

AWRP Program Review

Quality Assessment
Product Development Team



Quality Assessment (QA) PDT

Outline

- Organization
- Activities
- Accomplishments
- Plans

Quality Assessment (QA) PDT

If you can't verify it –
you can't forecast it!

Quality Assessment (QA) PDT

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you can't forecast it!

“It is hazardous, and in many ways irrelevant to become entangled with any form or variety of verification schemes. No matter where one stands, one is always in the middle of a lusty controversy. The verification expert and the meteorologist are always ravishing each other.”

--Col. A.C. Holman; BAMS 1947

Why a Verification Program

- Establish an **independent** assessment group to evaluate the quality of AWRP forecast products.
- Develop new and advanced approaches for aviation forecasts that have **never before** been verified, and continue to **develop improved approaches**
- The development of verification approaches requires **research and testing** much like the development of aviation forecast products.

QA PDT: Members

Co-Leads

Jennifer Mahoney and Barbara Brown

Core Members

Tressa Fowler, Mike Kay, Matt Kelsch, Andy Loughe,
Fred Mosher, Agnes Takacs

QA PDT: Organization

- AF and QA split
 - RTVS system development remains in AF PDT
 - Tasks pertaining to verification method development, analysis of results, and AWTT moved to QA PDT
- Tasks in other PDTs will remain in those PDTs for FY03, but will be moved to QA PDT in FY04.

QA PDT: Goals

- Help facilitate the transfer of technology through AWTT.
- Develop and apply appropriate, scientifically and statistically valid verification methods.
- Provide **meaningful** feedback to forecasters, developers, and managers.

QA PDT: Interactions

- Partnership between FSL and NCAR
- Work closely with other PDTs
 - Aviation Forecasts
 - Turbulence
 - Convective Weather
 - In-flight Icing
 - National Ceiling and Visibility
 - Oceanic Weather
 - Model Development and Enhancement

QA PDT: Interactions

- Participation in activities of various statistical and verification committees
 - AMS Probability and Statistics Committee
 - WWRP Verification Sub-committee
 - MITRE Aviation Verification Committee
- Collaborate with AWC, NWS, other NCAR and FSL divisions, other laboratories, and universities.

QA PDT: Activities

- Develop verification methods for aviation forecasts
 - Workshop on “Making Verification More Meaningful”
 - Collaborations with other verification groups
 - Leverage with other projects (FSL precipitation project; USWRP)
- Support AWTT decisions
 - Intercomparison exercises
 - QA reports
- Provide verification information to users
 - Confidence level information

QA PDT: Accomplishments

RTVS Convective Weather Demo

RTVS Convective Weather Demo

RTVS Convective Weather Demo

1. Make selections and get forecast periods for those selections.

Type: Product: Date: Forecast Length:

2. Select forecast period and get plot.

Forecast Period:

Frame Mode Loop Mode Adjust Speed Pause on First Frame Pause on Last Frame Quit Frame Current Frame

Nowcast (Extrap)
RTVS
VERIFICATION
Forecast Threshold: 35
Observation: 1400
Observation Threshold: 35
Issuance Time: Aug 12, 2002 1200Z
Forecast Length: 60
Valid Time: Aug 12, 2002 1300Z

PKY: 0.00
C3: 0.00
Haze: 0.00
PAR: 0.99
S Area: 2.40
R1: 0.12

MI
HI
FIVE MIN

[Back to RTVS](#)

RTVS Real Time Verification System

Forecast Verification Branch (FVB) is developing a real-time verification system (RTVS) that provides feedback on forecast quality to forecasters, model developers, and managers. FVB also participates in developing and enhancing verification methods.

Operational
(tools and methods in the field)

Experimental
(tools and methods in development)

FSL RTVS
AWC RTVS

ACARS-RUC
AAWU
CCFP
Ceiling and Visibility
Convection
CWD
HIOP
Precipitation
TMU
Turbulence

Reference

Product Monitor
Publications
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The information provided on this site is computed by the Real-Time Verification System (RTVS) and are developed by NOAA's Forecast Systems Laboratory (FSL) with funds provided by the FAA Aviation Weather Research Program.

