

Hurricanes from Spanish documentary sources: an update

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There are abundant chronologies of hurricanes in the Atlantic basin; they are mostly based on sources kept in the Americas. However, Spanish official documents from the Caribbean region have been poorly explored yet. They are a rich source of information on hurricanes for the years following the establishment of the Spanish colonies (García-Herrera et al., 2004). Some of these papers are from as early as the sixteenth century. They usually refer to hurricanes or intense storms and describe damages in lives and property. For Cuba and Puerto Rico, in particular, there are records covering more than four hundred years (approximately 1500-1898). This paper describes the results obtained after two years work at the AGI. We have examined a total of 218 *legajos* or bundles, which is the archival measuring unit. Each bundle contains a variable number of pages, ranging from dozens to (most usually) hundreds. After a preliminary analysis, the search focused mostly on the following archival sections: *Audiencia de México*, *Audiencia de Santo Domingo* and *Indiferente General*, since they are referred to areas such as México or the Caribbean where hurricanes and tropical storms were to be expected, and matters which deal with fleet and cities administrations. This has implied the reading of dozens of thousands pages. As a result, we have identified a total of 463 documents (kept in 133 bundles) which contained references to meteorological events and/or damages which could have a meteorological origin. These reports were then examined looking at: type of described phenomenon, intensity of damages and time of the year. By combining these criteria, the events were classified as hurricanes, intense storms and other meteorological events. This allowed to identify a total of 123 Hurricanes (104 dated at least with month and year), 353 storms (285 dated at least with month and year) and 191 other.

The annual frequency of hurricanes can be seen in figure 1. The maximum number of events is detected at the end of the 18th century for hurricanes, and at the end of the 16th century for storms. The total number of events detected in the 19th century remains very low, because Mexico and the other Spanish Caribbean territories became independent at the beginning of that century, Spain retaining Cuba and Puerto Rico until 1898. Though the task can be considered as very time consuming, the results are highly rewarding. They are useful in two ways: a) they provide information on hurricanes which had not been previously recorded and b) they provide information from independent sources on previously reported hurricanes. Thus, they help to complete pre-existing chronologies and to obtain better reanalysis of previously known hurricanes.

Notwithstanding this, neither the documents kept in the AGI, nor those kept in other Spanish relevant archives have been completely exhausted yet. More effort is still needed to completely abstract these sources. Only their complete abstraction will guarantee the obtention of the best hurricane chronology".

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References

- R. García Herrera, F. Rubio, D. Wheeler, E. Hernández, M. R. Prieto and L. Gimeno. (2004). The use of Spanish and British documentary sources in the investigation of Atlantic hurricanes in historical times. in *Hurricanes: present and past*. R. Murnane and K Liu (eds) Columbia University Press, (in press)

Figures

Figure 1. Evolution of the registered hurricanes (upper), storms (mid) and hurricanes+storms (lower) between 1501 and 1900.

