Perceptions of Local Tornado Characteristics and their Perceived Safety from Land factors

Roberto Sane*
Editorial Office, Journal of Climatology and Weather Forecasting, United Kingdom

*Corresponding Author**

Roberto Sane
Editorial office,
Journal of Climatology and Weather Forecasting
United Kingdom
E-mail address: Climatejournal@res.com

Received: 12-Aug-2022, Manuscript No. JCWF-22-20065; **Editor assigned:** 18- Aug-2022, Pre QC No. JCWF-22-20065(PQ); **Reviewed:** 20-Aug -2022, QC No. JCWF-22-20065(Q); **Revised:** 26-Aug-2022, Manuscript No. JCWF-22-20065(R); **Published:** 28- Aug-2022, doi: 10.35248/2332-2594.22.10(8).374

Abstract

Misconceptions regarding the relationship between land-surface features and tornado frequency as well as other tornado-related myths may have an impact on how people prepare for and act in dangerous weather situations. This study employs a phone survey (n=1804) to examine participants' perceptions of local tornado characteristics (such as movement direction, seasonality, and nocturnal timing) and belief in protection from land-surface features in three locations of Tennessee (i.e., hills, water bodies, and buildings). Most people base their opinions on their region of residence, but demographic factors, particularly age and gender, also have an impact. Residents of West Tennessee are more likely to overestimate the proportion of nocturnal tornadoes and believe that they are protected by hills, while those in hilly East Tennessee are more likely to believe that they are water bodies provide protection, maybe due of the area's proximity to the Mississippi River.

Keywords: Tornado • Land-surface • East Tennessee • Mississippi river • Seasonality

Introduction

Participants were unsure of when tornadoes were likely to occur outside of the typical severe weather season; specifically, they were unaware of their local wintertime tornado activity. Local organizations and people, such as National Weather Service offices and broadcast meteorologists, may be most helpful in dispelling these myths because public perceptions are linked to local features.

The need to better understand physical and societal susceptibility to tornadoes in the area has increased as a result of recent destructive tornado outbreaks in the southeast United States (SEUS), such as the April 2011 outbreak that produced 25 deadly tornadoes. After the outbreak in April 2011, researchers discovered that locals' actions were influenced, in part, by their knowledge and perceptions about their area's danger and susceptibility to tornadoes. Many of these myths gave people a false sense of security and might have endangered locals. In this study, we look at what people in Tennessee know and think about climatological tornado characteristics. Research may be able to provide strategies for clearing up any misconceptions through a better understanding of the scope of these conceptions.

Tennessee is located in the SEUS, an area where the tornado season is more active than it is dormant. In addition to a busy spring, the SEUS has had over 20% of its historical tornado activity during the winter (Dec-Jan-Feb and fall (Sep-Oct-Nov. The short "off-season" of the summer (Jun- Aug), which might be called the climatological lowest of tornadoes, has historically occurred. Tornadoes that were not part of outbreaks occurred in the SEUS at a nearly constant rate throughout the year, in contrast to other parts of the country that experienced distinct springtime peaks. Additionally, the SEUS experienced a distinct second peak in the fall while outbreak tornadoes peaked in all US regions in the spring.

