Selective Ensemble Mean Technique for Severe Mid-latitude Storms

Sebastian Scher (1,2) and Gabriele Messori (1,2)

(1) Department of Meteorology (MISU), Stockholm University, Stockholm, Sweden (sebastian.scher@misu.su.se), (2) Bolin Centre for Climate Research, Stockholm University, Stockholm, Sweden

Wind storms are the leading source of insured losses in Europe and can cause severe social and economic damage. Accurately forecasting both their intensity and position is therefore of crucial importance. Ensemble weather forecasts – and in particular ensemble mean tracks and winds – are routinely used for this task. We show that by sub-selecting ensemble members based on their performance at very short lead times (+12h) we obtain improved forecasts of extreme European wind storms. The analysis is performed on GEFS-reforecasts for a set of 50 storms from the Extreme Wind Storms Catalogue. More in detail, forecasts of the ensemble mean position of cyclone centres can be improved up to lead times of +36 to +48h by selecting members that show a below-average error in the cyclone centre position at +12h. Similarly, selecting members that show a below-average error in reproducing the footprint of the destructive surface winds at very short lead times leads to an increase in the quality of forecasted footprints at longer lags. Since there is a significant time-lag between the initialization time of ensemble forecasts and the actual delivery time of the forecasts to users, and since operational ensemble forecasts are typically initialised every 12h, we argue that the sub-selection approach could provide an improvement in extreme wind-storm forecasts in an operational context.