

Probabilistic NWP Training at COMET

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UCAR/COMET



UCAR
COMMUNITY
PROGRAMS



Agenda

- * Who we are and what we do at COMET
- * Training approaches
- * Ensemble and ensemble-related training
- * Plans for EPS training: short-term and longer term

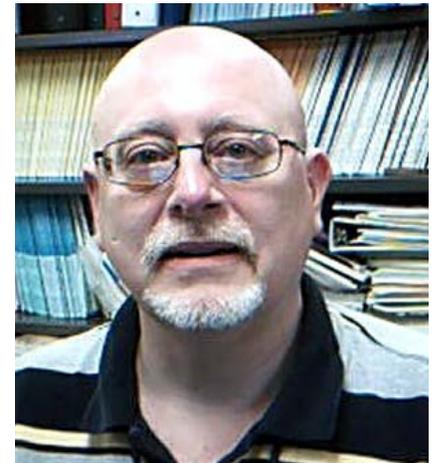
Who we are

* Staff of

- * 7 meteorologists and other earth scientists
- * 5 instructional designers
- * 1 graphic designers
- * 2 software engineers
- * 1 translator
- * 5 supervisory/administrative support staff



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What We Do

- * We have 24 years of experience fostering learning
- * Provide effective education and training by
 - * Needs assessment
 - * Type of audience
 - * Learning objectives
 - * Time constraints for turn-around
 - * \$\$\$
- * Capabilities
 - * Web-based multimedia lessons
 - * Webcasts of live presentations
 - * Virtual and residence courses
 - * Just-in-time training
 - * [RUC2RAP](#)

Training Approaches

- * **Content-centered**
 - * Content gathered from SMEs
 - * Logical sequence
 - * Information and exercises geared to how EPS work
 - * Accurate and current
 - * Authoritative presentation

.... and you risk “glazed eye syndrome”



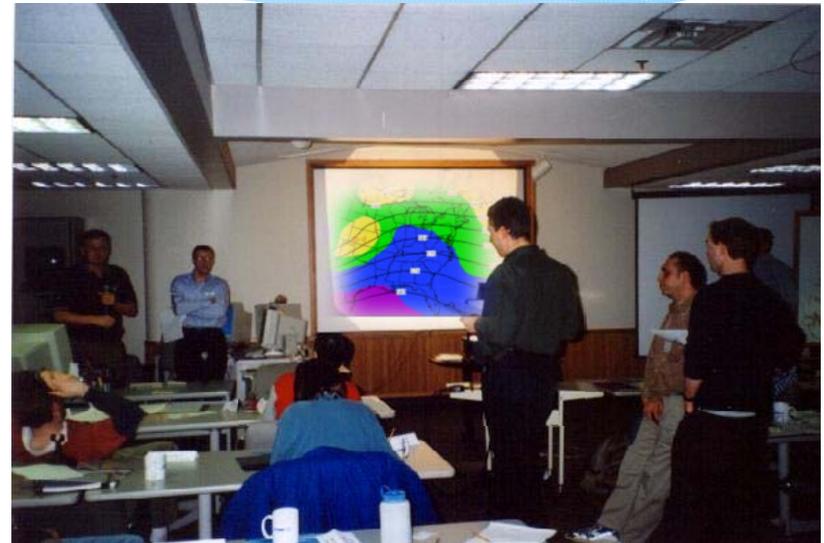
Training Approaches

- * **Learner-centered**
 - * **Gather information on learners' jobs**
 - * Bkgd/experience with EPS
 - * Problems encountered with respect to EPS
 - * What does NWS expect from forecasters with respect to EPS?
 - * Create realistic scenarios to help fcstrs obtain expected competence
 - * List benefits of using EPS to the fcstr and the NWS



