Updated tornado climatology of Austria

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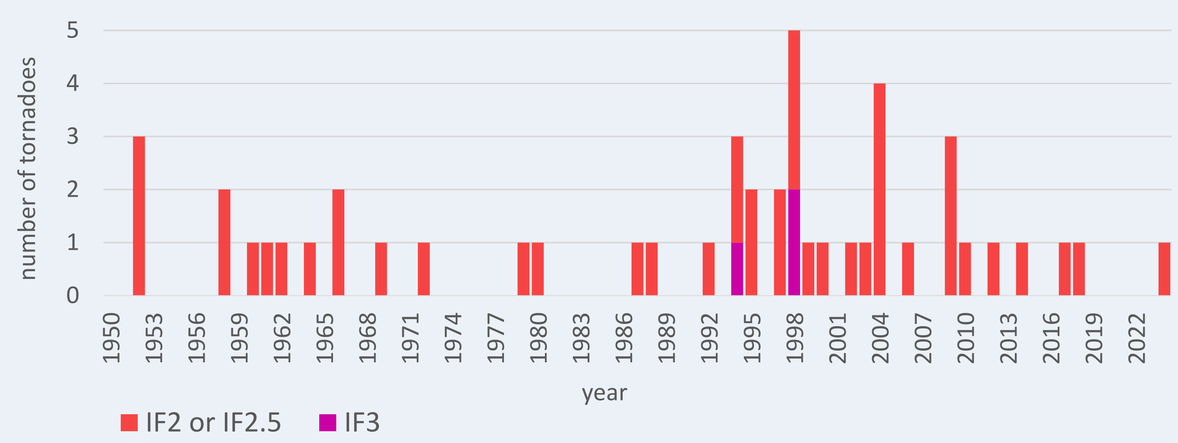
Introduction

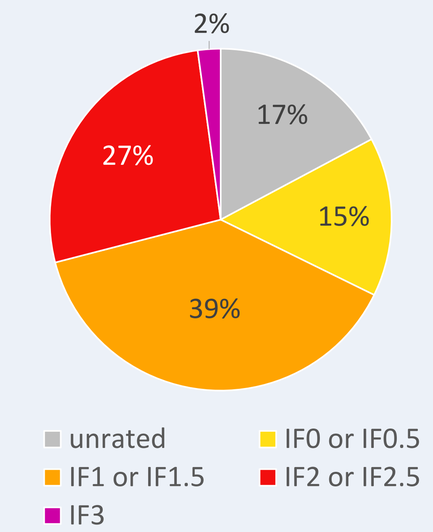
The aim of this poster is to provide an overview of the current climatology of tornadoes in Austria. For this purpose data on tornadoes in the European Severe Weather Database (ESWD; Dotzek et al., 2009a) was analyzed. The ESWD, that is maintained by ESSL, contains data collected by ESSL and partners – among those voluntary observers and observer networks. This analysis follows earlier analyses by A. M. Holzer (2001) and O. Svabik and A. M. Holzer (2005). To distinguish tornadoes according to their intensity the International Fujita Scale (IF-Scale) is used.

Strong tornadoes 1950-2024 (75 years)

