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Are we overestimating the effect of large-scale indices of climate variability in floods and droughts in Europe?

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Large-scale climate oscillation is known to influence local and regional climate, and has the potential to trigger flood and drought hazards. Therefore, atmospheric indices of climate oscillation such as ENSO, NAO and AO are often associated with an increase in the burden of natural disasters, and frequently fuel societal distress. Since climate variability is responsible for a great amount of variability in hydro- climatological events, it also influences the (medium term-) forecastability of local weather conditions and extreme events.

This study will examine a range of a large-scale indices of climate variability during their neutral and informed phases (either positive and negative) aiming at answering the following research questions: Has climate oscillation increased the frequency of flood and drought disasters in Europe between 1980 and 2014? Are climate informed years linked to a higher number of hydrological and climatological extreme events? Is there a change in flood and drought impacts between different phases?

For the analysis, different indices of climate oscillation (ENSO, NAO and AO) will be applied in order to verify whether there is predominant climate oscillation acting in both pan European floods and droughts , and their effect on flood damages and crop productivity, respectively. Using event specific disaster losses data, hydrological and climate information, and crop yield data, we expect to understand how large the influence is of large-scale indices of climate variability in natural hazards, and to perceive the harm or benefit of climate oscillation in the agricultural sector and the damages from floods to urban areas. Through the comprehension of the relationship between large scale climate variability and pan European flood damages and drought related agricultural impact, this study reflects on how this information could be potentially applied to improve flood and drought management by coupling such finds with seasonal forecasting of climate oscillation.