

The IMILAST project: Life-cycle and impacts of extreme extra-tropical cyclones in the Euro-Atlantic region using multiple tracking schemes

Urs Neu[†]; Margarida Liberato; Isabel Trigo; Ricardo Trigo; Sven Ulbrich; Joaquim Pinto; Piero Lionello; the IMILAST team

[†] Swiss Academy of Sciences, Switzerland

Leading author: urs.neu@scnat.ch

Extra-tropical cyclones are one of the most important features affecting climate over the Northern Hemisphere mid-latitudes. On short time scales, intense cyclones are often associated with extreme weather conditions, in terms of wind and precipitation extremes and they are among the most severe natural hazards affecting Europe (e.g. "Klaus", Liberato et al. 2011). Subtle shifts in the North Atlantic storm track, often associated with the NAO pattern, can have a major impact on the moisture transport and precipitation patterns, and therefore lead to profound impacts on the climate at the regional and hemispherical scales (Trigo 2006; Pinto et al. 2009). Recent winters have been prone to extreme events over Europe and the urge to better understand the underlying mechanisms of these outstanding storms is significant. Within the IMILAST intercomparison project, Northern Hemisphere cyclones were identified using multiple identification and cyclone tracking algorithms. All tracking schemes were applied to the ERA Interim dataset with 1.5° resolution for the period from January 1989 to March 2009. This enables an evaluation and comparison of the cyclogenesis, deepening rates, cyclolysis and track characteristics of several selected storms (which lead to strong socio-economic impacts), under the same dataset and resolution, allowing the assessment of the applicability of the different methodologies to this type of analysis. Additionally we evaluated the atmospheric circulation observed for the restrict number of intense storms that provoked extreme impacts and considerable economical losses over the Euro-Atlantic region during the last 20 years. This was done through the assessment of the synoptic evolution for each storm individually, its dynamical characteristics and main impacts. Finally the analysis of the selected storms is also put into perspective among storminess variability and potential links to major large-scale circulation modes over the Euro-Atlantic region during this 20-year period. References: 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 Pinto JG, Zacharias S, Fink AH, Leckebusch GC, Ulbrich U. (2009) Factors contributing to the development of extreme North Atlantic cyclones and their relationship with the NAO. *Clim. Dyn.* 32: 711-737. Trigo IF (2006) Climatology and interannual variability of storm-tracks in the Euro-Atlantic sector: a comparison between ERA-40 and NCEP/NCAR reanalyses, *Clim. Dyn.* 26: 127-143.