PWS Requirements and Opportunities for Probabilistic Products and Services

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WMO Expert Meeting on the Applications of Probabilistic Forecasting to PWS
Shanghai, China

24-28 September 2007

OUTLINE

- **Background/General Comments**
- **PWS Requirements for Probabilistic Products/Services**
- **Opportunities for Probabilistic Products/Services in PWS**
- **NWS Activities in Uncertainly/Probabilistic Forecasting**

BACKGROUND

- Uncertainty is a fundamental characteristic of weather, seasonal climate, and hydrological prediction, and no forecast is complete without a description of its uncertainty

- Nonetheless, for decades, users of weather, seasonal climate, and hydrometeorological forecasts have been conditioned to receive incomplete information about the certainty or likelihood of a particular event.

BACKGROUND

• Determinism in the 20th Century due to progression of the science toward exactness, NWP, satellite observations and models, media

•Opportunity…by partner with other segments of the environmental enterprise to understand user needs, generate relevant and rich informational products, and utilize effective communication methods, NMHss can take a leading role in the transition to widespread, effective incorporation of uncertainty information into hydrometeorological predictions.

SOME GENERAL COMMENTS

- Most PWS areas lend themselves to probabilistic products and services and will benefit from integrating probabilistic information

- We live in a deterministic world…some users, even sophisticated ones, want a one answer forecast/outcome thus disregarding the limits of predictability

- Deterministic and probabilistic information can be complementary and together form the basis of the optimal environmental forecast/climate dataset

- User outreach and education will be paramount in a NMHS's ability to successfully implement probabilistic PWS products and services

PWS REQUIREMENTS FOR PROBABILISTIC PRODUCTS/SERVICES

- Consistency…terminology/approach
- Training/education outreach for user community…and for forecasters too! (*important for them to know what & how users are applying probabilistic/uncertainty forecast information*)
- Adapt presentation of probabilistic information to phenomena and/or target user group (e.g. *temp vs. wind, emergency planners vs. transportation departments vs. health care officials*)
- Engage specific user communities to define needs and presentation options
- Critical to have media partners involved in process

OPPORTUNITIES FOR PROBABILISTIC PRODUCTS/SERVICES IN PWS

- Many NMHSs are either issuing, experimenting, or exploring probabilistic forecasts in a host PWS areas (rainfall, climate, extreme/low frequency high impact events, Hazmat …wind info)

- Opportunities exist to (further) exploit probabilistic products and services in several areas including

  - short fuse warnings (heavy rainfall, strong winds)
  - all-hazards event support (e.g. wind)
  - public health (e.g. air pollution)
  - marine and aviation forecasting

- Exploit advances in NWP and EPS

Change Type:

Probability

Change Field:

24hr prcp(in)

Check consistency:

Click here

Select a Threshold:

>1.0(inch)

Select a Day:

20070920

Select a Cycle:

