EMS Annual Meeting Abstracts
Vol. 14, EMS2017-158, 2017

Instrumental evidence of an unusually strong West African Monsoon in the 19th Century

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The West African Monsoon controls most of the precipitation in the Sahel area, which has been affected by a persistent drought period that started in the 1970s. The availability of precipitation series in West Africa is restricted to the 20th Century, limiting our understanding of the significance of this dry period from a long term perspective. Currently, our knowledge of what happened prior to the 20th Century relies in documentary or proxy sources. In this work we present a new instrumental index (ASWI) characterising the strength of the West African Monsoon since 1790 for July and since 1839 for August and September.

The ASWI is based on historical wind direction observations taken aboard sailing ships in the [29ºW-17ºW;7ºN-13ºN] area, and it is reliable measure of the monsoon's strength and the Sahelian rainfall. It clearly shows the well-known drought period starting in the 1970's but remarkably, our results also show that the period 1839-1890 was characterised by an unusually strong and persistent monsoon, resulting in wet conditions in the Sahel. Additionally, we found that two of the few dry years within this period were concurrent with large volcanic eruptions in the Northern Hemisphere. This latter result supports the recently suggested relationship between major volcanic eruptions with large aerosol loads in the northern hemisphere stratosphere and the occurrence of isolated drought episodes in the Sahel.

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