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Development and Application of a Tornado Database for the Chinese Mainland

GA, UNITED STATES, February 12, 2025 /EINPresswire.com/ -- This study developed an open-source tornado database for the Chinese mainland from 2004-2019, utilizing the Enhanced Fujita scale to assess intensity. It analyzed spatio and temporal distributions characteristics and simulated tornado occurrences using KDE and Monte Carlo methods, revealing seasonal geographic variations. Results highlight higher tornado probabilities in southern provinces during autumn-winter and northern provinces in spring-summer. The database enhances risk assessment capabilities and is available for further research.

Geographic Distribution Of Historical Tornadoes In Chinese Mainland.
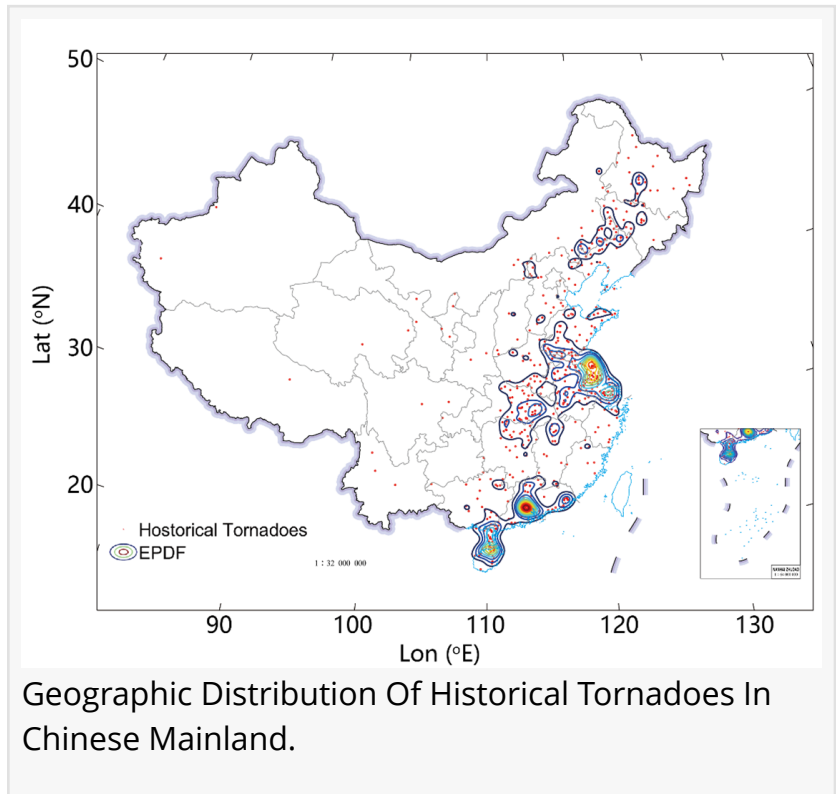
A study published in the KeAi journal Advances in Wind Engineering presents an open-access tornado database for mainland China. Developed using the Yearbook of Meteorological Disasters in China (YMDC) and supplementary media reports, the database includes data from 738 tornadoes recorded between 2003 and 2019, with detailed information on tornado occurrence times, locations, intensities, and damage descriptions.

"The research highlights the spatial concentration of tornadoes in Jiangsu and Guangdong provinces," says first author Genshen Fang. "These areas are more susceptible due to their climatic and geographic conditions. Temporally, the study finds tornadoes are most frequent in summer, peaking in July, with the least activity in winter."

Notably, the application of a modified Enhanced Fujita (EF) scale is adapted to local conditions to estimate tornado intensities based on available damage descriptions. This approach addresses the challenges of using conventional EF scale indicators in a region with different building materials and structural designs.

The data were further analyzed using statistical models and stochastic simulations to evaluate tornado risks across different regions and intensities. For instance, the probability of high-intensity tornadoes (EF2 and above) was calculated for specific counties, providing valuable insights for disaster risk management and urban planning.

While the database provides a comprehensive overview, the authors note some limitations.

"The annual tornado frequency showed a decreasing trend, which may be influenced by reporting inconsistencies rather than a true meteorological decline," adds Fang. "The study emphasizes the need for continued data collection and improvements in tornado reporting and monitoring."

Nonetheless, this database represents a valuable resource for understanding tornado activity in China, supporting risk assessment, disaster preparedness and future research efforts.

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