THE UNCOORDINATED GIANT

Why U.S. Weather Research and Prediction Are Not Achieving Their Potential

BY CLIFFORD MASS

Although the U.S. meteorological community has made significant strides in weather prediction, more closely coordinated research and operations would accelerate progress.

There can be little doubt that weather prediction in the United States has improved considerably over the past several decades. Synoptic-scale numerical prediction models, such as the National Centers for Environmental Prediction's (NCEP's) Global Forecast System (GFS), are producing far more accurate forecasts of major cyclones and other large-scale features. High-resolution mesoscale models, such as the fifth-generation Pennsylvania State University (PSU)–National Center for Atmospheric Research (NCAR) Mesoscale Model (MM5), the Navy Coupled Ocean–Atmosphere Mesoscale Prediction System (COAMPS), and the Weather Research and Forecasting (WRF) model, often predict realistic mesoscale structures, a situation unheard of a decade ago. A national Doppler radar system [Weather Surveillance Radar-1988 Doppler (WSR-88D)], even with substantial gaps, has afforded improved prediction of convective storms and better short-term precipitation forecasts over much of the nation. Burgeoning satellite data from high-resolution imagery and water vapor/cloud-track winds to multispectral vertical soundings now provide considerable information over previously data-sparse volumes of the atmosphere. Ensemble prediction techniques have proven their value for synoptic-scale forecasts, and hurricane-track forecasts have improved steadily. Finally, the community has moved quickly to take advantage of the Internet as a means for distributing weather information and forecasts.

But, in spite of these advances, there is a growing community sentiment that weather prediction research and operations in the United States have significant problems, and that progress is far less than our discipline's potential. Many believe that the large American weather prediction enterprise has worked with insufficient coordination and cooperation, resulting in inadequate resources for key tasks, inefficient duplication of effort, slow progress in developing essential technologies, inadequate interactions with user communities, and unproductive or inappropriate use of limited manpower. Pielke and Carbone (2002), for example, noted that the goals of the weather prediction enterprise "are unlikely to be

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