



The spatial and temporal variability of drought and pluvial through the Qing dynasty of China in East China between 1644 and 1911 AD

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The Qing dynasty is the last imperial era of China and also left the most weather/climate data during its reign. This study attempts to restore the hydrological history in East China from 1644 to 1911AD, through out Qing dynasty, with the data compiled from literally historical records of 1616 cities in China and tens of thousands of Chinese local chronicles (Zhang ads, 2004). Despite of unevenly distributed cities, more than 60k historical records related to drought, flood, and rainfall are used for the spatial and temporal reconstruction. The historical records are originally Chinese descriptions from time to time for abnormal conditions so they are interpreted as anomalies of hydrological conditions.

The data is valuable to map drought and pluvial patterns at high spatial resolution every year, which advances our understanding of spatial and temporal scales of droughts and pluvials in history. We find that the climate seems to be particularly variable in the 17th and 19th centuries with frequent droughts, floods, and abnormal rainfall events, and the signals were particularly strong in the middle of Yangtze River (110~120E, 25-32N). There are significant centennial fluctuations in drought, flood and rainfall records, mixed with the inter-annual and decadal variability. Flooding area was along the Yellow and Yangtze Rivers in the 17th century but it shifted from Yangtze to Pearl Rivers in the late 18th century. A severe flooding decade was found in 1880s along the Yellow River. On the other hand, 19th century appears to be the most pluvial years in terms of rainfall records in the total 268 years of the data. Lastly, 1650~1740 and 1770~1840 appeared to be the most arid periods containing a few intermittent decadal oscillations in the middle of Yangtze River. More detailed decadal variations and spatial patterns will be discussed. The findings could serve important clues to not only the behaviors of the large-scale atmospheric or oceanic oscillations but also signals of the climate change.

Zhang D (2004) A Compendium of Chinese Meteorological Records of the Last 3,000 Years. Phoenix House.Ltd., Jiangsu.