



Identification and spatial clustering of drought events in the Greater Alpine Region of the past 200 years.

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In this study the occurrence of drought in space and time in the Greater Alpine Region (GAR) of Europe over the past two centuries is investigated. Following research questions are covered: (i) What are the main spatial patterns of droughts in the GAR? (ii) What major events occurred in the last 200 years and to what extent do droughts in the GAR show a North/South divide? (iii) Are drought patterns stable over time?

The data used is the gridded precipitation dataset of the HISTALP database covering the period from 1801-2003 on a monthly basis and a spatial resolution of 0.083° . Usually drought indicators like the Standardized Precipitation Index or the Palmer Drought Severity Index are used to assess dry (and wet) states in a given region. We decided to use solely precipitation as an indicator for drought, since indices do show some degree of uncertainty in their methodological approach which could be avoided by using only rainfall data, which also implies that only meteorological droughts are investigated. In this investigation drought is defined by precipitation sums falling below the 10% percentile for a given month, whereas precipitation is accumulated on different time scales of 1, 3 and 6 months in order to account for different drought time scales.

Different clustering approaches are tested to regionalize drought characteristics in the GAR. Each method is tested to account for strengths and weaknesses. Furthermore, these analyses are performed in two ways. One time the clustering is applied over the whole time period under consideration in order to obtain individual regions differentiated by their drought characteristics. The second time the clustering is carried out within a defined time window of n years running through the whole time series to account for changes in the spatial structure of main drought patterns over the last 200 years.

Preliminary results show the possibility of large spatial differences in drought occurrence on a North/South axis, with the Alpine crest being a clear weather divide. On the other hand droughts also occur widespread over the whole GAR, for example in 2003. Considering the time dimension, the GAR was afflicted by extraordinary dry decades in the 1860s and 1940s.