



0.1 Tornadoes in Germany 1980-2003 and their Relation to particular Weather Conditions

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Tornado events and their damages have become a hot topic in Germany during recent years. Such events are difficult to predict, in particular because it is a small scale phenomenon. On the other hand it is very helpful to know the particular weather conditions in which the probability of tornado events are high, and to find empirical relations between such weather conditions and the occurrence of tornadoes. These relationships can be derived from climatology.

In this contribution, the relations between tornado frequencies in Germany and the following parameters describing defined weather conditions are investigated:

- Weather types, based on the objective weather types classification of the German Meteorological Service,
- Frequencies of thunderstorm days for different regions of Germany,
- Temperature and dewpoint in different levels and combinations of these data derived from German radiosonde stations.

The tornado frequencies have been computed on the basis of the tornado compilation of the German Aerospace Centre. They are available for different intensities which can be analysed separately from each other. Also, a high variability of the tornado frequencies in space and time has to be taken into account.

First results show that the majority of the tornadoes in Germany can be attributed to three particular weather types. These types are all defined by a south-westerly airflow

and a high air humidity. The fraction between the number of tornadoes and thunderstorm days has a high variability within Germany and is highest in some north-western areas of Germany (values up to 0.63 tornadoes per thunderstorm day). As for the aerological data, the tornado frequency shows a strong relation to the temperature in 850 and 500 hPa, and to the dynamic stability of the atmosphere, but a much weaker one to the dewpoint and the humidity in these levels.