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QA PDT: Accomplishments

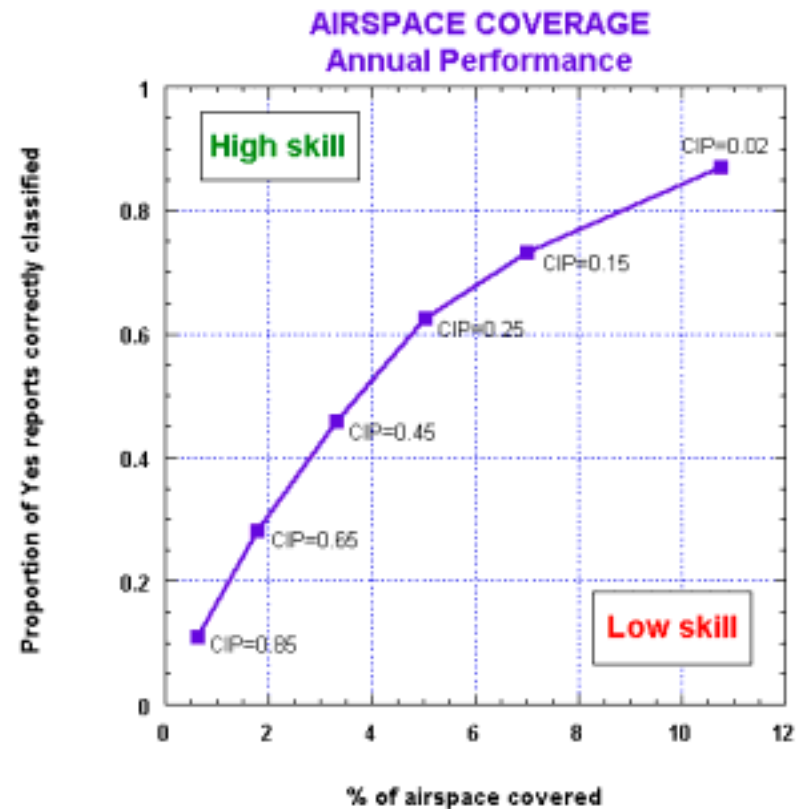
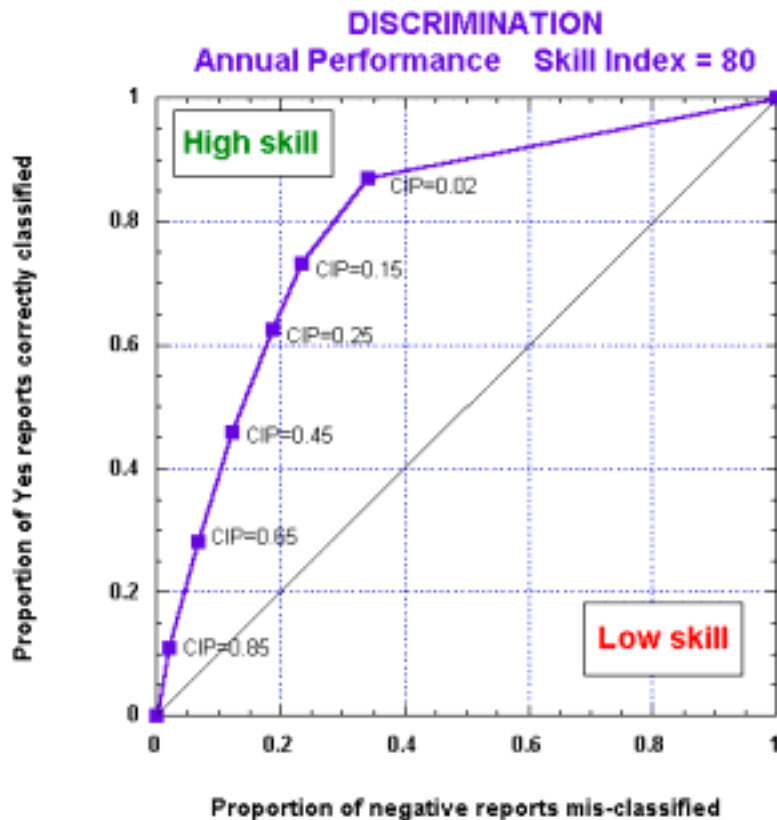
Confidence Level Information

Current Icing Potential (CIP) Performance Statistics:

- http://adds.aviationweather.gov/projects/adds/icing/cip_performance.php
- Annual, seasonal, and regional
- Similar information for other products (e.g. ITFA) will be included on ADDS.

QA PDT: Accomplishments

Confidence Level Information



QA PDT: Accomplishments

- Submitted technical reports to AWTT Technical Review Panel
 - IIDA/CIP
 - IIFA/FIP
 - ITFA

QA PDT: Accomplishments

International Workshop:

“Making Verification More Meaningful”

- **Goals**
 - Bring together verification experts
 - Consider major issues in verification of aviation weather and related forecasts
 - Establish and extend collaborations
- **Focus**
 - Operational issues (how to make verification relevant)
 - Observations (uncertainty, scaling)
 - Advanced methods (especially for spatial forecasts)
 - Ensemble forecast verification

QA PDT: Accomplishments

“Making Verification More Meaningful”

Participants:

- From 6 countries and all parts of U.S.
- Atmospheric scientists, operational meteorologists, hydrologists, statisticians, mathematicians
- Government laboratories, universities, operations, private consultants



