



Synoptic- and Mesoscale Weather Situations Associated with Tornadoes in Europe

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Tornadoes research is mainly practiced in and focused on the United States, but tornadoes occur all over the world causing damage and casualties. In this study, focus is given to the synoptic- and mesoscale environment which leads to tornadoes in central Europe. Consideration is given to 15 significant events (defined to be equal to F2 tornadoes) between 2005 and 2006 and in a band north of the Alps and extending from eastern France to Poland, with focus on Germany. Tornado data are taken from the European Severe Weather Database (ESWD), which includes the date, time, location and intensity on the Fujita scale of the event. Three aspects are discussed: (a) The synoptic- and mesoscale weather situation is analysed. The tornado events are characterised with respect to upper-level (jet streaks, PV anomalies) and low-level (fronts) forcings. Moreover, satellite data and surface weather charts of the German Weather Service are taken into account. (b) The applicability of US tornado indices is investigated. Consideration is given to typical tornado indices used in the US: convective available potential energy (CAPE), storm-relative helicity (SRH) and the energy helicity index (EHI). It will be shown that the indices are only partly applicable in European settings. (c) Factors preconditioning the atmosphere for severe convection and tornadoes are discussed. For this reason regions of moisture source are determined by lagrangian backward trajectories.