of the GEV distribution at some stations. The disparate behavior of the parameters at different stations, however, does not a priori point to an effect of anthropogenic climate change.