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Conference on European Tornadoes and Severe Storms

Tornadoes in Estonia

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Tornadoes or trombes, occur relatively frequently in Estonia. The oldest recording in the former province Livonia is dated 22 June 1795 (Schweder, 1873). One year later six waterspouts were simultaneously observed over the Gulf of Finland. The most spectacular series of tornadoes occurred on 22 May 1872 in Livonia. 25 manors were heavily damaged, 74 farms and a church were destroyed, seven persons were killed and fourteen injured. This event belongs according to the Fujita-Pearson tornado scale (Goliger et al., 1997) to the F4 event. Strong tornadoes occurred on 10 May 1920 and on 3 August 1922. The latter tornado left one of the longest tracks (P4 class) ever recorded (82 km) in Northern Europe (Letzmann, 1921, 1923). Only the Borås tornado in Sweden in 1899 covered a longer track (260 km). These tornadoes were studied in detail by one of the leading tornado researchers of our century Johannes Peter Letzmann, who worked with Tartu University. The biography of J. P. Letzmann is studied and published by R. E. Peterson (1992, 1995).

Fifteen to seventeen waterspouts were observed by Captain Toom near the Saaremaa island on 22 July 1928 (Letzmann, 1931).

A detailed study was published by Tooming and Moldau (1960) on the tornado which occurred on 27 June 1960 in South Estonia (F3 event). Detailed description were published also on the tornadoes on 27 May 1966 by Kask (1966) and by Tooming, Kotli and Peterson (1995) (P4 event). Tornadoes near Tallinn on 18 May 1967 (F3) and 9 October 1984 (F3, P1) were described by Ohak-Kotli (1967) and Kask (1985). The so-called "storm of the century" devastated Estonia on 6-7 August 1967 (Toots, Ohak, 1967). Windspeed reached 34-35 m/s. About 10 000 ha of forest were destroyed. The storm broke telephone and telegraph poles, tore off roofs, etc. The damage was increased by tornadoes in Northwest Estonia. A detailed description of strong tornado (P3 event) in South Estonia on 13 August 1997 was published by Kadaja and Tooming (1998). The largest sequence of waterspouts in the post -World War 11 period which consisted of eight funnels and occurred on

July 1987 near the Estonian west coast, was observed and described by Uluots (1987) and Tarand (1988). By Tarand (1995) also overview on old tornadoes in Estonia is given.

Letzmann's concept of a tornado alley in Latvia and Estonia, where most of the tornadoes move from Latvia and South Estonia to the north or northeast, has been confirmed on the basis of recent events.

In Estonia as an average 2-3 tornadoes occur per year. The June of 1998 was exceptional - 22-24 tornadoes of F1 - F2 event were observed over Estonia.

The resulting mean rate of occurrence of tornadoes per year per square kilometre for Estonia is about $6 \cdot 10^{-5}$. In 1998 this value was $5 \cdot 10^{-4}$. Otherwise it means that per year an average one tornado occurs per 15,000-20,000 km². In 1998 this value was one tornado per 2,000 km².

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