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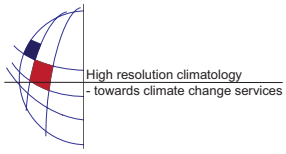

Synoptic patterns associated with heavy rainfall events in the South of the Iberian Peninsula

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This study presents a classification of synoptic patterns of heavy precipitation days in the South of the Iberian Peninsula. The database comprises 85 rain gauges with daily records in the period 1955-2006. A subdivision of the region under study in two sub-regions was carried out attending the nature of precipitation in this area: a smaller area in the eastern part with 14 stations and another area, that covers the western and center regions, clustering the rest of the stations. A heavy precipitation day was defined as a day when at least 2 or more stations in the eastern area and 5 or more stations in the western-center area recorded a rainfall above a pre-defined specific threshold for each area. This threshold was computed by calculating the 95th percentile for each station and averaging these values among all the stations which belong to each region.

The circulation patterns were obtained by applying a Principal Component Analysis, in T-mode, to the daily data grid (NCEP/NCAR reanalysis) at Sea Level Pressure (SLP) and at Geopotential Height at 500 hPa (Hgt500) corresponding to the selected heavy precipitation days. In addition, the relationship between synoptic patterns has been identified with some of the most influential teleconnection indices in the region, such as the North Atlantic Oscillation (NAO) and the Western Mediterranean Oscillation (WeMO). These relationships have been established by computing the values of these indices in the days clustered in each pattern. The results show a clear difference between the two regions for the interannual distribution of heavy precipitation days, where the eastern area presents most of them in autumn and the western-center area in winter. The synoptic patterns determined show a relationship with negative values of WeMO index in the eastern area while for the rest of the region there are some patterns related with negative values of NAO.

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