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Climate of the Past Discussions

Interactive comment on "Documentary-derived chronologies of rainfall variability in Antigua, Lesser Antilles, 1770–1890" *by* A. J. Berland et al.

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General comments Berland and co-authors carefully compiled documentary data to provide a quite extensive reconstruction of rainfall variability in a particular island of the Lesser Antilles, for the period 1770-1890. They used a large and extensive set of documentary information which led them to interpret year to year meteorological conditions both in the whole island and more specifically in central-eastern Antigua (the latter only for the period 1770-1854). Besides, they also used compared their interpretations with an instrumental data series available for the lap 1870-1890 (taken from Auchinleck, 1956). Whenever it was possible, they categorized each "rain year" (beginning in December and ending in November the following year) into five classes (from very wet to very dry). The work finally produces sequences of (9) dry and (6) wet phases between

1770 and 1890. In their conclusion, the authors discuss correlations and correspondence with the few other chronological reconstructions of precipitation variations at the regional, or wider, spatial scales. They finally note that "no clear relationships suggestive of straightforward correlations and simple climatological mechanisms" related to indices of climatic variables such as ENSO and NAO" could be established. The major contribution of this work deals with the care that has been taken in the compilation, analysis, and interpretation of the available documentary data. The rigorous methodological approach followed for the selection of written sources, the cross-comparison of data from different sources, the elimination of observations from a single location, and the elimination of sources which did not correspond to direct observations, is fully relevant and should be given in example for this kind of historical climate reconstruction. It is only through such careful data analysis that historical climatology can, and will, occupy a deserved reconnaissance among paleoclimatological sciences. In some cases (e.g. 1786-87), the authors did not hesitate not to classify a given year because of the paucity of data. In other cases they rightfully considered a category "assumed normal" rain-years on the basis that no information existed for either drier or wetter than normal conditions. Because of the hydrological cycle characteristics proper to the studied island, the authors have been in a position of interpreting, and then categorize, each rain-year by taking into account the seasonal time-scale. This approach is particularly relevant and gives much weight to their paleoclimatic reconstruction. Finally, the chapter 4.3. dealing with "Methodological limitations" is particularly appreciated and provides much confidence in the treatment of data reliability. Overall, the paper is well-written, well- presented, and only contains a few typos (that were already noted by previous reviewers). This paper is fully relevant for Climate of the Past, and should certainly be published.

Specific comments In chap. 2 dealing with the climatic setting, the authors express that "Antigua experiences considerable interannual precipitation variability, which is known to be driven by the El Niño Southern Oscillation (ENSO) and North Atlantic Oscillation (NAO)". I wonder whether this statement should not be modulated or modified, since

1) it suggests that there is no question regarding the combined (?) impacts of ENSO and NAO on the interannual rainfall variability in the island, and 2) it is not referred to by any previous study/bibliographical source. It is not sufficiently clear whether the authors fully share this analysis (in which case they should develop the demonstration that ENSO and NAO are the major – or only?- mechanisms responsible for this interannual variability) or if they simply mention that "it is generally/commonly considered" that ENSO and NAO play an important role in that rainfall variability. More importantly, the quoted assertion as it is, is somewhat contradictory with the two but-last sentences at the end of the paper, according which ". . . the Caribbean is known to be influenced by the complex interaction of multiple independent drivers of annual to multidecadal climate variability. The extent to which observed local precipitation variations will reflect any one of these remains uncertain". I thus suggest being more precise and specific in the climate setting paragraph. This will allow the authors to cope with the fact that neither present-day climatological variations nor historical data for the eighteen-nineteen centuries are clearly related with ENSO, NAO or a combination of both. I think that it cannot be within the scope of the paper to enter into a detailed analysis of the present-day teleconnection pattern linking specific climatic situations in the Caribbean region, and Antigua island more specifically. In this context, the authors would not have to make a major case of the lack of straightforward correlations between their results and findings with the much debated ENSO chronologies. Regarding the case made by a previous reviewer (H. Diaz) about the 1769-71 climatic situation, I can confirm that neither in Peru (Ortlieb, 2000, and more recent unpublished data) neither in Chile (unpublished data) has been evidenced any clear manifestation of El Niño conditions. The only possible indication of an oceanographic anomaly in Lima area, dated March 1769, refers to a mass fish disease which might be related to an algal bloom (not a sufficient criterion to infer El Niño manifestation). In central Chile, drier than normal year were reported in 1771-72-73 and may correspond to La Niña conditions. Another reviewer (D. Nash) suggested that the rain-years should be referred to as "1769-70" instead of "1769-1770". I fully agree with this recommendation.

Technical corrections I agree with the few typo corrections already made by previous reviewers, and shall not repeat them.

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