



Diagnosis of exceptional recent European winter storms

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Europe has recently witnessed major damage from winter storms Klaus, Kyrill and Xynthia which exhibited uncommon characteristics. Klaus and Xynthia travelled eastwards on lower latitude than usual along the edge of the dominant North Atlantic storm track. Their development had "bomb" characteristics, reaching their minimum core pressure over the Bay of Biscay and inducing the highest wind gusts in the surrounding regions. On the other hand, Kyrill followed a more typical path (over Great Britain, North and Baltic Seas) but reached Eastern Europe with an uncommon intensity. The development of these three storms is analysed with simulations with two mesoscale models COSMO-CLM and WRF at different horizontal resolutions, reaching 0.0625° and 7 km, respectively. This approach aims at finding answers to the following questions: Why does the core pressure of Kyrill persist over this long time and what role plays the formation of the secondary cyclone Kyrill II close to continental Europe? Which mechanisms lead to intensification of Klaus and Xynthia on a lower than usual latitude? How is the position of the jet stream compared to the position of the cyclones when the storms reached their maximum intensity? Both models are forced by the same input data (ERA Interim); thus, the comparison of model results can be addressed to differences in their interior dynamics and formulations, which leads in some cases to slightly different results. Finally, as evaluation a comparison of time series of single simulated meteorological parameters (e.g. wind speed) against observations is performed.