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Including climatic variability in stochastic rainfall for flood catastrophe modelling – The effect of ENSO and SOI in China

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Damages from flooding in China account on average for 60-70% of the total Annual Losses derived from natural catastrophes. The extreme rainfall events responsible for these inundations can be broadly categorised in two well differentiated mechanisms: Tropical Cyclone (TC) induced, and non Tropical Cyclone induced (nonTC) precipitation. Between 2001 and 2015, inland nonTC rainfall flood events occurred roughly with double the frequency as TC events. While TC events can be highly destructive for coastal locations, over the entire China territory nonTC flooding accounted for more than half of the total economic flood loss for events with significant socio-economic impact, highlighting the importance of the nonTC flooding mechanism on the regional and national scale.

Large-scale modes of climate variability modulate in different ways TC and nonTC induced precipitation, both in the frequency and the magnitude of the events. In a stochastic rainfall generation framework, it becomes therefore useful to model these two mechanisms separately and include their differentiated long-term climatic influences in order to fully reproduce the overall observed rainfall variability. This work presents results on the effect of ENSO and Southern Oscillation Index (SOI) values on seasonal rainfall in China, and how to include this climatic variability in stochastic rainfall for flood catastrophe modelling.