Geophysical Research Abstracts, Vol. 9, 01950, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01950

The impact of cyclone trends on the precipitation regime of western Europe

Ricardo M. Trigo (1), Isabel F. Trigo (2), Daniel Paredes (3), Ricardo Garcia-Herrera (3)

(1) CGUL, Universidade de Lisboa, Portugal , (2) Instituto de Meteorologia, Lisbon, Portugal, (3) Universidad Complutense de Madrid, Spain. (email: rmtrigo@fc.ul.pt / Tel: +351 217500855, Fax: +351 217500977)

An objective methodology is applied to ERA-40 (European Centre for Medium-Range Weather Forecasts 40-year Reanalysis), to evaluate the inter-annual variability and trends of cyclone frequencies for the Euro-Atlantic sector (85žW-70žE; 20žN-75žN), spanning the period 1958 to 2002. Results reveal dramatic changes over the last four decades in the location of cyclones, with significant decreases of cyclones affecting the Iberian Peninsula dominating in the winter months, particularly in December, February and March (Paredes et al., 2006). It is shown that this winter decline affects the entire Mediterranean basin, albeit less intensively than over Iberia. On the contrary, important increments in cyclone counting are observed over the northern Atlantic region, between eastern Greenland and Scandinavia (Trigo 2005). Using precipitation data from ECMWF reanalyses and CRU high resolution dataset we show the impact of these trends in cyclone frequencies upon the corresponding precipitation trends in the influenced areas. Finally we have evaluated the role on these changes played by the large scale patterns modes, namely the North Atlantic Oscillation (NAO), the Eastern Atlantic (EA) and the Scandinavian Patterns (SCAN).

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Trigo I.F. (2005) “Climatology and interannual variability of storm-tracks in the Euro-Atlantic sector: a comparison between ERA-40 and NCEP/NCAR reanalyses”, Climate Dynamics, DOI 10.1007/s00382-005-0065-9