

Historical El Niño Variability as Recorded by Western Pacific Coral-Derived SST and South-American Documentary Data

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Despite a large body of recent studies on climatic variability through time linked to ENSO, the precise reconstruction of the chronology and intensity variation of past occurrences of El Niño (and La Niña) remains a problem of major concern. Annual-resolution archives (e.g. coral and ice-cores) from inter-tropical areas or subtropical regions (mainly tree-rings and marine varves) are intensively investigated and begin to provide most useful information. However, in many cases and for most proxies, it may be difficult to determine the precise impact of the ENSO manifestations, or to identify (and quantify) the local, regional, or global effects of former El Niño events. There is a strong need for a consolidated chronological sequence that would rely upon the most pertinent data and proxies, and would thus enable more accurate interpretations of wide-spread annual archives.

To address this problem, we compare two different archives from the seventeenth century: the first one (coral-derived monthly SST) from the south-western Pacific Ocean, and the other (documentary data) from northern Peru and north-central Chile. Both archives are also compared to the relevant modern instrumental records from their respective areas. These records are relevant to the reconstruction of historical individual ENSO events, but also shed a new light on the question of the interactions between El Niño climatic mode (including decadal ENSO variability) and the longer-term climatic variation of the Little Ice Age. This approach also leads to reconsider some aspects of the ENSO teleconnection system in the course of the last few centuries.