Quality Assessment PDT

Aviation Weather Research Program Review

November 2003
Objectives for QA PDT

• Provide an independent evaluation of the quality of AWRP forecast products
  – Provide support for the process of transferring new and enhanced forecasts to operations (AWTT)

• Develop and improve approaches for evaluating aviation weather forecasts

• Provide meaningful feedback to forecasters and users
Members

Joint effort primarily between FSL and NCAR

Co-leads

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Core members (FSL, NCAR, AWC)

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Work also supported by

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Close interaction with AWRP PDTs
Collaborations

• Participation in statistical and verification committees
  – WMO: WWRP/WGNE Verification Working Group
  – FAA’s ATM workshops
  – CDM Collaborative Routing Weather Applications Subcommittee
• Collaborate with AWC, AAWU, NWS, other NCAR and FSL divisions, other laboratories, and universities
Icing

Accomplishments

QA assessment reports completed for FIP and CIP-AK
Icing: CIP-AK
Plans

Evaluate AWTT algorithms and provide QA report to committees

- CIP severity (Feb ’04) – D3
- FIP-AK (July ’04) – D3
- FIP SLD (July ’04) – D4
- FIP severity (July ’04) – D3
Turbulence

Accomplishments

Completed turbulence subjective evaluation at AWC and United Airlines. Provided reports to Turbulence PDT
Developed and implemented turbulence diagnostic plot
Began looking at use of *in situ* edr observations for verification
Turbulence

Turbulence AIRMETs/PIREPs  2002-12-09 14Z

Spatial Distribution of Forecasts, PIREPs, & Lightning

Vertical distribution of forecasts and PIREPs at PIREP locations

Legend:
- Forecast YES Observed YES
- Forecast NO Observed YES
- Forecast YES Observed NO
- Forecast NO Observed NO
- AIRMETs
- Lightning

Note: PIREP number (NOT A CROSS SECTION)
Turbulence

Plans

Evaluate new components of GTG for AWTT

- Mid-levels and new upper level diagnostics (July ’04) – D3
- Mountain wave, probabilistic forecasts, and 24-h forecasts (Feb ’05) – D3
Convection

Accomplishments

Supported convective weather demonstration
Providing on-going evaluation of the 2-6 h RUC-based convective forecast product
Making significant progress on extending verification approaches for convection

- Interpretation of observations
- Diagnostic methods
- Operationally-relevant approaches
- Metrics to evaluate temporal consistency of forecasts
Convection

10nm surrounding
4-km NCWD
Convection

Key: Defining convective activity that impacts the flow of traffic

Compute coverage over 3,000 sq. area
Convection
Convection

Object-oriented approaches

Forecast

Observed
Convection

Plans

Evaluate NCWF-2 for AWTT
  • QA report available in February ’04
Develop ‘operational’ approaches for convective forecasts; coordinate with ATM groups etc.
Continue development of object-oriented approach (NCAR; with partial support from FAA and USWRP)
Use ASD observations in verification methodologies
Apply route- or terminal-specific evaluation
Oceanic Weather

Accomplishments

Prepare for the evaluation of Cloud Top Height

- Investigate verification approaches that incorporate satellite observations
- Apply datasets from weather experiments to the evaluation of OW products

Set up verification methodologies for OW convective diagnostic product
Oceanic Weather

THORPex
winter 2003
Pacific observation region
Plan:
- Evaluate Cloud Top Height
  - QA report available in July ’04 – D3
- Continue to develop robust verification methodologies for data sparse regions
- Develop infrastructure for evaluation of Convective Diagnosis, Oceanic GTG
Accomplishments

Developed methods to select METAR stations for C&V forecast evaluation
Completed implementation of verification capabilities for NCV forecasts into RTVS and post-analysis system
Preparing for AWTT evaluation of NCV analyses and forecasts
National Ceiling and Visibility

Spatial model approach:

Neighbor matching approach:
National Ceiling and Visibility

Plans

- Develop methodologies to evaluate the C&V analyses
- Conduct statistical evaluation late FY04
Other Accomplishments

Confidence Level Information

Current Icing Potential (CIP), Forecast Icing Potential (FIP), and Graphical Turbulence Guidance (GTG)

Performance Statistics:

– Statistics available on ADDS, on page for each product
– Annual, seasonal, and regional
– Updated quarterly
– Information will be provided for other products as they progress through AWTT to D4
Other Accomplishments

Confidence Level Information for GTG

**DISCRIMINATION**
Annual Performance  Skill Index = 71

**AIRSPACE COVERAGE**
Annual Performance

Annual, Seasonal, Regional
Verification meeting, January 2003

Objective

• Identify methods to develop operationally relevant verification approaches

Result

• Identifying the need for a 2-6 h extended range convective forecast. Therefore, the process for evaluating the 2-6 h RUC based convective forecast began
Summary

Many activities and objectives…

Challenges:

Coordinating complex schedules with PDTs and AWTT

Identifying and developing approaches to use new observations

Understanding scientific and practical attributes of new forecasts and algorithms

Developing and applying meaningful metrics of forecast quality

Developing approaches that are “operationally meaningful”