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LINK BETWEEN ANOMALOUS SOURCES OF MOISTURE ASSOCIATED WITH ATMOSPHERIC RIVERS USING THE OCEANIC REMOTE SENSING DATA OAFLUX

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ABSTRACT:

Recent research has provided hard evidence that a large fraction of extreme precipitation events in Western Europe results from the combined effect of Atmospheric Rivers (AR) associated with deep low pressure systems of Atlantic origin. ARs are relatively narrow regions of concentrated water vapour responsible for horizontal transport in the lower atmosphere. The large amount of WV that is transported can lead to heavy precipitation and floods.

In this work we use an automated AR detection algorithm to identify those events that affected Europe based on the ERA-Interim reanalysis between 1979 and 2012. The identification of the ARs affecting Europe was done by means of the vertically Integrated horizontal water Vapor Transport. We have identified all the ARs with Atlantic origin that have reached Europe between 70-35°N at 10ºW. Once the ARs are identified we developed an approach that aims to quantify the moisture that is being transported by the ARs. Thus, a Lagrangian analysis of the transport of moisture based on the methodology developed by Stohl and James (2004) was performed to understand in detail the physical relationship between ARs and the extreme precipitation events. The anomalous oceanic sources of moisture that fuel the ARs are identified and oceanic remote sensing datasets as OAFlux data will use to try to link the evaporative regions with the precipitation intensity. OAFlux database is considered as the "state-of-the-art" product of ocean evaporation available on daily and 1°×1° resolution. OAFlux products are constructed from an optimal blending of satellite retrievals and three atmospheric reanalyses (NCEP and ECMWF). These products make extensive use of various satellite sensors, including the SSMI, AMSR-E, and the QuikSCAT scatterometer, all used as input data source to compute the wind speed (with SSMI also used to compute the near surface humidity); and the AVHRR products to retrieve the SST.

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