Overview of COMET Training for Ensemble Products

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The COMET Program

- Founded 1989
- Staff of 48, including NWS and MSC visitors
- NWS, AFWA, NMOC have been/are sponsors
- MetEd has 150,000 registered users/200 countries
- Over 600 hours of on-line materials
  - Over 60 modules and 125 hours of NWP content
- NWP topic area one of the most popular
The MetEd Website
www.meted.ucar.edu

- The primary portal for COMET training
- Topics
- Communities
- Courses
- Cases
COMET Training Development

Our Approach

- Sound Science
- Innovative Instructional Design
- Outstanding Graphics
- Operational Focus
- Scenarios/Case-based Instruction
COMET NWP Training

- COMET NWP Team: Bill Bua, Stephen Jascourt, Cody Kirkpatrick*, instructional designers
- Produce multimedia distance learning modules for operational forecasters
- Current thrust is new NWP DL course: *Effective Use of NWP in the Forecast Process*
COMET Ensemble Training

• Initiated with *Ensemble Forecasting Explained* module in 2004
• Over 10 hours of on-line training on ensembles
• Training development began as part of NWP course (2004)
• Topic Areas:
  • Weather Prediction (initiated 2004)
  • Marine Prediction (2006)
  • Hydrologic Prediction (2007)
• Also treated in residence courses

- Statistics
- Theory and use of EFSs
- EFS products
- Interpretation & application to forecast process
- 4-5 hour module

http://www.meted.ucar.edu/nwp/pcu1/ensemble/
Introduction to Ensemble Prediction (2005)

- Companion module focused on operational needs
- Basic definition of ensemble terminology
- Interpretation of EPS products

http://www.meted.ucar.edu/nwp/pcu1/ensemble_webcast/
## Ensemble Models Matrix

- One stop shopping for EFS characteristics
  - NAEFS (GEFS, CEFS), ECMWF MREF, NCEP SREF
  - ICs for control run, pert method
  - # members, horiz and vert resolution
  - Vertical coordinate system, domain
  - Precipitation Physics
  - Radiation Turbulence
  - Post-processing and verification

Introduction to NAEFS (2009)*

- 1-hour webcast - emphasis on forecast applications
- Brief review of theory
- Overview of EPS in NAEFS
- Strengths & limitations
- Effective use in the forecast process

http://www.meted.ucar.edu/nwp/NAEFS/
Deterministic vs. Probabilistic NWP (2010)*

- 1 hour module with Rich Grumm as SME
- Advantages and limitations of deterministic NWP forecasts
- How to overcome limitations through use of EFSs
- Effective use of deterministic and probabilistic forecasts w/ case examples

http://www.meted.ucar.edu/nwp/prob_v_determ/
Hydrologic Prediction

• **NWS Hydrologic EFS (2007)**
  - 1-hour webcast by Dr. Richard Koehler
  - Basic elements of the NWS Hydrologic EFS
  - hydrological vs. meteorological ensembles
  - Explores relationship between probability, risk and uncertainty in products

• **Ensemble Streamflow Prediction 2007)**
  - 1 hour Koehler webcast
  - Basics on ESP, strengths and limitations
  - Interpretation and application

http://www.meted.ucar.edu/hydro/ESP/nws_hefs/
Marine Prediction:

- 1-hour webcast introduces EGOWaFS to forecasters
- Basis for ensemble prediction of ocean waves
- Product output and interpretation
- Case examples

http://www.meted.ucar.edu/nwp/WaveEnsembles/
Current and Future Development

- Ensemble Forecasting of Winds and Seas
  - NMOC funded-follow-on to 2006 Wave Ensembles Module
  - SMEs: Dr. Jim Hansen, NRL, Pat Dixon, OTSR
  - Focus on integrating ensembles into forecast process
  - Medium range forecast of winds and seas
  - Case study—optimum track ship routing
  - Support Navy move toward probabilistic forecasts (Watch Floor of the Future)

- New NWP Course will add more applications oriented training on ensemble forecasting

- Training available will grow with increasing use of uncertainty products

- Training effort dictated by NWS/NSTEP, NMOC, and AFW funding priorities
Closing Thoughts

• COMET has a variety of ensemble training products for weather, marine and hydrologic prediction
• Training is an essential element of successful operational implementation
• COMET can be a training resource for your efforts, contingent on sponsor funding priorities

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