Between 1953 and 2015, the fraction of tornadoes occurring in Tennessee during the cold season (Nov-Feb) dramatically rose, whereas it had dropped elsewhere. Because of people's potential holiday distractions and the possibility of a more difficult forecasting environment, these cold-season tornadoes pose forecasting and communication issues. Another crucial and distinctive component of the SEUS tornado climatology is daily timing. In the US, the SEUS has the highest percentage of nocturnal tornadoes, and between 1950 and 2005, about half of Tennessee's tornadoes happened at night. This is crucial because tornadoes that strike at night are more likely to result in fatalities than ones that occur during the day. Nocturnal tornadoes are not only difficult to spot Because of the added forecasting difficulties at night as well as the reduced vision, the public is more vulnerable because they are frequently dozing off, possibly in flimsy structures. How people prepare for and react to a tornado event may be influenced by their knowledge of the local tornado climatology. Risk perception, which includes perceived likelihood of an event, may have an impact on choices like whether to purchase a house with a storm shelter before an event. These impressions may influence how much attention a person pays to a potential hazard during an event. Those who thought their county had a low climatological tornado risk reported being less likely to receive a tornado warning at night if one were to be issued. A person may react differently even if the warning is communicated to them depending on the risk they perceive. As discussed by Lindell and Perry, a precise Threat perception and appropriate catastrophe reaction, specifically a person's choice to take preventive action, are correlated. Therefore, a person's climatological knowledge may be a factor in determining their chances of hearing a message, acting effectively in response to it, and having a safe location to go. The physical and social environments of tornadoes in the SEUS vary, in addition to its distinct tornado climatology, which affects how vulnerable its population are to them. Because view is frequently obstructed by hills and forests, darkness, or the rain of a high-precipitation supercell, tornadoes are particularly difficult to observe in the SEUS. Additionally, locals may form opinions about the tornado risk associated with their physical surroundings, which could prevent them from acting appropriately in the event of a tornado warning. A good illustration is a notion that hills shield people from tornadoes. Although new research suggests that fewer tornadoes may occur in places with significant terrain variability in the Great Plains, the relationship between terrain and tornadoes is not well understood. No matter how the terrain and tornadoes interact, , assuming that hills will offer protection from an existing tornado is surely dangerous. Although not exclusively associated with the SEUS, similar misconceptions exist regarding the impact that rivers, roads, and other physical features have on tornado behaviour, despite the fact that these characteristics will not shield anyone from a tornado's path. High mobile home density, poverty rates, and the population density of senior citizens all contribute to social vulnerability. These elements have helped create a historical tornado death zone that starts in southwest Tennessee and extends to the northwest and southeast. This fatality threshold has gradually moved southeast, into Mississippi and Alabama.

We want to gauge how well-informed Tennessee individuals are about the features of tornadoes in their state. Through a phone poll, people

from the three regions of the state were questioned about their perceptions of the protection that hills, bodies of water, and structures offer from tornadoes, as well as the seasonality, travel patterns, and timing of tornadoes during the day. In order to evaluate the connections between beliefs, geography, and demographic traits, we compare survey results to climatological data. We anticipate finding differences between the three regions of Tennessee due to the state's high degree of tornado climatology variability, particularly the East Tennessee region's lower tornado frequencyand its proximity to various land-surface types that may affect public perceptions, such as the East Tennessee Smoky Mountains.

The Storm Prediction Center's tornado database was used to gather information about tornado characteristics (SPC). Since 1954, tornadoes have been recorded in the SPC database. This information includes the location (start and end points), date, time, intensity, and any related injuries or fatalities. Over 50 years (1965-2014), we chose tornadoes that occurred in or intersected the chosen counties and we calculated climatological traits like the monthly distribution of tornado occurrence, the percentage of nighttime tornadoes, and the distribution of the direction of travel. Because there are so few historical observations for East Tennessee counties, the traits were averaged for each of the three regions (west, middle, or east) across each of their four counties.

The majority of the documented problems with the tornado database are unrelated to the variables used in this analysis. Since places with lower population density are more likely to "miss" spotting or observing a tornado than densely inhabited areas are, there is a documented demographic bias in the historical tornado record that may effect our work. The public's awareness and impression of a natural hazard can be learned through surveys and interviews. Surveys and interviews have been used in tornado research, for instance, to learn more about decision -making in imagined or potential tornado events, past responses to a tornado warning, how the local environment affects risk perception, and the impact of past behaviour on behaviour in potential tornado events. As opposed to other methods, like focus groups or interviews, surveys enable us to gather a relatively large, affordable sample size for this study. We do not portray our findings as reflecting the full population of the research area, only those who responded to the survey. As just a few counties in each region were tested, our findings the three regions' combined population may not be represented.

The Human Dimensions Research Laboratory at the University of Tennessee completed the questionnaires. The University of Tennessee Institutional Review Board gave its blessing to the survey's use of human beings in research. A list of landline and mobile phone numbers from the 12 counties was used to randomly pick the participants. Informed agreement was obtained from each participant, who had to be at least 18 years old, before the survey started. During the phone call, which lasted an average of 14 minutes, they were questioned on 51 different topics. Participants were questioned about their socioeconomic standing, opinions on what makes a tornado, and what they planned to do in a storm. In questions that are pertinent to this study are listed. When there 1804 participants total, with 131 participants-175 participants per county. The sample covers a slightly older segment of the population, with 34% of participants being 65 years of age or older, as is typical in phone survey research, and there were more female participants (63%) than male participants. Ellis provides more information about the counties, sample population, and survey questions.

Cite this article: Sane, R. Perceptions of Local Tornado Characteristics and their Perceived Safety from Land factors. J Climatol Weather Forecast. 2022,10 (08), 001-002