INTRODUCTION

"Tornado Alley" is a term that is often used to refer to a region in the central United States where tornado frequency is especially high (Bluestein, 1999). For the United States, it is well-known that tornado frequency is greatest within the state of Oklahoma. The National Climatic Data Center’s information website, in an article titled Tornado Climatology, shows tornado frequency based on long-term data from the Storm Prediction Center of the National Severe Storms Laboratory (Figure 1). A depiction of Tornado Alley is also presented on this map running from northern Texas is a north-north-eastward direction towards Iowa and southern Wisconsin.

The NCDC article also shows another depiction of Tornado Alley based on the work of Concannon et al. (2000) (see Figure 2). The National Severe Storm Laboratory’s severe weather primer website presents yet another depiction (see Figure 3). In both of these cases, Tornado Alley is shown to stretch from north-central and northwest Texas to northward to South Dakota. These latter depictions are located further to the west than that illustrated in Figure 1. The map in Figure 3 also attempts to illustrate the causation for high tornado frequency in this area by showing locations of typical warm and cold air masses. Several public informational websites depict Tornado Alley using the NSGL geographic depiction shown in Figure 3.

Other popular informational web sources depict Tornado Alley in various manners. For example, the Tornado Chasers website simply highlights states in the central part of the country (Figure 4). Chuck Boswell’s tornado chasers website illustrates Tornado Alley (Figure 5) similar to that depicted by Concannon et al. (2000) (as shown in Figure 2). By contrast, Tornado Alley is illustrated in the book Weather for Dummies (Cox, 2000) to be further eastward (Figure 6).

The concept of Tornado Alley is indeed very subjective and there may be many smaller tornado alleys across the country as argued by Broyles and Crosbie (2004). Nevertheless, the depictions presented in these maps (Figures 1-6) generally correspond to the popular perception of Tornado Alley, albeit with notable variations in its specific geography.

RESULTS

The kernel density estimation was applied to our 1° latitude by 1° longitude quadrant tornado frequency data for Oklahoma and Texas. Figure 8 provides a monochromatic depiction of the results while a color version is presented in Figure 9. For further illustration, Figure 10 shows the dot map tornado locations (i.e. as shown in Figure 7) overlain onto the KDE map results (i.e. as presented in Figure 9).

The tornado density results clearly illustrate that the southern portion of Tornado Alley is located distinctly further to the east than the governmental agency depictions and most popular website depictions presented in Figures 1-5. Interestingly, the Weather for Dummies depiction of Tornado Alley (shown in Figure 6) is a closer representation to that suggested for the geographic location of Tornado Alley by our study.

CONCLUSION

This study has shown that the southern area of Tornado Alley is located well within northern Texas, but especially in the eastern part of the state. This geographic location is distinctly further to the east (within Texas) than depictions found on most governmental and popular informational websites.

References Cited

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