



## **Reconstruction and impact evaluation of droughts in Southwest Germany**

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Droughts are complex hazards, which can have severe impacts on the environment, society and the economy. Due to current climate and environmental change, many regions, including Central Europe, are at risk of experiencing droughts more frequently in the future. The reconstruction and impact evaluation of past droughts can help mitigate this increased prospective threat.

Considerable efforts have been made in analyzing historic droughts of the past 50 to 100 years, mainly using hydrometeorological data, which also included impact analysis derived from historic reports. However, risk analysis and extreme value statistics become more certain, when considering larger spans of time. Additional historic documents were consequently used to reconstruct the frequency and extend of extreme weather events, particularly dry spells, going back to the 16th century. This extended analysis allows for a more comprehensive impact evaluation and creation of adaption profiles of societies and the environment in south-west Germany.

As part of this analysis, early instrumental data of temperature and precipitation from 1800 onward was used to calculate indices like the standardized precipitation index (SPI) and the standardized precipitation evapotranspiration index (SPEI), in order to identify and characterize drought events. Based on this meteorological information, duration, severity and intensity of droughts were calculated and the probability of reoccurrence was determined.

Prior to the establishment of national meteorological networks in the 19th century, information on droughts is only accessible from non-instrumental sources including documentary evidence, such as chronicles or newspapers. Based on this documentary evidence data was collected and coded for the time period between 1500 and 1800 and transferred into the collaborative research environment named [tambora.org](http://tambora.org). Furthermore an index was derived, ranging from extremely dry to extremely wet weather events, that also captures societal and environmental impacts. In order to build a 500 year long weather event database of droughts in south-west Germany, the link between impacts and severity, duration and timing of droughts must be understood. Therefore this research identifies and includes numerous extreme weather events and dry spells of the past, which are used as a basis for further risk related analysis.

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