



Extreme value return times for SPI time series: Sicily and Elbe basin

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The present study is focused on the statistical analysis of extreme dry and wet events as deduced from the Standardized Precipitation Index (SPI) time series from 1951 to 2000 computed using rain gauge data of Sicily and Elbe basin (Germany). In order to analyse meteorological and hydrological extremes, the index has been computed on 3-month (SPI-3) and 24-month time scale (SPI-24). Because the SPI is a standardised index, the problem related to the choice of the threshold for the extreme value analysis reduces to the selection of the index class, i.e. index values less than -2 means extreme drought, while values greater than 2 means extreme wet conditions. Nevertheless, the use of the SPI to study extreme events of dry or wet periods has some problems. One is related to the persistence of the index above the threshold and the other one to the time scale of the index. About the last problem, if the time scale of the index is long and the record length is too short (compared with the climate variability of the index time series), we cannot have a correct estimation of the parameters of the Pareto Distribution. Results suggest that the estimation of return times for extreme events using the SPI-24 needs time series longer than 75 year. Here we try to use synthetic data of different lengths to estimate the right return times.

On the other hand, to partially avoid this problem, we use the SPI on the shorter time scale considered (SPI-3) and better results have been obtained. Some features characterising the return times of extreme events in the two areas are probably related to orographic effects and seem to be consistent with the climatic conditions of the regions.