



## Revisiting the recent European droughts from a long-term perspective

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Early 21st-century droughts in Europe have been broadly regarded as exceptionally severe, substantially affecting a wide range of socio-economic sectors. According to the estimate of the United Nations Environmental Programme, the 2003 drought resulted in an economic loss of 13 billion euros, while the corresponding estimate for the 2015 drought event is 2 billion euros. These extreme events were linked mainly to increases in temperature and record-breaking heatwaves that have been influencing Europe since 2000, in combination with a lack of precipitation during the summer months. Drought propagated through all respective compartments of the hydrological cycle, involving low runoff and prolonged soil moisture deficits. What if these recent droughts are not as extreme as previously thought? Using reconstructed droughts over the last 250 years, we show that although the 2003 and 2015 droughts may be regarded as the most extreme droughts driven by precipitation deficits during the vegetation period, their spatial extent and severity at a long-term European scale are less uncommon. This conclusion is evident in our concurrent investigation of three major drought types – meteorological (precipitation), agricultural (soil moisture) and hydrological (streamflow) droughts. Additionally, unprecedented drying trends for soil moisture and corresponding increases in the frequency of agricultural droughts are also observed, reflecting the recurring periods of high temperatures. Since intense and extended meteorological droughts may reemerge in the future, our study highlights concerns regarding the impacts of such extreme events when combined with persistent decrease in European soil moisture.