

Recent climate change trends of extreme precipitation in the Iberian Peninsula

S. Bartolomeu¹, M.J. Carvalho¹, M. Marta-Almeida¹, A. Rocha¹

¹ CESAM and Dept. Physics, University of Aveiro, Aveiro, Portugal

During the last decades, extreme precipitation events have been the target of numerous studies all over the world, particularly to evaluate their eventual changes under the possible range of climate change scenarios with consequences on human society. As such, there is a growing need for a more detailed knowledge of precipitation climate change. To address this study presents a spatial and temporal analysis of the trends in precipitation indexes for the Iberian Peninsula (IP) for the period between 1986 and 2005 considered as reference period by the Intergovernmental Panel on Climate Change (IPCC) to evaluate recent climate change. Simulations were performed using the Weather Research and Forecast (WRF) model, which was forced by the MPI-ESM-LR, because it is considered to be one of the best overall models in simulating the European climate. With a horizontal resolution of 9 km, daily simulations of accumulated precipitation were used and the extreme precipitation indexes recommended by Expert Team for Climate Change Detection Monitoring and Indices (ETCCDMI) were calculated. Then, inter-annual trends of the indexes were computed using the Theil-Sen Method and the Mann-Kendall Trend test in order to evaluate their statistical significance. The results show an increase in the total amount of precipitation in wet days during the winter (in the northern Portuguese coast) and a decrease during the spring (except in the north of the IP), summer and mostly during the autumn. An

increase in Consecutive Dry Days (CDD) is seen in the spring (in the south of Spain), autumn and especially summer, which is the season that contributes the most to the positive annual trend. On the other hand, the trend in Consecutive Wet Days Index (CWD) is negative during the summer and autumn. There are positive trends in the north of Portugal and in the northwest region of Spain, due to the contributions of winter and spring. Throughout the years under analysis, there is a negative trend of number of days with extreme precipitation during the summer and autumn and an increase of days during the winter. In the annual analysis, the trend for these events decreases in the central and northern part of the IP, and increases in the central and southern regions.

Acknowledgements: This study was supported by FEDER funds through the Programa Operacional Factores de Competitividade - COMPETE and by Portuguese national funds through FCT - Fundação para a Ciência e a Tecnologia, within the framework of the following projects: RESORT Project Reference PTDC/CTEATM/111508/2009; CLIPE Project Reference PTDC/AAC-CLI/111733/2009; CLICURB EXCL/AAG-MAA/0383/2012.

Keywords

Precipitation events, Iberian Peninsula, Recent climate change

Correspondence

Email: sofiabartolomeu@ua.pt