Delivering Weather Warnings across the Last Mile

Research in the emerging field of weather, climate, and society often focuses on the impacts of climate and weather phenomena on society. Several of the articles in this issue, including a study of tornado vulnerability in Texas and a study of how major winter weather events influence federal aid expenditures in Oklahoma, illustrate this valuable scientific emphasis on the impacts of extreme weather events on the public. Previous issues of *Weather, Climate, and Society* have also featured articles on social impacts of extreme weather events, such as Nancy E. Westcott's article on the impacts of the 1954 midwestern U.S. heat wave (Westcott 2011).

Equally important, however, is research that helps us to understand ways to reduce the detrimental impacts of extreme weather events. The lead article in this issue on communicating weather forecast information to end users—in this case, to boaters—provides an example of such an approach. A plan to incorporate high-tech communications technologies in extreme event warnings, recently released for comment by the National Oceanic and Atmospheric Administration (NOAA)'s National Weather Service (NWS), illustrates another such approach. The NWS proposes to provide mobile weather services to its ''core partners,'' which include emergency managers, domestic and international government partners, and electronic media. It would also provide information in an easily adaptable format for commercial mobile applications, and it plans to educate the public about mobile weather services.

The National Weather Service should be commended for seeking to adopt new technologies in its ongoing efforts to protect the public with information on extreme weather events. Timing is critical. It is essential to provide individuals and communities with as much advanced notice as possible when they may be in harm's way and, consequently, to do so in the most efficient and effective way possible. The use of rapid and widely available mobile technologies could save lives and protect the property of Americans—if they get the message in time.

However, it is as critical to bridge the communications gap between emergency managers and the public at risk—bridging that last mile—as it is to get basic information out to emergency managers. Here, social, behavioral, and economic scientists, the *Weather, Climate, and Society* research community, could advance the state of our knowledge about communicating across the last mile in reaching the public at greatest risk. The core partners of the NWS are actually middlemen in the communications process, standing between the NWS and the individuals, families, and communities in harm's way. They play a critical role in the communications process by obtaining emergency information from the NWS and transmitting it to endangered populations by multiple means, including sirens and television. But although bridging this last mile from the information providers to the endangered public is essential, it is complicated by the fact that residents of the communities at greatest risk often do not have high-tech mobile devices or do not live in areas with mobile connectivity.

What kinds of research are needed to improve communication across the last mile? We need research on how to reach isolated individuals and communities, the elderly and persons with disabilities, and people living in poor rural areas—beyond the reach of sirens. We need additional research on the ways that we process information in our brains to understand better how previous experience influences what people perceive about extreme weather event warnings. We also need to look at the tension between the influence of past experience and the tendency to accept authoritative announcements in processing information and how these two different ways of processing information are spread across various social groups,

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families, and individuals. We need to know more about how to prepare effectively for low-probability, high-consequence weather events. We need to learn how to use existing social networks in isolated communities to spread information about potential and present dangers. We need to use our growing knowledge of the impacts of extreme weather events to educate and prepare the public to respond more quickly to weather warnings and thus to ameliorate their more serious impacts. These are just a few ideas of potentially useful research and demonstration projects. The beauty of having a journal like *Weather, Climate, and Society* is that it provides a regular forum and a continuing venue for exploring these important research issues in the future.

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REFERENCE

Westcott, N. E., 2011: The prolonged 1954 midwestern U.S. heat wave: Impacts and responses. *Wea. Climate Soc.,* **3,** 165–176.