L49- From Advection to Precipitation: Reconstructing the Monsoons in Historical Times by Using Old Wind Measurements.

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ABSTRACT

The precipitation associated to the West African Monsoon is strongly modulated by the ocean-atmosphere interaction in the tropical North Atlantic. During the last four decades, this monsoon has experienced a strong decline in its strength which has resulted in large shortages of precipitation in populated areas such as the Sahel, with the consequent humanitarian crisis. The improvement of our understanding of the long term variability of this monsoon and its relation to its moisture sources is therefore, of paramount importance.

The historical evolution of the West African Monsoon has been usually addressed by combining instrumental precipitation series in northwest Africa. Unfortunately, reliable meteorological series in this region are only available since the beginning of the 20th Century thus limiting our understanding of the significance of the unusually persistent drought period.

As most of the moisture involved in the generation of monsoonal precipitations came from the ocean, it is feasible the construction of an index characterising the monsoon strength by using wind records. In this work, by using exclusively wind direction measures taken aboard thousands of sailing ships circumnavigating Africa, we have assembled a new index measuring the strength of the West African Monson since 1839. Our new reconstruction has evidenced for the first time, that this monsoon can experience persistent periods of high activity, as it seems to have occurred between 1840 and 1890.

Additionally, we have been able to study the relation of the West African Monsoon with several climatic patterns. Our results suggests that since the beginning of the weak monsoon period starting in the 1970s, the correlations with different climatic patterns such as the Atlantic "El Niño" have changed significantly in relation to those of the previous century.

Keywords: Monsoons, Sahel, Climate Indices.

Acknowledgements This research was funded by the Spanish Ministerio de Economía y Competitividad through the projects CGL2013-44530-P and CGL2014-51721-REDT.