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# WWRP / WGNE Joint Working Group on Verification (JWGV)

2007-08 activities and plans

24<sup>th</sup> WGNE meeting  
Montreal, 3-7 November 2008



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## JWGV mission

- Plan and implement verification component of WWRP
- Collaborate with WGNE, WCRP, CBS, on forecast verification
- Research and develop new verification methods, including diagnostic verification to improve models
- Training
- Promote data sharing
- Promote relevance of verification to users

[http://ftp.wmo.int/pages/prog/arep/wwrp/new/Forecast\\_Verification.html](http://ftp.wmo.int/pages/prog/arep/wwrp/new/Forecast_Verification.html)



## Who is JWGV - 2008

- New members in 2008:  
Martin Göber,  
Joël Stein,  
Marion Mittermaier
- CBS liaison - David  
Richardson



**JWGV Membership:** B. Brown (USA), H. Brooks (USA), B. Casati (Canada), B. Ebert (Australia), A. Ghelli (ECMWF), M. Göber (Germany), M. Mittermaier (UK); P. Nurmi (Finland); Joël Stein (France); D. Stephenson (UK), C. Wilson (UK), L. Wilson (Canada)



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3

## 2007-08 highlights: Publications

January 2008 special issue of  
*Meteorological Applications*  
on forecast verification

- Edited by A. Ghelli and B. Ebert
- Verification review paper authored by JWGV members
- 18 contributed papers from participants in 2007 Internat'l Verification Methods workshop

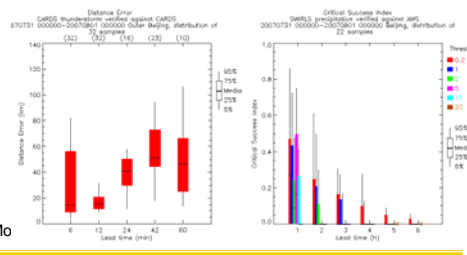
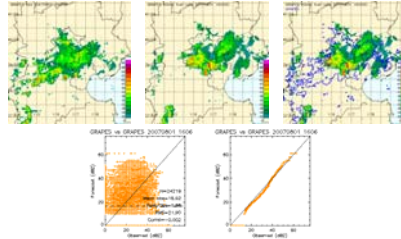


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4

## FDPs and RDPs

- Beijing 2008 Forecast Demonstration Project
  - Real-Time Forecast (nowcast) Verification (RTFV)
  - Training
- Beijing 2008 Research Demonstration Project
  - Guidance; test plan
- MAP D-Phase
- Vancouver Olympics planning
  - Forecast verification

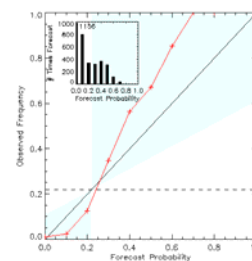


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## Methodology documents

- Verification methodology documents – primarily intended for WGNE forecast evaluations
  - Precipitation Verification (2004)
  - **Revised version includes probabilistic forecast verification (2008)**
  - Cloud Verification (in progress)

*Reliability diagram for PQPF*

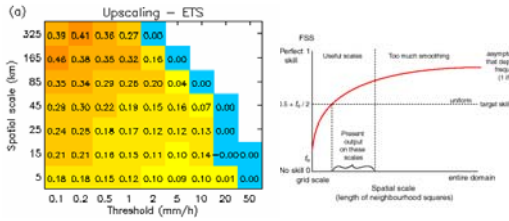


*ETS for cloud-base height*

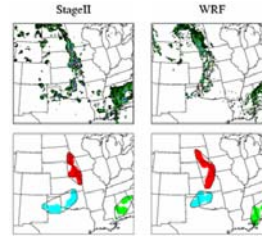


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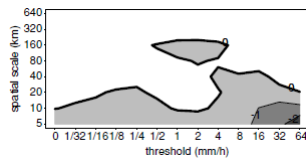
# Spatial Verification Method Intercomparison Project



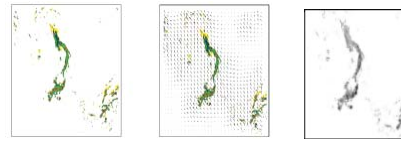
Neighborhood (fuzzy) methods (13)



Features-based methods (7)



Scale separation methods (1)



Field verification methods (2)

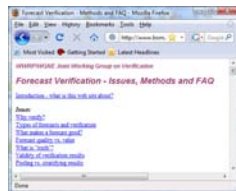


More information and some code available at <http://www.rap.ucar.edu/projects/icp/index.html>

# Outreach

- EUMETCAL training modules (P. Nurmi and L. Wilson) <http://www.eumetcal.org.uk/eumetcal/verification/www/english/courses/msgcrs/index.htm>

- Verification web page



- Tutorials (traveling and on-site)

The Brier Score - Accuracy of a probability forecast

The Brier Score is probably the most commonly used metric measure for assessing the accuracy of probability forecasts. The score is the mean squared error of the probability forecasts over the verification sample and is expressed as:

$$BS = \frac{1}{N} \sum_{i=1}^N (p_i - o_i)^2$$

where  $N$  is the sample size. The observations  $o_i$  are all binary, 1 if the event occurred and 0 if it didn't. The Brier score ranges from 0 for a perfect forecast to 1 for the worst possible forecast. Although the score can be computed on a single forecast, the result usually is very meaningful because the observations in hours and the forecast is a probability.

The following table shows two forecasts of the probability of precipitation from each of five forecasters, "Mr. Pevik", "Ms. Sharp", "Ms. Clouse", and "Ms. Coo". "Ms. Pevik" believes he can distinguish the likelihood of rain to within 10% intervals, so he tries to use all probability values, to the nearest 0.10. "Ms. Sharp" believes that one should give the probability that forecasting error 50% is unlikely to materialize. "Ms. Clouse" has no confidence whatsoever as far as ability to discern greater and lesser chances of rain, but he believes that rain happens on average just 6 times out of 10, 60% of the occasions. "Ms. Coo" is a traditional deterministic forecaster, and thinks that the duty of the forecaster is to give the best estimate of what will happen. He forecasts rain daily, forecasting rain if he thinks it is likely to happen. Using the observations given in the last row, compare the Brier scores for these forecasts and answer the following questions.

	1	2	3	4	5	6	7	8	9	10
Mr. Pevik	0	10	20	20	30	40	40	60	70	80
Ms. Sharp	0	0	10	10	20	20	30	30	40	40
Ms. Clouse	40	40	40	40	40	40	40	40	40	40
Ms. Coo	0	0	0	0	0	0	1	1	1	1
Observations	0	0	0	1	0	0	0	1	1	1

To aid the computations, the square of each of the possible error values is shown below:

$$0^2 = 00 \quad 6^2 = 36$$


## 2008-2009 plans

- FDPs and RDPs
  - Beijing 2008 FDP: real-time + follow-on analyses
  - Vancouver 2010 RDP: Planning; development of tools
  - Shanghai MHEWS 2010: ?
- JWGV meeting
  - 1-3 December 2008, Shanghai
  - Combined with WWRP Mesoscale Forecasting WG
- Scientific workshop and tutorial
  - 4-10 June 2009 at FMI / University of Helsinki
- Outreach
  - Other tutorials... on the road
  - Web site update
- Collaboration with other groups
  - WGCM
  - WGSIP

