



The Tornado Climatology of Australia: Assessing Risk and Evolution Through Time

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A climatology for the occurrence of tornadoes in Australia has been developed for the period 1795 to 2014, the second largest single country record. Like many places outside of the United States, the historical records for tornadoes are poorly documented. Existing data from the Australian Bureau of Meteorology National Severe Storms Archive also suffer from observer-driven spatial limitations, and biases related to institutional policy of event documentation. Leveraging the extensive library archives of scanned newspapers, and digitized severe thunderstorm records allows description of a more comprehensive and complete climatology.

Keyword optimization was used to identify tornadoes from the scanned data while reflecting changes to terms used in the historical vernacular. Additional metadata relating to intensity, time of occurrence, path characteristics, injuries, fatalities and damage were inferred from newspaper accounts. Further, tornadoes from the existing Severe Storms Archive were cross-validated and additional metadata determined for inclusion in the new climatology. Based on documentary evidence, tornadoes were rated via the Fujita scale using three categorizations to reflect uncertainty in historical strength determination (Weak F0-F1, Strong F2-F3 and Violent F4-F5). The quality of record for each identified event was categorized into three levels (Possible, Likely or Definite) based on the reliability of observations, as well as documentation of characteristics indicating the presence of a tornadic event.

In this presentation, we will explore the characteristics of the full Australian climatology (spatially, seasonally and diurnally), examining how this changes perceptions of the hazard compared to earlier studies. Since the 1890s, the annual frequency of tornadoes in Australia has ranged between 30 and 80 observed tornado events per annum, but this total likely underestimates the total frequency given underreporting due to population density. Combining this information with the number of outbreak cases, it will be illustrated that these events present a credible and frequent hazard to Australia. Finally, to illustrate the rate of non-detection we will explore the known environments favorable to the tornado hazard in the context of prior research for Europe and the United States.