



## **Tornadoes in Portugal overview**

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The impact of tornadoes on the population and the territory and the consequent interest of the public, the agents of territorial planning and civil protection justifies the study and registration of each occurrence, work that has been developed in the IPMA since 1999.

For each reported occurrence, all available data was saved, including material provided by local authorities, witness reports, press articles and internet posts, photographs and videos of the phenomena and its effects. Site visit by IPMA meteorologists was done on some occasions. When available radar observation was studied.

The tornado's identification is made by the observation of the funnel cloud and the interpretation of traces found on the ground. The location and time, the estimated intensity and duration, the length, width and path's direction were recorded.

Usually, tornados affect families and private companies, causing minor damage. In some cases of greater intensity, or when crossing vulnerable territory, the impact of the tornado is very strong, with long-term consequences. There are no victims for most of the tornadoes reported, but 7 deaths must be taken into account and one of the occurrences caused 43 wounded persons.

Tornadoes occur mainly during autumn, winter, and spring as a result of the circulation of a short living rotating vortices that radar observation often shows in organized convection, associated with a cold front or convergence line. In these instances the tornado trajectories were short, but the impact was sometimes significant.

The most intense tornadoes developed from supercells. Some of those were classified as F3 intensity, and paths were longer than 50 km.

When the synoptic environment characteristics are propitious, it is frequent the occurrence of more than one tornado, although in many those days no occurrences were reported. In this study reports of tornadoes in Portugal since the mid-19TH century were found. From 2001 to 2010 there were 65 tornadoes reported on land and at sea off the coast of Portugal, Azores and Madeira Islands, of which 51 had effects on the territory.