QA PDT: Accomplishments

“Making Verification More Meaningful”

Outcomes:

- A variety of issues identified:
 - Users and operationally-relevant verification
 - Scaling
 - Improved spatial forecast verification approaches
 - Incorporation of observational uncertainty)
 - Need for improved education
- New collaborations
- Desire for similar events in the future

Web address: http://www.rap.ucar.edu/research/verification/ver_wkshp1.html

QA PDT: Plans

- Develop and test approaches that address “operationally-relevant” questions.
 - Practically-perfect approach (Brooks et al.1998)
 - Ebert/McBride (2000) diagnostic approach
 - Object-oriented approach (NCAR, NSSL)

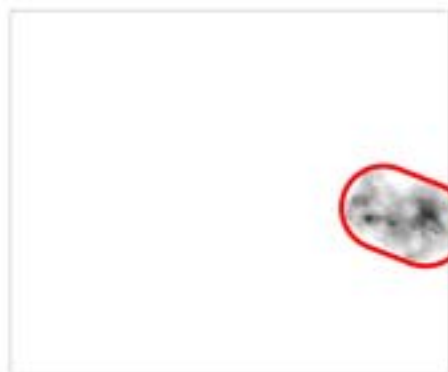
QA PDT: Plans

An “Object-Oriented” Approach

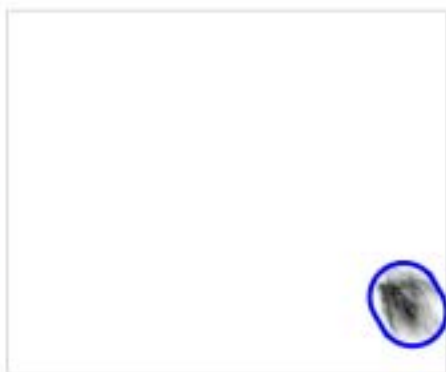
- Identify verification questions that are *meteorologically and operationally relevant*
- Define precipitation/convective objects and shapes
- Diagnose errors in location, shape, size, timing, etc.
 - Include operationally-relevant attributes, such as location of “gaps” in convection
- Characterize and compare convection within shapes

QA PDT Plans: Example of Object-Oriented approach

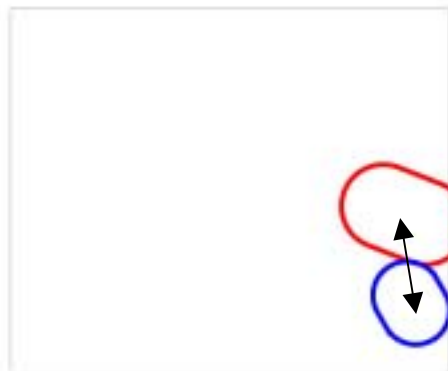
Shapes/objects and matching:



Stage 4 data
Area 1403



WRF4 data
Area 809

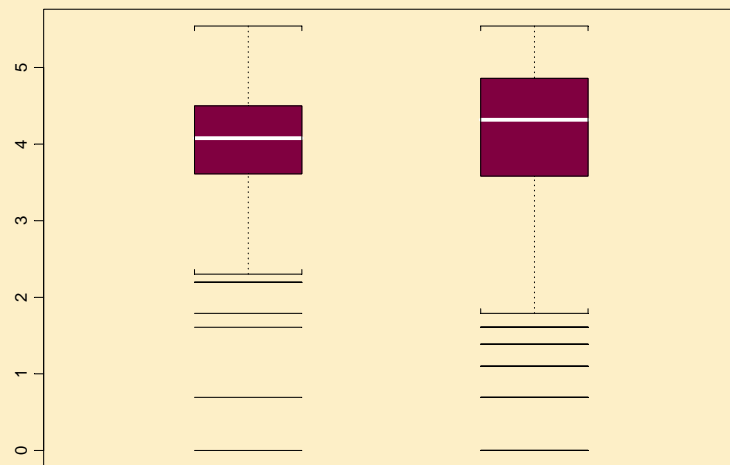


Int Ratio 0.14 %
SD Ratio 157.38 %



Int Ratio 57.59 %
SD Ratio 42.41 %

Precipitation intensities:



Stage 4

WRF

QA PDT: Plans

- Continue technology-transfer activities
 - CIP icing severity for D3 decision
 - FIP for D4 decision
- Begin development of C&V and Oceanic Weather intercomparison activities for D3 decisions in FY04
 - National C&V algorithm
 - Cloud top height
 - Global convective diagnosis
 - Global turbulence forecast
- Continue Convective Weather evaluation activities
 - NCWF 2-h forecast for D3 decision in FY04

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Questions ?

