



## **North Atlantic wind and cyclone trends and their impact in the European precipitation and Atlantic significant wave height**

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An analysis of the inter-annual variability and cyclone frequency trends (1958-2002) for the Euro-Atlantic sector (85°W-70°E; 20°N-75°N) is performed by means of an objective methodology applied to the ERA- 40 Surface Level Pressure dataset. Monthly and seasonal trends for the u and v wind speed components (corresponding to the last vertical level of the ERA-40 Reanalysis) are also computed using the highest spatial resolution available (1.125° x 1.125°). All cyclone and wind speed trend maps were computed with the corresponding statistical significance field.

Results reveal dramatic changes in cyclone tracks for the last four decades, presenting a significant frequency decrease over the Iberian Peninsula in winter, particularly in December, February and March. Accordingly, the seasonal and monthly analysis of trends of wind magnitude show similar results. In fact, most of the winter core months (i.e. January, February and March) are characterised by negative trends west of Iberia and over the Mediterranean basin while Northern Europe and the North Atlantic region present similar wind magnitude trends but of positive sign. The results obtained for the zonal wind component present a similar spatial pattern with negative trends west of Iberia and positive trends west of the British Isles. Overall, these results are compatible with those obtained for the significant height of waves in the recently published “The KNMI/ERA-40 WAVE ATLAS”.

Using precipitation data from ECMWF reanalyses and a CRU high resolution dataset we show the impact of these trends in cyclone frequencies upon the corresponding precipitation trends in the influenced areas. It is also shown that these changes are partially linked to major shifts on the indices of large-scale patterns modes, namely the North Atlantic Oscillation (NAO), the Eastern Atlantic (EA) and the Scandinavian Patterns (SCAN).