



The 1984 Ivanovo tornado outbreak: diagnosis and modelling

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The 1984 Ivanovo tornado outbreak is one of the most fatal tornado events in Europe with previously unspecified tornado track characteristics. Here, we used the related literature corpus and Landsat images on tornado-induced forest disturbances to restore actual characteristics of tornadoes during the outbreak.

We confirmed the occurrence of eight tornadoes during the outbreak and determined their location, path width and length. Other tornadoes occurrence during the outbreak was discussed. Fujita-scale intensity of confirmed tornadoes was estimated based on literature sources and on information on tornado path lengths and widths.

In total, the Ivanovo outbreak includes 8–13 tornadoes with F-scale rating mean ranges from 1.8–2.5 and has adjusted Fujita length around 540 km, which makes the outbreak one of the strongest in Europe and places it within the upper quartile of U.S. outbreaks. Characteristics of certain tornadoes within the Ivanovo outbreak are exceptional for Russia. The widest tornado path during the Ivanovo outbreak is 1740 m; the longest is from 81.5–85.9 km.

We modelled a synoptic situation with the WRF-ARW model. We used three nested grids and NCEP-CFSR fields as initial and boundary conditions. Various parameterisations were tested. Reasonably good correspondence between numerical simulations and observations was received.

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