



Characteristics of storms that contribute to extreme precipitation events over the Iberian Peninsula

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Floods correspond to one of the most deadly natural disasters in the Iberian Peninsula during the last century. Quite often these floods are associated to intense low pressure systems with an Atlantic origin. In recent years a number of episodes have been evaluated on a case-by-case approach, with a clear focus on extreme events, thus lacking a systematic assessment.

In this study we focus on the characteristics of storms for the extended winter season (October to March) that are responsible for the most extreme rainfall events over large areas of the Iberian Peninsula. An objective method for ranking daily precipitation events during the extended winter is used based on the most comprehensive database of high resolution (0.2° latitude by 0.2° longitude) gridded daily precipitation dataset available for the Iberian Peninsula. The magnitude of an event is obtained after considering the total area affected as well as its intensity in every grid point (taking into account the daily normalised departure from climatology). Different precipitation rankings are studied considering the entire Iberian Peninsula, Portugal and also the six largest river basins in the Iberian Peninsula (Duro, Ebro, Tagus, Minho, Guadiana and Guadalquivir).

Using an objective cyclone detecting and tracking scheme [Trigo, 2006] the storm track and characteristics of the cyclones were obtained using the ERA-Interim reanalyses for the 1979-2008 period. The spatial distribution of extratropical cyclone positions when the precipitation extremes occur will be analysed over the considered sub-domains (Iberia, Portugal, major river basins). In addition, we distinguish the different cyclone characteristics (lifetime, direction, minimum pressure, position, velocity, vorticity and radius) with significant impacts in precipitation over the different domains in the Iberian Peninsula.

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Trigo I. F. (2006) Climatology and interannual variability of storm-tracks in the Euro-Atlantic sector: A comparison between ERA-40 and NCEP/NCAR reanalyses. *Clim. Dyn.*, 26, 127–143.