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Conference on European Tornadoes and Severe Storms

Tornado climatology of Austria

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Alfred Wegener already reported in his classic book “Wind- und Wasserhosen in Europa” several tornadoes in Austria (and its former crown countries). (WEGENER, 1917)

Two devastating tornado outbreaks not only challenged scientists in the first third of the 20th century, but also were some of the worst ever recorded (databases reach back to 1910) in Austria: 1916 a tornado caused enormous damage in Wiener Neustadt, leaving 32 people dead and 328 wounded (DÖRR, 1917). After some work on this case and its archive material it was possible to determine this tornado as an F3 (Fujita scale) or T7 (TORRO scale) tornado.

1927 two tornadoes went through the eastern parts of Styria, leaving back a 35 km track of devastation. Thanks to the fine work of Alfred Wegener (WEGENER, 1928) both events were easily classified as F3 or T6 tornadoes. This historical outbreak has a counterpart in southern Styria in 1998, when two tornadoes, classified as F2 and F3 (T4-5 and T5) caused damage of about 20 million Euro. (HOLZER, 1999)

These examples were not the only ones recorded in the environment around and south of Vienna and the area around, south and east of Graz, representing the areas most often hit by strong tornadoes in Austria. Whereas tornadoes seldom form in the alpine areas, there are some factors providing favorable conditions for tornadogenesis near the eastern flanks of the Alps. (DOTZEK et al., 1998)

Whereas in the alpine regions less than 0.3 tornadoes per 10000 km² and year are counted (averaged for provinces or major parts of a province), we can count 0.9 in the greater Graz area, 1.0 in the

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greater Linz area and 1.2 tornadoes per 10000 km² and year in the greater Vienna area. Some districts in these areas even have an average of 3 tornadoes per 10000 km² and year, very similar to the mean values calculated for Florida (NWS, 1993).

One reason for these local accumulations is the topography. The Alps act as a barrier to low level cold airmasses from the Northwest, while from the Southeast a low level inflow of moist and warm air from the Mediterranean can sustain for some time. These favorable conditions also reflect in extraordinary high probabilities of hailstorms, especially in eastern Styria. Due to high values of low level wind shear there seem to be good conditions for the formation of supercells where mountainous and flat terrain get in contact.

On the other hand the statistical accumulations may partly be produced by higher observing and reporting probabilities in densely populated areas. From sparsely populated areas we probably know from only some of the tornado events which may have occurred.

Furthermore only for the period from 1946 to 1971 (PÜHRINGER, 1973) good records are available. Therefore this period is seen as representative. Taken these data as basis, we can expect an average of 2.6 tornadoes per year in Austria. Record years were 1952, 1953 and 1961 with 6 tornadoes each, followed by 1954 and 1971 with 5 tornadoes each year.

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