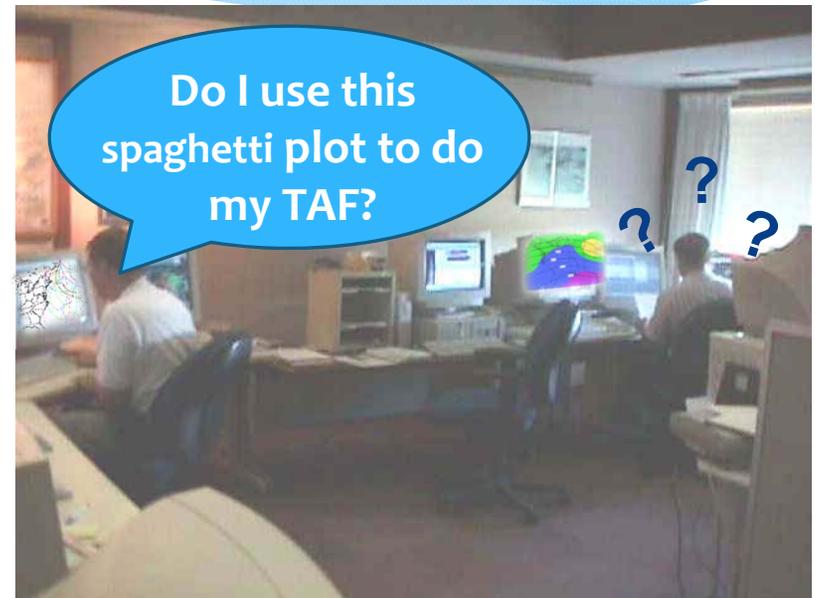
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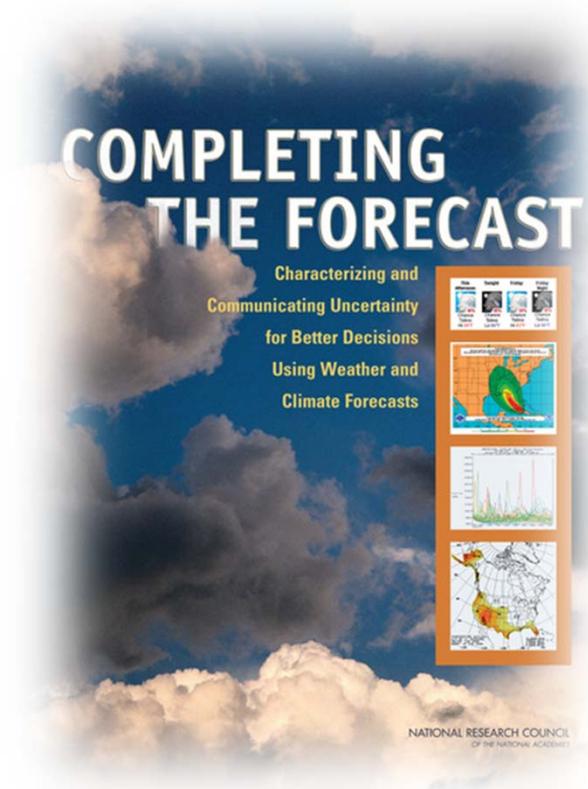
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WEATHER-READY NATION

