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Conference on European Tornadoes and Severe Storms

The Tornado Problem: Forecast, Warning, and Response

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Research on tornadoes over the last 20 years in the U.S. has been funded in large part by the Federal government. This research has been conducted by a combination of universities, research institutions, Federal agencies and more recently by private meteorological companies. Recent advances in storm observing technologies(especially Doppler radars, wind profilers and new geostationary satellites) and computers have led to an explosion of knowledge in the last decade. This is evidenced by increased accuracy in the detection and prediction of tornadoes. This has led to increased warning lead time averaging 12 minutes in the U.S. before tornado formation and impact. Today, some tornado warnings have lead times of 30 minutes or more. Most of the research in this area has focused on the physical sciences and technology portion of the warning process. Far less attention has been spent on the warning communication process, behavioral response, and epidemiology of tornados.

New technologies, especially the advent of the WSR88-D Doppler radar network have led to an increases in the number of warnings, the probability of detection, and warning lead times. However, the increased data and resolution may have also contributed to increasing the warning false alarm rate, or over warning, for tornadoes. This paradoxical situation may also be due to staff turnovers and lack of refresher training. The nearly-completed NWS Modernization is designed to improve warning services for the Nation. The combination of professionalization of office staff, enhanced technologies and scientific advances has already

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Key Words: tornadoes, warning, warning response, wind engineering, tornado research, radar, disaster epidemiology

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demonstrated improvements in the warning products. The translation of improved science into improved services should also involve the incorporation of physical science, social science, and the private sector. This is necessary to develop improved warning communication and coordination processes with the media and local emergency management authorities that will lead to the further protection of lives during tornadoes.

We consider the implications of the new findings on tornado warnings, dissemination and societal response in the U.S. to the European meteorological public warning services.