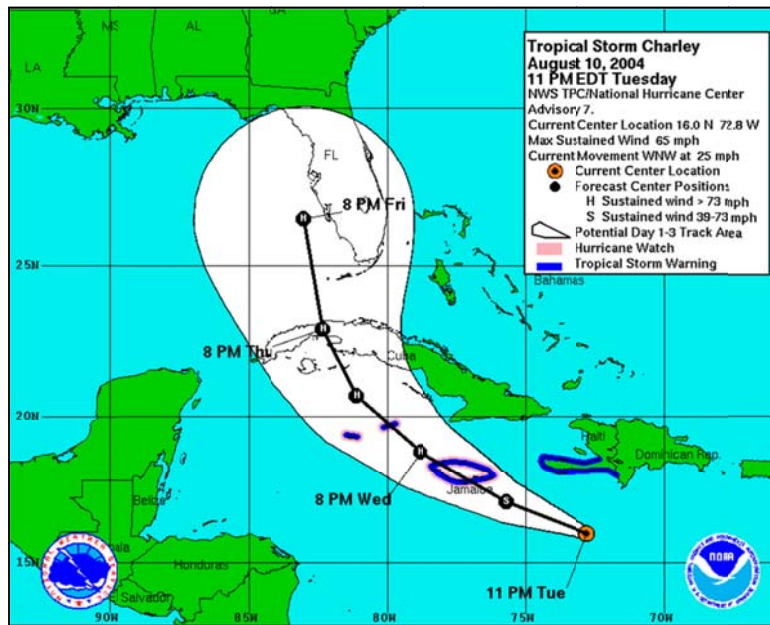


The “Cone of Uncertainty” and Hurricane Forecasting

CRED researchers analyze an iconic climate forecasting visual aid



Credit:NOAA

Researchers at the Center for Research on Environmental Decisions (CRED) examined the “cone of uncertainty,” a visual aid used by the National Hurricane Center and often adapted by the media to communicate hurricane risk to the public prior to landfall.¹ CRED research found that this forecast product is subject to misinterpretation, which can cause serious problems. Misinterpreting consequences of intense storm warnings can have much more dangerous consequences than misinterpreting a daily weather forecast.

The “Cone of Uncertainty” represents the forecasted track of the center of a tropical storm or hurricane and the likely error in the forecast track based on predictive skill of past years. It contains numerous additional details about the storm (see above figure).

The manner in which weather forecasts are presented is critically important to risk management. CRED researchers conducted a media analysis and stakeholder interviews to identify the factors leading to the misperception of the “Cone of Uncertainty.” The primary conclusion was that people put too much faith in the track line forecast, negating the uncertainty message that the cone is intended to convey. Additionally, there is confusion about what the cone represents, with many seeing it as the potential swath of destruction of the storm versus just the potential area the center (“the eye”) of the storm may travel in.

Over the past decade, storms have traveled within the cone about two-thirds of the time. Another major factor is that the hurricane warning graphic packs too much information into a single graphic, confusing the recipient and causing difficulty in

pulling out and absorbing the most relevant bits of information.

There is no perfect “one size fits all” image given the range of vulnerabilities and potential responses of a socio-economically varied and culturally diverse population such as the United States. Of course, many other factors influence risk perception and decision making, including the nature of the risk, the trustworthiness and credibility of the messenger, the knowledge, values and worldviews of the recipient, etc.

Thus the utility of any single risk communication product must be evaluated within the individual, social and institutional contexts of the recipient. What to include and not include should in part be a function of who the intended audience is and their ability to handle different sorts of information.

It is critical that producers of information focus on its relevance and whether it provides enough detail for particular decision makers to assess their own risks. For example, some individuals and areas are more vulnerable to storm surge (coastlines), others to strong winds (trailer parks), while others are more vulnerable to the loss of electricity (e.g., those who rely on refrigerated medication).

Merely knowing the likelihood that a hurricane might strike a particular area does not provide the more specific information people need to consider when assessing the risks and choosing a course of action.

¹ Broad, K., Leiserowitz, A., Weinkle, J., Steketee, M., 2007: “Misinterpretations of the “Cone of Uncertainty” in Florida during the 2004 Hurricane Season. *American Meteorological Society* 88(5) 651-657.