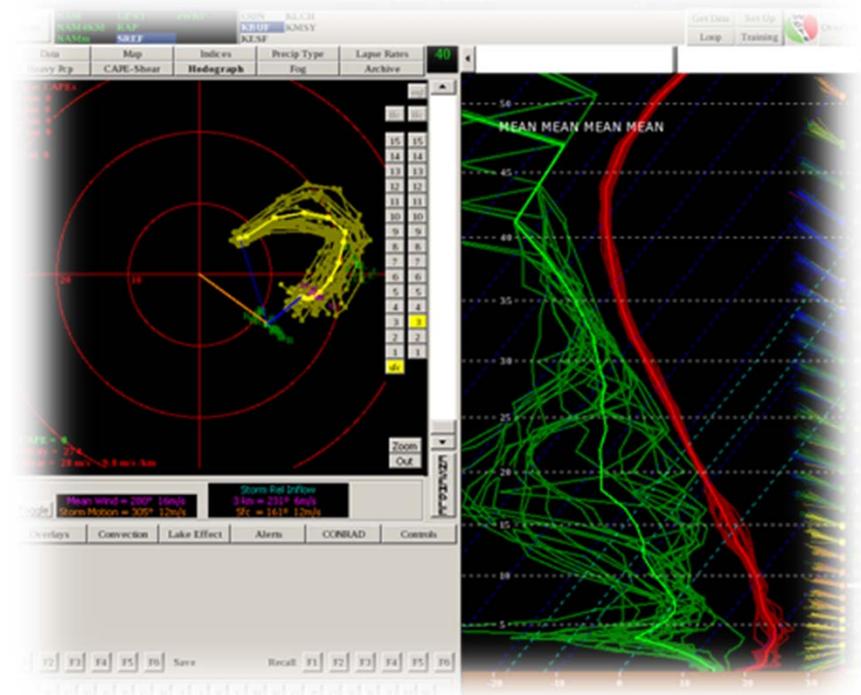


Forecasting extreme weather events
Providing extreme event decision support
Assisting emergency managers
Forecasting interseasonal/interannual climate
Others too numerous to mention

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BUFKIT ensemble of soundings

Training Approaches

* Learner-centered

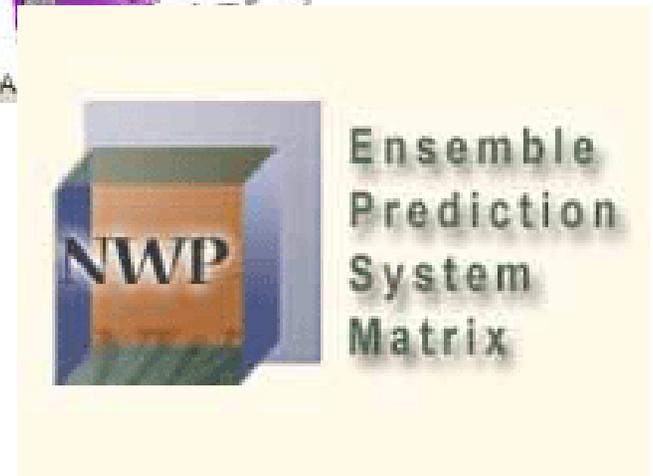
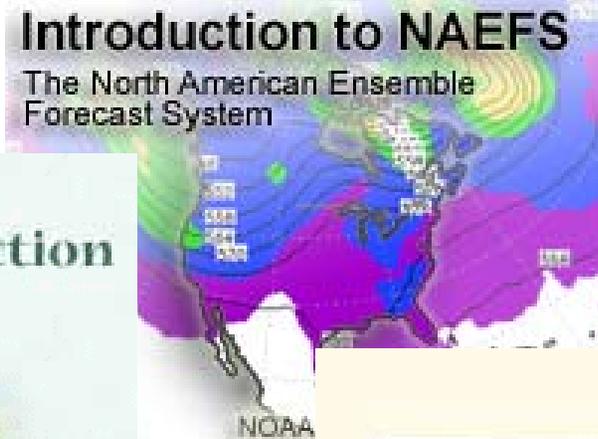
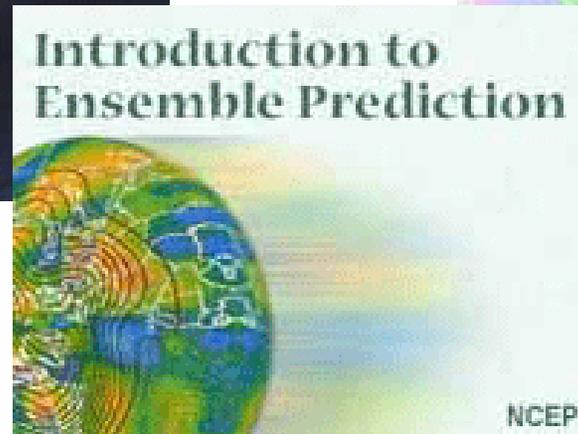
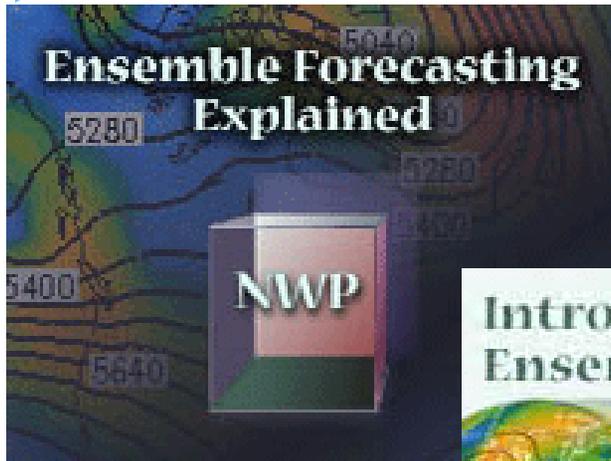
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- ✓ See all the prediction possibilities
- ✓ Know when model fcsts are uncertain
- ✓ Better anticipate extreme events
- ✓ Provide better decision support
- ✓ Save time in medium range

