

Tracing Tornadoes Through Time: Enhancing Tornado Climatology in Romania with Historical Data and Modern Analysis

Wednesday 9 July 2025 18:10 (20 minutes)

“How tornadoes form?” is a seemingly simple question, yet the answer is quite complex. Much remains to be discovered about tornadoes, tornadogenesis and the forecasting of tornadoes. One way of improving our current understanding about tornadoes is to develop detailed tornado climatologies. In this study, we are expanding the existing Romanian tornado database by meticulously documenting additional tornadic events found in historical sources.

Thus, we have conducted searches in recently available digital newspaper archives for tornado reports using keywords such as “tornado”, “waterspout” (“tromba” in Romanian, a term also used in newspaper for tornadoes over land), “hurricane” (uragan), “cyclone” (ciclon), and “orcane” (orcan). The search yielded records dating as far back as the late nineteenth century, with the earliest events recorded in 1880. To the existing 199 tornadoes from the Romanian tornado database, we have added another 46 verified events. These 245 tornadoes reported between 1634 and 2024 were then used to construct a new climatology of tornadoes in Romania (i.e., spatial, annual, monthly, hourly distribution). The environments in which some of these tornadoes (after 1940) developed and evolved were analyzed using the ERA5 reanalysis data. Based on ERA5 data between 1940 and 2024, a series of convective indices were derived (e.g., CAPE, CIN, vertical wind shear). The comprehensive analysis of tornado records spanning over three centuries and the inclusion of newly documented events significantly contribute to our understanding of tornado climatology in Romania.

This study not only enhances our knowledge of tornadic events in the region but also provides valuable insights into the environmental conditions conducive to tornado formation, thereby improving tornado forecasting and mitigation strategies.

Primary author: Ms BĂRĂSCU, Andreea (Faculty of Physics, University of Bucharest)

Co-author: Prof. ANTONESCU, Bogdan (Faculty of Physics, University of Bucharest)

Presenter: Ms BĂRĂSCU, Andreea (Faculty of Physics, University of Bucharest)

Session Classification: Environmental and Solar Physics, Meteorology and Geophysics

Track Classification: S04 –Environmental and Solar Physics, Meteorology and Geophysics