09Z

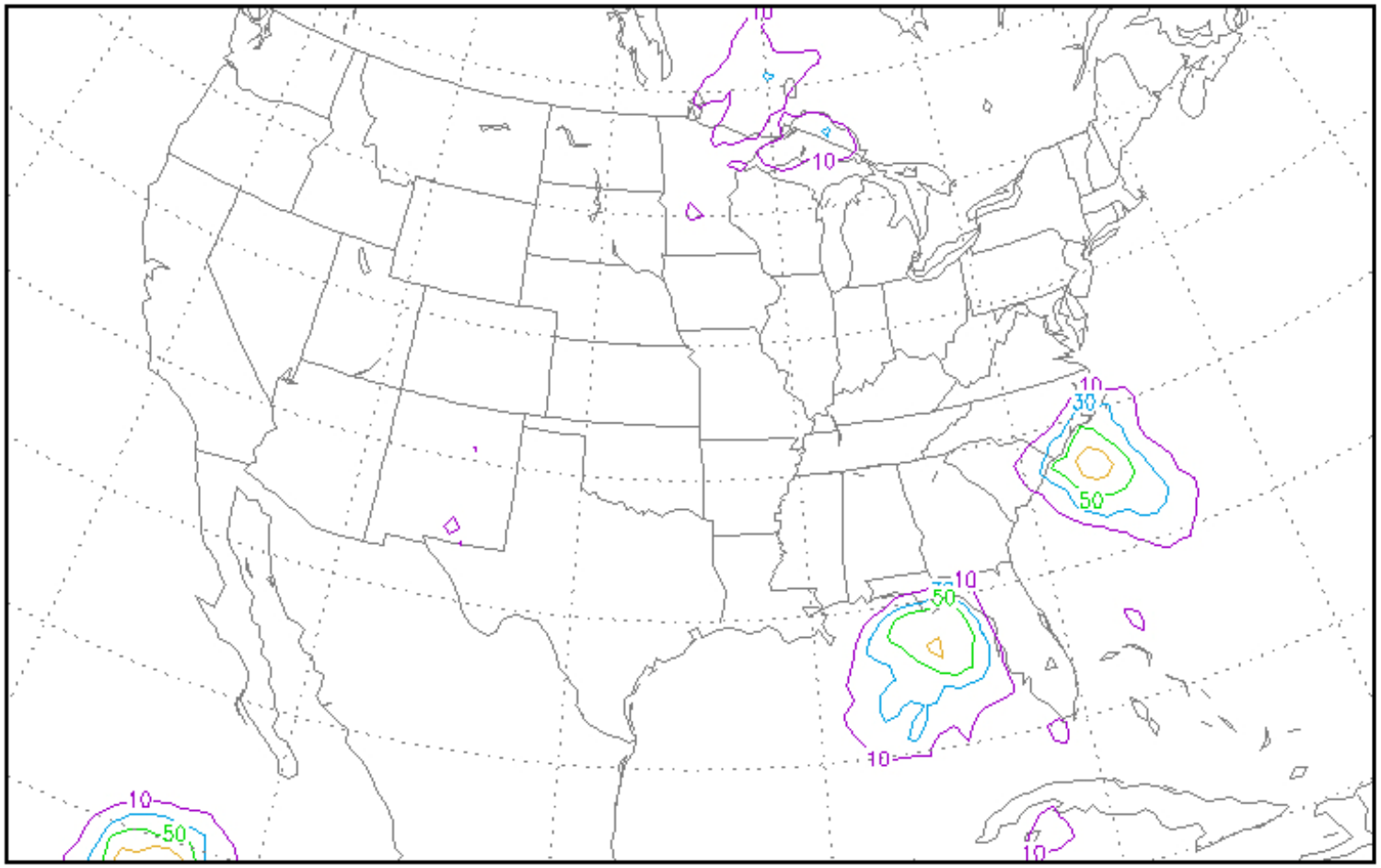
CONUS page

Alaska page

Hawaii page

SREF system home

COM_US Prob 24-hr precip > 1.0 in 36H fcst from 09Z 20 SEP 2007
verified time: 21z, 09/21/2007



NWS ACTIVITIES IN UNCERTAINTY/ PROBABILISTIC FORECASTING

Routine probabilistic forecast information provided in several program area

- Tropical Cyclone Program
- Hydrology…Advanced Hydrologic Predictive System (AHAPS)
- Days 8-14 forecasts (NCEP)
- Climate outlooks

Probabilistic forecasts are being explored or done experimentally in several other program areas:

- severe weather (tornado/hail)
- snowfall
- tropical cyclone Storm Surge Probabilities
- severe weather warnings

NWS ACTIVITIES IN UNCERTAINTY/ PROBABILISTIC FORECASTING

2005…NOAA/NWS commissions National Research Council to provide recommendations on how NWS can more effectively estimate and communicate uncertainly in hydrometeological and climate forecasts

2006…NRC releases findings and recommendations to characterize and communicate uncertainly in hydrometeological and climate forecasts

NWS ACTIVITIES IN UNCERTAINTY/ PROBABILISTIC FORECASTING

April 2007…NWS establishes Forecast Uncertainty Service Evolution Steering Team to advise and coordinate NWS activities related to the development, implementation, and evolution of forecast uncertainty products, services, and information.

June 2007…NWS creates NWS Uncertainty Requirements for Operations Team to lead the gathering, organization, and validation of forecast uncertainly requirements from NWS operational personnel and national centers. Survey sent out to MICs/WCMs/SOOs & counterparts at national centers this summer.

NWS ACTIVITIES IN UNCERTAINTY/ PROBABILISTIC FORECASTING

What about the National Digital Forecast Database?

- Currently, NDFD is based on a single deterministic prediction with no accompanying forecast uncertainly information

- NRC report cites lack of uncertainly information in NDFD as primary weakness….report stated that using single, deterministic forecast values for days into the future is not scientifically valid & potentially misleading

- Goal to develop NDFD that can produce and communicate uncertainly information/guidance for most parameters Vision…NDFD would be able to access deterministic and ensemble prediction system output, historical error stats & statistically post-processed forecast information (MOS)