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An Analysis of the Memphis County Warning Area Tornado Climatology and its Implications on Local Emergency Preparedness

Tornadoes are a brutal force of mother nature and can destroy anything within in their path. While anywhere in the continental United States can experience a tornado, some areas are more prone to them compared with others. Studies conducted by Guo et al. 2016, Elsner et al. 2015, and Genisini et al. 2018 have observed spatial and temporal trends in tornadoes, particularly an increase in tornadoes in an area in the southern United States called “Dixie Alley”. In the heart of Dixie Alley lies the Memphis Country Warning Area (CWA), which is made of 55 counties across the states of Arkansas, Missouri, Tennessee, and Mississippi.

To determine tornado frequencies occurring within this area, a tornado climatology was completed to analyze the number of tornadoes and tornado days observed between 1970 and 2020. Additionally, the total annual number of tornadoes, as well as a breakdown of the frequency of each EF scale rating, was compared between the Memphis CWA and national data. In addition, the hazard mitigation plans for each state in the Memphis CWA, as well as Shelby County’s Hazard Mitigation Plan was examined to determine any gaps or improvements that could be made to represent

changing tornado conditions in the area. It was determined that some of the hazard mitigation plans would not be effective for increases in tornado activity for the area.

A key recommendation based on the information found in this study is the creation of a resource where both emergency managers and the general public in the Memphis CWA can access this climatology data for personal safety and decision-making. The continuous collaboration between emergency managers and meteorologists will be crucial in assisting all communities within the Memphis CWA be better prepared for the potential increase in the number of tornadoes affecting their areas.

Presentation Theme: This research aimed to promote the importance in effective communication between meteorologists and emergency managers. By building a tornado climatology for the Memphis CWA, best practices for hazard mitigation planning through collaboration between Warning Coordination Meteorologists and local emergency managers were determined.

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