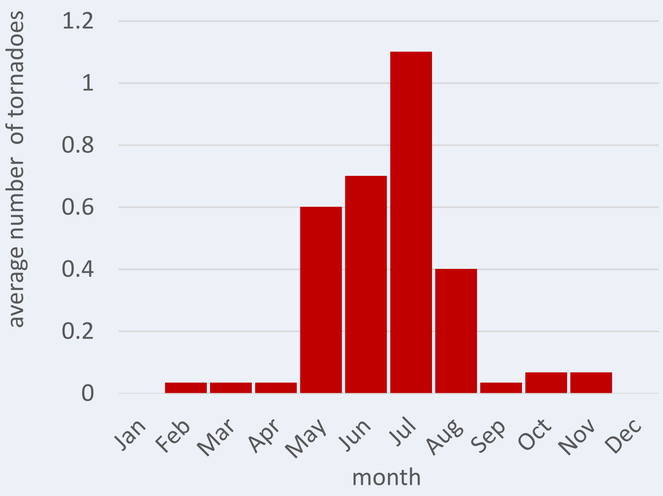


Number of strong tornadoes observed per year

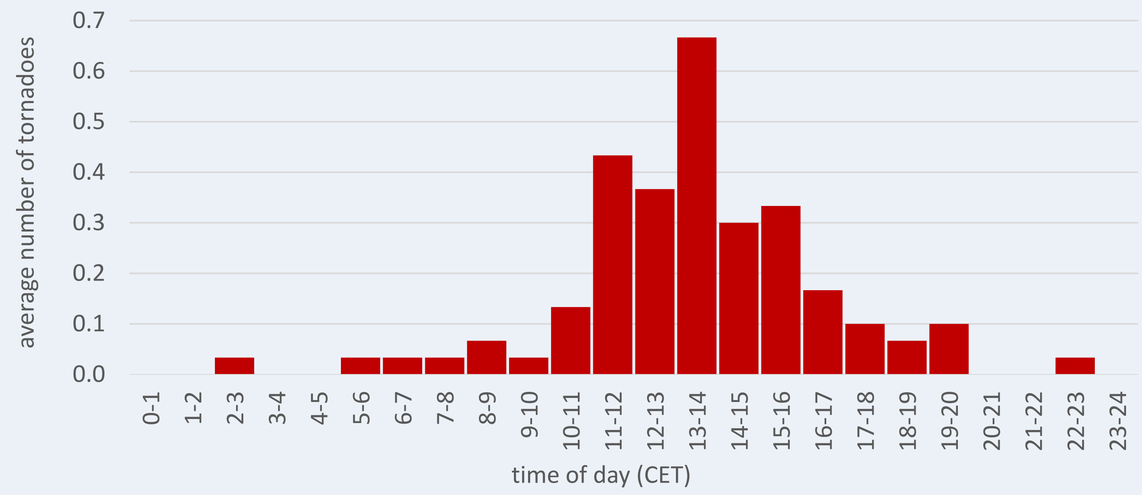
Tornadoes 1995-2024 (30 years)



Share of different intensity classes



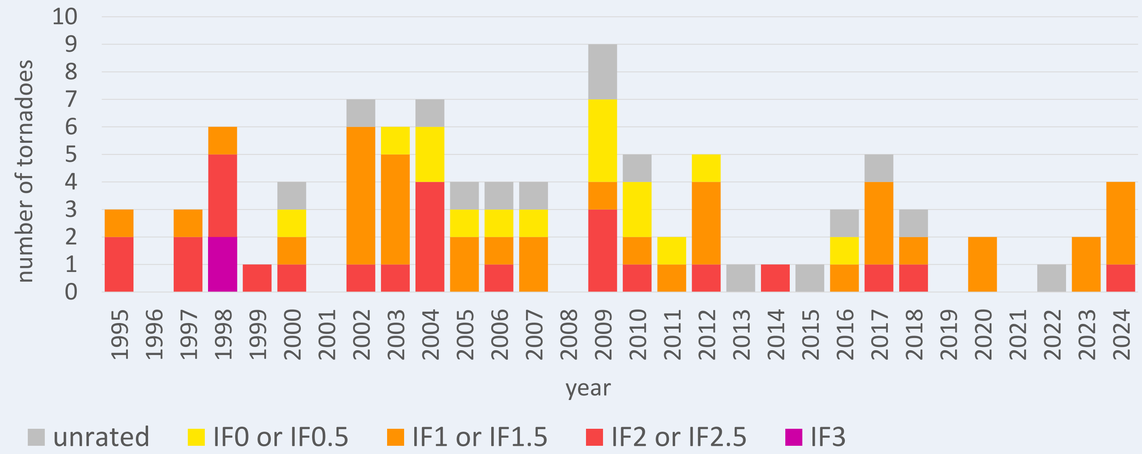
Average number of tornadoes observed per month



Average number of tornadoes observed per hour (CET)

	frequency		empirical return period
	absolute	relative (per year)	in years
IF1 or IF1.5	36	1.2	0.83
IF2 or IF2.5	25	0.83	1.2
IF3	2	0.07	15
total	93	3.1	0.32

