

Changing monsoons: Tracking the monsoon history of the last 200 years

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Most of the oceanic areas affected for monsoonal regimes have been heavily navigated since the 18th Century and as a result, thousands of ancient wind direction observations taken aboard sailing ships can be found in logbooks stored in historical archives. A lot of these records are currently digitized and made available on the ICOADS database (International Comprehensive Ocean-Atmosphere Data Set). The dramatic seasonal change in the surface wind direction associated to a monsoon is distinguishable in these historical records and it can be used to assemble monsoonal indices for what it was previously considered a preinstrumental period.

In the framework of the recently finished INCITE project (INstrumental Climatic Indexes. Application to the study of the monsoon-Mediterranean TEleconnection), our team developed new centennial indices for the West African Summer Monsoon, the Indian Summer Monsoon onset, the Australian Summer Monsoon, and the Western North Pacific Summer Monsoon. These indices show for the first time, that all these monsoons have been highly variable along the decades and that their relationship with the global scale variability modes such as the El Niño / Southern Oscillation or the Atlantic Multidecadal Oscillation has suffered significant long-term changes. The following can be highlighted:

1. The decrease of the West African Summer monsoon strength originating the Sahel's drought started in the mid 1970's has not precedent in the last 200 years, on the contrary, this monsoon was anomalously strong in the 19th Century.
2. The relationship between the Western North Pacific Summer Monsoon and the El Niño / Southern Oscillation reversed in the mid 20th Century.
3. The increase in precipitation over Northern Australia reported for the last 60 years appears as a manifestation of a much longer lasting trend related to the strengthening of the Australian monsoon that has been occurring since at least 1816.

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