

Spatiotemporal characteristics of climatic drought periods in Austria

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We characterized climatic drought periods in Austria, in order to detect drought-causing atmospheric patterns. Drought indices were calculated for the period 1801 to 2008 using the HISTALP data set. SPI and SPEI were calculated for 1, 3 and 6 and 12 months accumulation periods. To learn about the temporal dynamics of Drought events in Austria, temporal, spatial and intensity indicators of Drought indices were investigated. The length of Periods, which are defined by a sequence of month showing negative values, when at least one value was lower than -1 for SPI and SPEI and -3 for scPDSI. Additionally, the affected area of a Drought event was evaluated to gain information about the spatial dimension of a drought. The indicators further were assigned to the season (summer/winter) of their occurrence. The number of drought periods shows a different behaviour for the summer and winter season, especially during the 19th century, where the most intense drought occurs in winter, showing two peaks around the years 1856 and 1890. While the number of drought periods exceeds the number of summer drought month in this period, the 20th century drought events are similar distributed among seasons. A Principal component analysis was applied on the drought index time series for summer and winter. In both seasons the first 3 components show the influence of the division of the alpine main ridge, the division between east and west and the influence of the alpine area. However, depending on the season their order varies. While in winter months the 1. PC shows mainly the influence of the alpine main ridge division, in summer the 1. PC divides East from West. The patterns in every month described by the principal components were linked to the affected area, drought intensity and drought period length. Around 60 distinct drought periods were found so far, whereas temperature and precipitation anomalies using the HISTALP data set and sea level pressure anomalies using Lutherbacher et al. (2002) were calculated and compared to the detected drought periods.