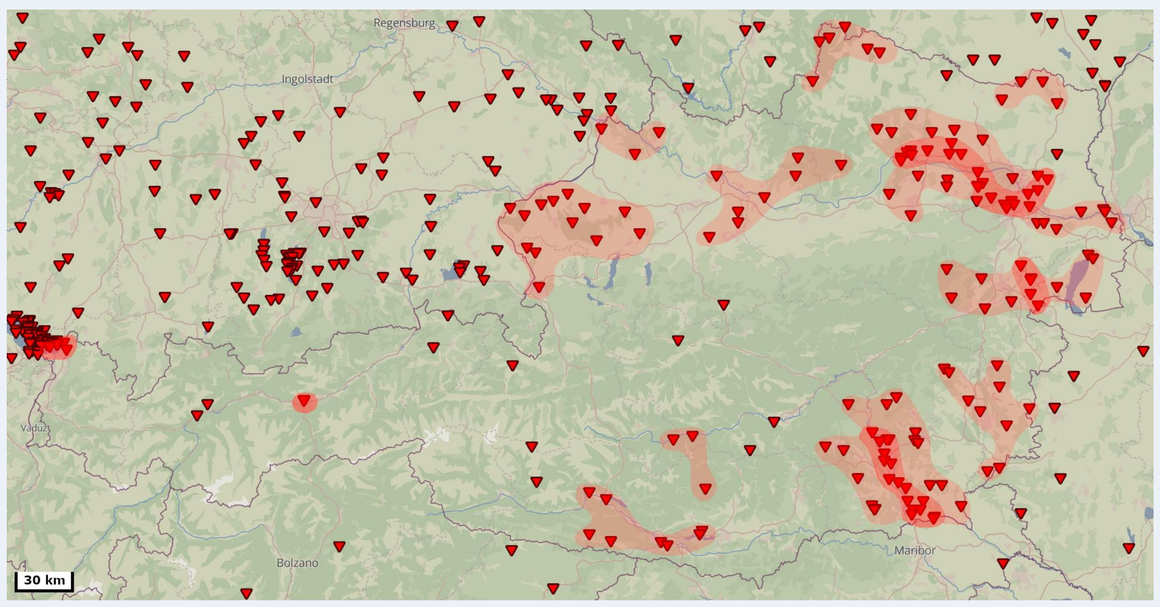
Frequency and probability statistics



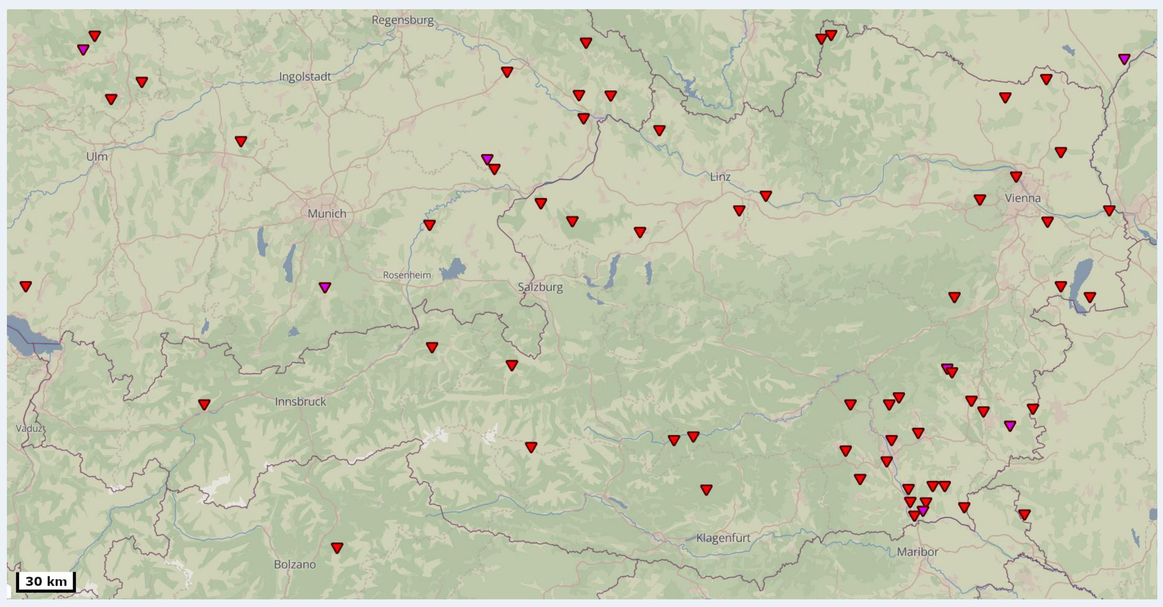
Number of tornados observed per year

Over the past 30 years, on average about 3 tornadoes per year have been observed in Austria, most of which were weak or moderate. Only two IF3 tornadoes have been observed (see A. M. Holzer, 2000). Tornadoes typically occur from May to August with a peak in July, and most tornadoes are observed from late morning until late afternoon. After a peak in the 1990s and 2000s, the number of tornadoes observed and also the number of strong tornadoes observed declined.

Spatial distribution of tornadoes 1950-2024



All observed tornadoes; highlighting based on natural boundaries / geography for regions within Austria only; Map base: MapLibre;



Strong observed tornadoes (IF2+); IF3+ tornadoes in purple; Map base: MapLibre;

Several tornado "hotspots" with more than 1 tornado observed per 100 km² over the past 75 years exist in Austria – for example the region from Krems to Vienna, Lake Constance (waterspouts) and Graz region. With the exception of some wider valleys, like at Innsbruck, tornado density is lower in the mountains. The highest density of strong tornadoes is found in south-eastern Austria.

References

Dotzek, N., P. Groenemeijer, B. Feuerstein, and A. M. Holzer, 2009a: Overview of ESSL's severe convective storms research using the European Severe Weather Database ESWD. Atmos. Res., 93, 575−586.

Holzer, A. M., 2000: Die Untersuchung und Dokumentation von zwei Tornados in der südlichen Steiermark im Sommer 1998. Wetter und Leben, 50, 103-114.

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Svabik, O., Holzer, A. M., 2005: Kleinräumige, konvektiv verursache Stürme und Wirbelstürme (Tornados) in Österreich. Österreichische Beiträge zu Meteorologie und Geophysik (ZAMG), 36.

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