Ensemble Prediction Training at COMET

Ensemble Training at COMET: Content-Centered



Ensemble Training at COMET: Content in other modules

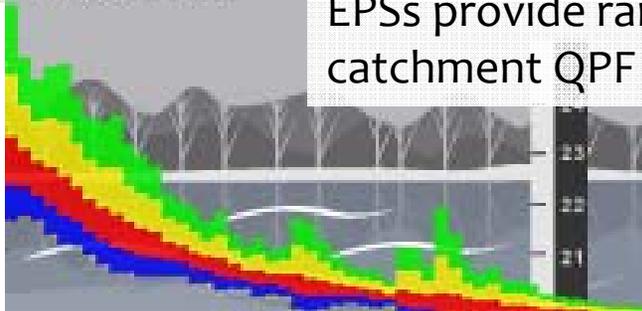
BIAS CORRECTION OF NWP MODEL DATA

Ensemble Bias Correction

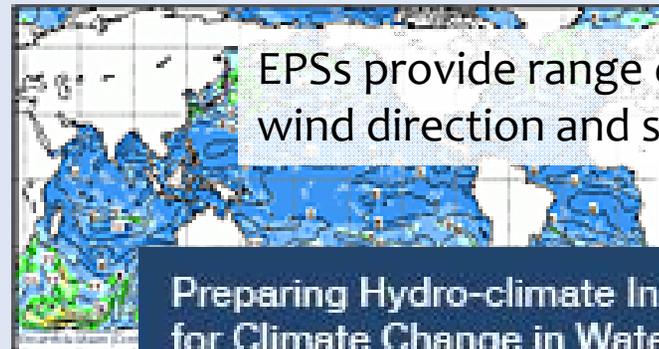
BIAS-CO

NWS HYDROLOGIC ENSEMBLE FORECAST SYSTEM

EPSs provide range of catchment QPF



Wave Ensembles in the Marine Forecast Process



EPSs provide range of wind direction and speed

Preparing Hydro-climate Inputs for Climate Change in Water Resource Planning

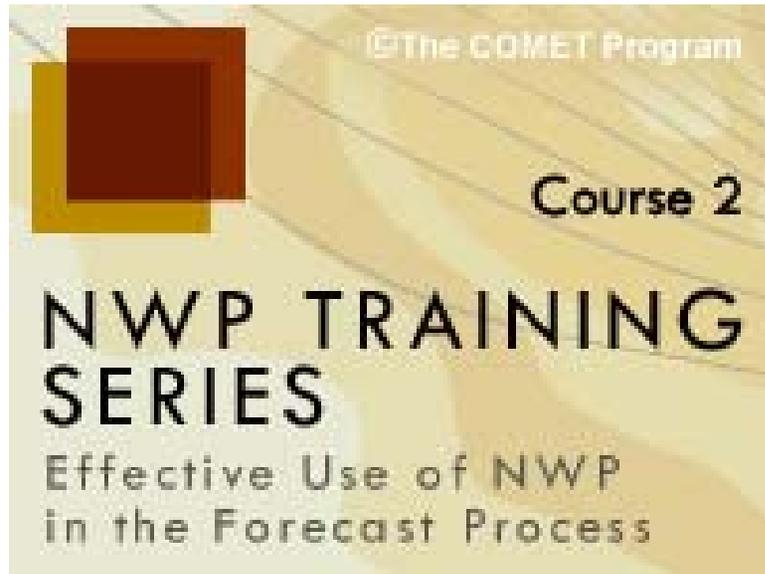
Climate EPSs provide inputs from future climate scenarios

Ensemble Training at COMET: Learner-centered and case-driven

Cases from old NWP Professional Competency Unit 3

- SREF and the 6-7 Jan 2002 snowstorm
- Short Range Ensemble Forecasts (SREFs) and Their Use in Winter Storms: A Washington DC Area Case
- Short Range Ensemble Forecasts (SREFs) and Their Use in Winter Storms: A North Carolina Case
- Interpretation of Global Model Forecast "Flipflops"

Ensemble Training at COMET: Learner-centered and case-driven



UNDERSTANDING THE ROLE OF DETERMINISTIC VERSUS PROBABILISTIC NWP INFORMATION

Using ensemble output to offset limitations of deterministic NWP models.

DETERMINING PLAUSIBLE FORECAST OUTCOMES

Use of ensemble output to determine uncertainty and what forecasts are plausible. Includes WES cases by WDTB.

Most Recent Ensemble Training

Introduction to Ensembles: Forecasting Hurricane Sandy



Use of NUOPC output
in a case study to
protect Naval assets.

Lombardo Pier at Naval Weapon Station Earle



Carrier Deckhouse on a Barge



Ensemble Training at COMET: Upcoming publications

“Ensemble Applications in Winter” (through Met Service of Canada) to be published in late April

- Learner placed in forecaster’s shoes as a blizzard approaches southern Ontario in February 2013
- Use of medium- then short-range deterministic and EPS guidance in a narrative form
- Includes aviation applications

The National Blender Project

- * Goal: **Objective** weighting of all guidance, **including ensemble data**
