EVALUATION OF TORNADO RISK
BASED ON F-SCALE DISTRIBUTION

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Abstract:

Conventionally the tornado frequency distribution had been plotted according to state, one-degree squares, month and other dimensions of area and time. All charts were used to indicate areas of the greatest frequency of tornado occurrence over a given number of years. Unfortunately the intensity of the tornado was never considered in these past analyses.

The research in this paper utilizes the tornado intensity defined by the F-scale for the past three and one-half years. The F-scale ratings have been received by the National Weather Service since 1971 for each tornado. Comparisons of the figures containing the F0 - F5 tornadoes with those with only the intense F4 and F5 tornadoes yielded some interesting results. The center of the greatest probability of intense tornadoes was located east of the Mississippi River. This is in sharp contrast to the greatest number of all tornadoes which was centered in the Kansas - Oklahoma region. Therefore it is important to understand that the number of tornadoes and intensity of tornadoes are quite different. This is an extremely important fact when applied to the potential destructive force to structures. Further research should be performed in this area over a longer period of time.

General Statement:

Each map was drawn by counting the number of tornadoes within a three-degree radius circle. The center of the circle was placed at the intersection of each degree of longitude and latitude. The number of tornadoes counted was placed at this intersection thus forming a base for the final map drawing.

The four charts shown are for: 1971, 1971-72, 1971-73, and 1971-74 (May). Each contains isolines only for F 4 and F 5 tornadoes which have windspeeds estimated to be in excess of 206 miles per hour. These tornadoes were chosen due to their extreme damage and missile projection characteristics. An interesting result was that the greatest probability of the intense tornadoes was found east of the Mississippi River and not in areas where the greatest numbers of tornadoes occur.

Further research needs to be done. A three and one-half year set of data is not a good statistical sample. If there were time and money available the same approach could have been tried for a greater period of time. The three-degree radius circle is rather coarse and may place some areas in high risk zones without cause. In order to use a smaller circle a larger sample is needed. For example, a ten-year sample may use a 2 radius circle and a 1 radius may be used for a twenty-year period.

1971

1971 — 1972

1971 — 1973

1971 — 1974 (MAY)