Semi-quantitative ENSO reconstruction over the Indonesian archipelago using historical documentary evidence

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Positive El Niño/La Niña-Southern Oscillation (ENSO) anomalies have been associated with prolonged dry periods across the Indonesian archipelago. Data from the second half of the 20th century demonstrate that both El Niño-induced drought years and La Niña-induced extreme rainfalls have substantial, often adverse, implications for people living in this populous region. Our knowledge of ENSO events and its societal repercussions prior to the last century is nevertheless limited. Historical documentary evidence providing high temporal resolution information could fill this gap of knowledge and enhance our understanding of the mechanics of ENSO. Using a combination of primary and secondary historical sources, we compile records of climate-related disasters, such as droughts, famines, floods, epidemics, and fires from Java and the Outer Islands encompassing the past four centuries. The results of this study corroborate the potential use of colonial and post-colonial accounts for semi-guantitative climate reconstruction and for understanding how the Indonesian societies were affected by ENSO. We show that historical climate data can be used to complement and ground-truth climate data reconstructed from natural proxies. We will also discuss the complexities associated with document-derived climate reconstructions, including methodological issues and the influences of other climatic systems in determining regional climatic manifestations in Indonesia.