- * Project just started last year in response to Hurricane Sandy
- * Includes funding for training component
- * Will require update of EPS matrix and addition of new EPSs (e.g. NAVGEM global ensemble, ECMWF ensemble)

Ensemble Training Wish List (not exhaustive!)

- * Learner-centered lesson development based in the operational forecast office environment
- * Emphasis on probabilistic NWP and how it enhances the forecast process
- * Focus via case study/case examples, using ensemble guidance in
 - * Warning decision process (with WDTB)
 - * Decision support for end-users, including local, state, federal governments
 - * Prediction of extreme events
 - * Climate applications

Website for NWP/Ensemble Training

<http://meted.ucar.edu>

MetEd

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Topics:

Languages:

Numerical models are complex tools. Here you'll find resources that explain how these models work and how to use them in various forecast processes. In addition, you can explore a host of case studies to test your forecasting skills on real-life numerical weather modeling examples.

Sort by:



1 - 40 out of 60 results

How Satellite Observations Impact NWP

How Satellite Observations Impact NWP

Satellite observations have a huge impact on numerical weather prediction (NWP) model analyses

Special Interest

More on Numerical I

Operational Models
The **Operational Moc** the characteristics at many commonly use models in the US, C:

WRF Model Training
COMET offers a varie forecasters better un WRF model and its l

- For training on us forecast process

Summary and Conclusions

- * COMET an important provider of meteorological training, including ensemble prediction systems
- * Early training content-centered → provides facts but not engaging
- * More recently have used a learner-centered approach → greater engagement and retention
- * Current content covers theory, some quasi-current EPS, and some applications set in forecast office
- * Future training based on National Blender Project

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