TITLE: Concurrent floods and droughts in the catchment of River Jing as reconstructed from historical archives collected in the Southern Chinese Loess Plateau

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ABSTRACT

Usually occurring at catchment scales, droughts and floods are two natural threats to communities and societies mainly due to the extreme variation of precipitation in spatiotemporal scales (Zhao and Running, 2010; Dai, 2011; Schiermeier, 2011, Chen et al., 2015; Ge et al., 2017). Within the context of global warming, the risk of floods and droughts has increased rapidly in different regions (Allamano et al., 2009; Min et al., 2011; Pall et al., 2011; Blöschl et al., 2018). Therefore, understanding the mechanisms of the regional occurrence of floods and droughts is of enormous importance for risk management and the adaptation and/or mitigation measures under climate changes. However, available instrumentation records are too short (only a few decades) to conduct a meaningful study of the mechanisms of floods and droughts at regional and catchment scales. Using historical archives from 1646 to 1949, here we present a high-resolution dataset of droughts and floods within the catchment of River Jing in the southern Chinese Loess Plateau. River Jing is a tributary of River Wei, the largest tributary of the Yellow River in northern China. Our results show that the frequencies of droughts and floods in the study region is synchronous on multiple decadal timescales, and they are broadly in phase with the reconstructions of both global and regional temperatures. There are the minimum numbers of floods and droughts during the coldest period of the Little Ice Age (i.e., Maunder Minimum, 1645-1715). While during the warmer periods (e.g., 1740-1780; 1820-1860), there are much more floods and droughts in our catchment. Our finding contributes to providing some paleo-evidence on how the flood frequency has changed between cold and warm periods of similar time lengths.

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