Geophysical Research Abstracts, Vol. 9, 01063, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01063
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A chronology of El Niño events from primary documentary sources in Northern Peru

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We present a chronology of El Niño (EN) events based on documentary records from northern Peru. The chronology, which covers the period 1550 to 1900, is constructed mainly from primary sources from the city of Trujillo (Peru), and supplemented by information from the Archivo General de Indias in Seville (Spain) and the Archivo General de la Nación in Lima (Peru). The archive in Trujillo has never been systematically evaluated for information related to the occurrence of El Niño-Southern Oscillation (ENSO). Abundant rainfall and river discharge correlate well with EN events in the area around Trujillo, which is very dry during most other years. Thus, rain and flooding descriptors, together with reports of failure of the local fishery, are the main indicators of EN occurrence that we have searched for in the documents.

A total of 52 EN events are identified in this work. Our chronology is compared with the two main previous documentary EN chronologies and with ENSO indicators derived from proxy data other than documentary sources. The 17^{th} century appears to be the least active EN period, while the 1720's and 1870's are the most active decades. Unlike previous EN chronologies, our results reveal long-term fluctuations in warm ENSO activity that compare reasonably well with low-frequency variability deduced from other proxy data.

This pre-instrumental EN chronology is more reliable than the previous ones because

it reduces two of the main uncertainties in the previous historically-based works: the use of second hand accounts and evidence obtained from locations poorly connected with ENSO. This new series reveals previously uncovered features of the long-term behavior of ENSO and should be of interest to paleoclimatogists for comparison of different ENSO proxies, and other climate indices.