Geophysical Research Abstracts
Vol. 13, EGU2011-10367-1, 2011
EGU General Assembly 2011

Storm Xynthia: Life-cycle and impacts of an extreme extra-tropical cyclone in the Euro-Atlantic Region

Margarida L. R. Liberato (1,2), Isabel F. Trigo (1,3), Ricardo M. Trigo (1,4), Sven Ulbrich (5), and Joaquim G. Pinto (5)

(1) CGUL, IDL, University of Lisbon, Lisbon, Portugal (mlr@utad.pt), (2) University of Trás-os-Montes e Alto Douro, School of Sciences and Technology, Vila Real, Portugal , (3) Institute of Meteorology, Lisbon, Portugal, (4) Engineering Department, University Lusófona, Lisbon, Portugal, (5) Institute for Geophysics and Meteorology, University of Cologne, Germany

Extratropical cyclones are often associated with extreme weather conditions, in terms of wind and precipitation. Southwestern Europe was hit by a series of destructive storms throughout recent winters (e.g. "Klaus", Liberato et al. 2011). In this work we assess the synoptic evolution, dynamical characteristics and the main impacts of storm "Xynthia" (27-28 February 2010), which caused 59 reported casualties in Europe (45 in France) and considerable economical losses. "Xynthia" wind peaks reached 150 km h-1 and uprooted numerous trees, blew down electricity masts and blew many building roofs. The unfortunate combination of intense winds, extreme low pressure values and high tide triggered an unusual storm surge in western France coastal areas. The flood water stood up to 1.5 m high in the streets in numerous towns and villages near La Rochelle.
The evolution of "Xynthia" is analysed using two cyclone tracking algorithms – one based on mean sea level pressure (SLP) fields and another on the SLP laplacian (as a proxy for vorticity) – both applied to ERA-Interim data. The automatic methods were supported by a synoptic evaluation. "Xynthia" was first identified as an extratropical cyclone over the subtropical North Atlantic Ocean on the 26th February 2010. It then moved north-eastward and experienced a notorious strengthening. In its strengthening phase, "Xynthia" presented deepening rates around 20 hPa/24h (45ºN), implying an outstanding event with bomb characteristics. This development was supported by an intensified polar jet across the North Atlantic Basin, strong upper-air divergence and tropical moisture export converging into the genesis region. The analysis of storm "Xynthia" is also put into perspective among storminess variability and large-scale circulation over the North Atlantic region during this winter, which was characterized by record-breaking negative AO and NAO values and intense precipitation over western and southern Iberia (Andrade et al. 2011; Vicente-Serrano et al. 2011).

Andrade C, Santos JA, Pinto JG, Corte-Real J (2011) The wet 2009-2010 winter in Portugal: hydrological impacts and large-scale atmospheric dynamics. Clim. Res. doi:10.3354/cr00945

Liberato MRL, Pinto JG, Trigo IF, Trigo RM (2011) Klaus - an exceptional winter storm over Northern Iberia and Southern France. Weather doi:10.1002/wea.755

Vicente-Serrano SM., Trigo RM, López-Moreno JI, Liberato MLR, Lorenzo-Lacruz J, Beguería S, Morán-Tejeda E, El Kenawy A (2011) The 2010 extreme winter north hemisphere atmospheric variability in iberian precipitation: anomalies, driving mechanisms and future projections. Clim. Res. doi: 10.3354/cr00977