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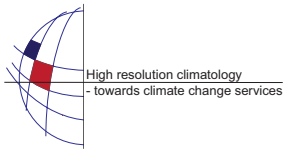

Circulation types classification for the Iberian Peninsula and relationships with observed relative extreme values of temperature and precipitation

S. Fernández-Montes (1), F.S. Rodrigo (1), S. Seubert (2), E. Hertig (2), and A. Philipp (2)

(1) University of Almeria, Applied Physics, Almería, Spain (soniafm@ual.es), (2) University of Augsburg, Institute of Geography, Augsburg, Germany

Temperature and precipitation extremes have a major impact in the Iberian Peninsula on multiple sectors, and changes in their frequency are very likely linked to changes in the atmospheric circulation.

By means of the COST733 software, daily mean SLP reconstructions from the project EMULATE for the period 1850-2003 have been used for classifying daily circulation types (hereafter CTs) using a simulated annealing clustering technique. On the other hand 25 long series (between 70 and 150 years) of daily precipitation, and maximum and minimum temperature across the Iberian Peninsula are considered for the study. In order to get a better understanding of the relationships between atmospheric circulation and local occurrences of extremes, a small window centred in the Iberian Peninsula was preferred rather than a large North Atlantic- European window. A PCA t-mode analysis of the SLP data was previously performed to determine a suitable number of clusters for each 3-months season.

An index has been defined for each CT to measure its mean efficiency to conduce to extreme values at a specific location. This index is the ratio between percentages among extreme days and among non-extreme days in the period avaiable.

Results demonstrate quite skill for the seasonal classifications in relating local extremes to some types, showing as well clear regional behaviours in the CTs more related to such extremes. The relationship between atmospheric CTs and daily extreme precipitation is even better explained (only few CTs are conducive to heavy precipitation) than for daily temperature extremes. The existence of significant trends in the temporal frequency of a few CTs is discussed, as well as their within type temporal variations in association to local extremes.

Higher resolution grids of atmospheric parameter, such as the new 20th Century Reanalysis (V2) will be considered for further researches.

References:

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