

The Use of Uncertainty Information in Weather Forecasts

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The American Meteorological Society commissioned a study (ACUF) intended to help increase the effective use of uncertainty information to make more useful weather forecasts. One motivator: many aspects of a forecast involve uncertainty and yet (too many) forecasts produce deterministic (single answer) outputs. (Examples: High today 47. Snow accumulating 1-2 inches.) Probabilities now in use typically address only one aspect of uncertainty (probability of .01 inch of precipitation in a specified location in a 12 hour period). What about duration, intensity, timing of rainy and dry periods, etc?

The study committee included 60 people with specialties including numerical modeling, forecasting, broadcasting, consulting, basic and advanced research, and social science. The committee was organized into subgroups tasked with exploring specific areas of inquiry and information development.

Strategic goals that came out of the work:

1. Increase Enterprise (government, non-government organizations, commercial weather services and media, and academia, i.e.; all the stakeholders in the field) understanding and knowledge of hydrometeorological uncertainty:

a. Assess what can be provided, how it can best be communicated. It also includes the tightly integrated need for users to know what they can expect from this type information (what is possible) and how they can provide guidance to providers about specific needs.

b. Increase understanding of the nature and causes of uncertainty and foster reasonable expectations about the accuracy and helpfulness of new types of probabilistic information for specific uses.

2. Actually use the new information properly:

a. Outreach and education to raise the level of awareness about why uncertainty information is important and how it can be used for better decision making.

b. Use social science and other interdisciplinary inputs; the enterprise needs to develop the most effective ways and most useful formats for presenting various types of uncertainty information.

c. Develop decision support tools and services that link uncertainty information (that is being delivered) to risk tolerance (among the users).

3. The NWS and other agencies (USGS, NASA come to mind) maintain and extend their foundational tools that can then be used by the entire Enterprise in order to enhance and tailor the information for specific users. This includes (among other things)

a. Improved ensemble prediction

b. Post processing of ensemble output to discover and correct biases, systemic errors, etc. that would otherwise limit the usefulness of those ensembles

1. Statistical work needed to improve forecast data sets

2. Non statistical work to handle variables that are not directly handled by the models or which are dealt with by separate statistical relationships

c. The role of the human forecaster: add value and collaborate/coach/work with users. A key requirement is to make the foundational tools available (in as close to real time as possible) to the entire Enterprise

To do all this requires new/expanded infrastructure.

A final draft of the committee report was delivered in summer 2010 and is currently under review.

Presenter's Bio

Elliot was born in Philadelphia, PA, on May 31, 1947. There was a thunderstorm outside the hospital that day. He became interested in weather at the age of five when his father, a research chemist, built a barometer for him. Elliot was a weatherman in his second grade class play and was blamed for rainy weekends in fourth grade.

Elliot earned a B.S. and an M.S. in meteorology from the Pennsylvania State University. In college he was a charter member of Chi Epsilon Pi meteorology honorary society. Elliot is also a distinguished graduate of the United States Air Force Officer Training School. Elliot joined AccuWeather in 1967, and was a co-founder of AccuWeather's radio service in 1971. Elliot is now a Senior Vice President and Chief Forecaster for AccuWeather. He is heard daily on radio stations in Boston, Providence, Portland, Portsmouth NH, New York City, Philadelphia, Washington DC, Pittsburgh, Buffalo, Chicago, Morgantown WV, Kansas City, and Kalamazoo MI. (Some of the forecasts are right). His daily blog and video appear on AccuWeather.com. He was a co-author of the college text "Meteorology," published by McGraw-Hill. Elliot is also co-author of AccuWeather's On-Line With AccuWeather instructional program for junior and senior high school classes. In 2010, Elliot was co-chair of an American Meteorological Society committee that submitted a report designed to spur more effective use of uncertainty information in weather forecasting and weather decision support. The committee included 60 people, including meteorologists, researchers and social sciences.

Elliot has earned the accredited status of Certified Consulting Meteorologist along with the American Meteorological Society (AMS) Seals of Approval for both radio and television. In the AMS, Elliot has served on the Broadcasting Board and the Board of Certified Consulting Meteorologists. Elliot earned the 1993 AMS award for Outstanding Service by a Broadcast Meteorologist "for his decades of significant contributions to radio weather broadcasting and to weather education at all levels," and followed this up with the 1994 AMS Charles Mitchell Award for "outstanding and unique dissemination of weather forecasts to the nation's public by radio and television." In 1996, The National Weather Association named Elliot "Broadcaster of the Year."

Elliot is in his fifth elected term as a Township Supervisor in his locality, and serves as Chair. Elliot has been married to Bonnie since 1969. They have two sons: Mike and Randy. Bonnie was an award-winning second grade teacher, and now celebrates her retirement volunteering for several community groups. Randy interned in the AccuWeather promotions department and now manages the Credit-Suisse office in Taiwan, where he lives with his wife, Sonnie. Mike was a part-time broadcaster at AccuWeather, and is now on the editing team for the cultural and arts sections of The New York Times. He and his wife Rebecca have two children, Jacob and Maya. Neither has yet developed a keen interest in weather forecasting. Elliot has spoken at previous Southern New England Weather Conferences, and predicts that for this year, if there is no snow or ice, it not likely to be slippery.