

MOS Precipitation Guidance

Part I: A Current Overview

Joe Maloney

Meteorological Development Laboratory

NWS PQPF Science Strategy Workshop
June 3-4, 2002

<http://www.nws.noaa.gov/mdl/synop>

“Traditional MOS”

- Definition of predictands (PoP and QPF)
- Current MOS guidance packages:
 - ▶ NGM MOS
 - ▶ AVN MOS
 - ▶ ETA MOS
 - ▶ MRF MOS
- Verification of PoP and QPF guidance
 - ▶ March - April 2002

Predictand Definitions

- PoP (Probability of Precipitation)
 - ▶ The probability that at least 0.01" (liquid equiv.) of precipitation will fall at a given location within a given time frame (6, 12, or 24 hours)
- QPF (Quantitative Precipitation Forecast)
 - ▶ Probabilistic: The probability that at least {0.10, 0.25, 0.50, 1.00, 2.00*} of precipitation will fall...
 - ▶ Categorical: The probabilistic guidance is compared to derived thresholds to produce a categorical forecast of precipitation amount

Predictand Definitions

(continued)

- For all but the NGM MOS, the QPF predictands were *conditional*
 - ▶ The probability of {0.10, 0.25, ...} GIVEN THAT 0.01" has occurred.
- Conditional QPF is made unconditional through post-processing
 - ▶ e.g, $P(A) = P(A | B) \times P(B)$

MOS Guidance: NGM (FWC)

- Two cycles daily (0000 and 1200 UTC)
- First produced PoP: 07/26/1989
- First produced QPF: 10/28/1993
- Available products:

	12	18	24	30	36	42	48	54	60
PoP/QPF 06	X	X	X	X	X	X	X	X	X
PoP/QPF 12			X		X		X		X

MOS Guidance: AVN (MAV)

- Four cycles daily (0000, 0600, 1200, 1800 UTC)
- First produced PoP
 - ▶ 0000/1200 UTC: 09/20/2000
 - ▶ 0600/1800 UTC: 10/30/2001
- First produced QPF
 - ▶ 0000/1200 UTC: 07/24/2001
 - ▶ 0600/1800 UTC: 04/18/2002

MOS Guidance: AVN (MAV)

Available Products

00/12Z	12	18	24	30	36	42	48	54	60	66	72	78	84
PoP/QPF 06	X	X	X	X	X	X	X	X	X	X	X		
PoP/QPF 12			X		X		X		X		X		
PoP/QPF 24					X		X		X		X		X
06/18Z	12	18	24	30	36	42	48	54	60	66	72	78	84
PoP/QPF 06	X	X	X	X	X	X	X	X	X	X	X	X	
PoP/QPF 12		X		X		X		X		X		X	
PoP/QPF 24				X		X		X		X		X	

- ▶ 24h forecasts not available in alphanumeric messages
- ▶ Forecasts valid 78 hours not in alphanumeric messages

MOS Guidance: ETA (MET)

- Two cycles daily (0000 and 1200 UTC)
- First produced PoP: 02/26/2002
- First produced QPF: 02/26/2002
- Available products:

	12	18	24	30	36	42	48	54	60
PoP/QPF 06	X	X	X	X	X	X	X	X	X
PoP/QPF 12			X		X		X		X
PoP/QPF 24					X		X		X

- ▶ 24h products not in alphanumeric message
- Soon: Archival of 32km grid, more projections...

MOS Guidance: MRF (MEX)

- One cycle daily (0000 UTC)
- First produced PoP: 07/19/2000
- First produced QPF: 07/19/2000
- Available products:

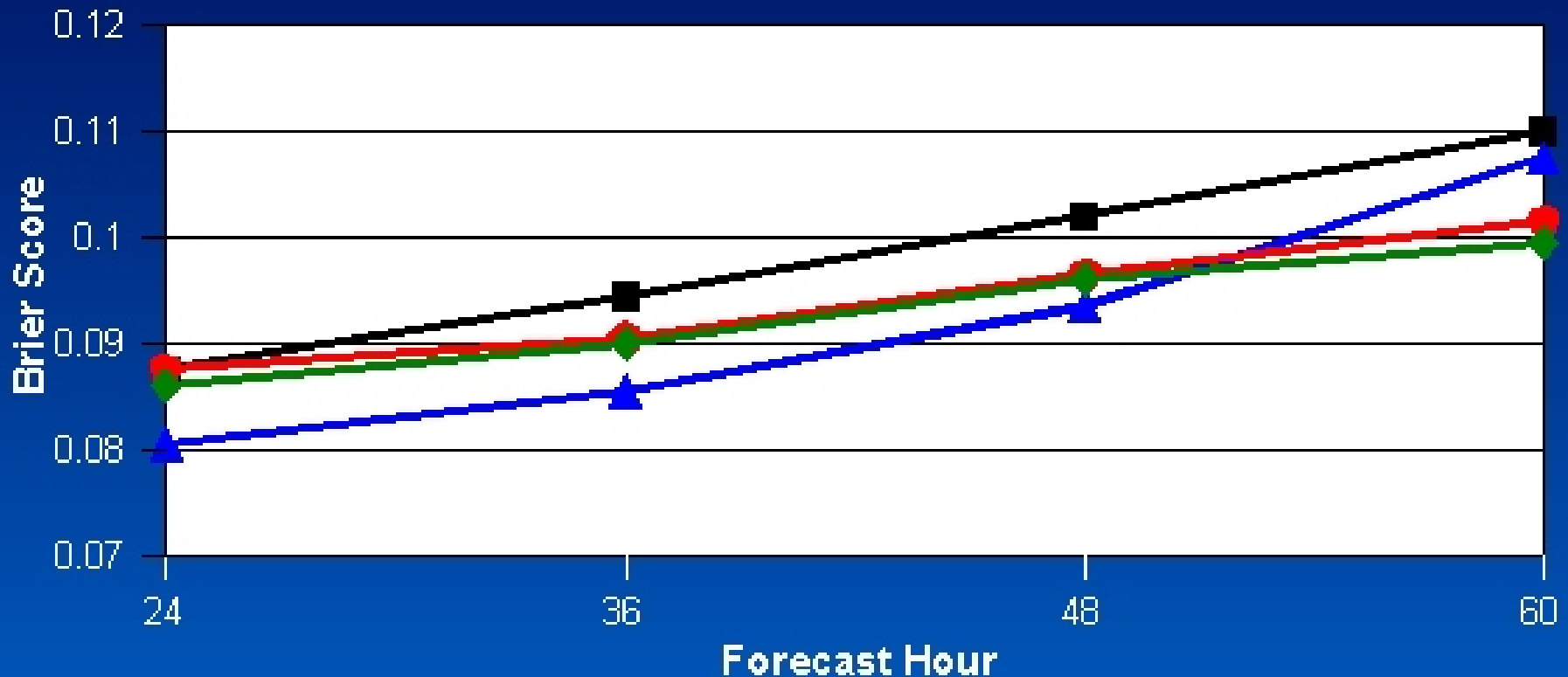
	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
PoP/QPF 12	X	X	X	X	X	X	X	X	X	X	X	X	P	P	P
PoP/QPF 24		X	X	X	X	X	X	X	X	X	X	X	P	P	P

- ▶ P: PoP only; **RED**: Not in alphanumeric message
- Warm Season 2004: 2 pkgs @ 0000/1200 UTC

Verification: 12h PoP

Brier Score

March - April, 2002



—■— NGM MOS

—●— AVN MOS

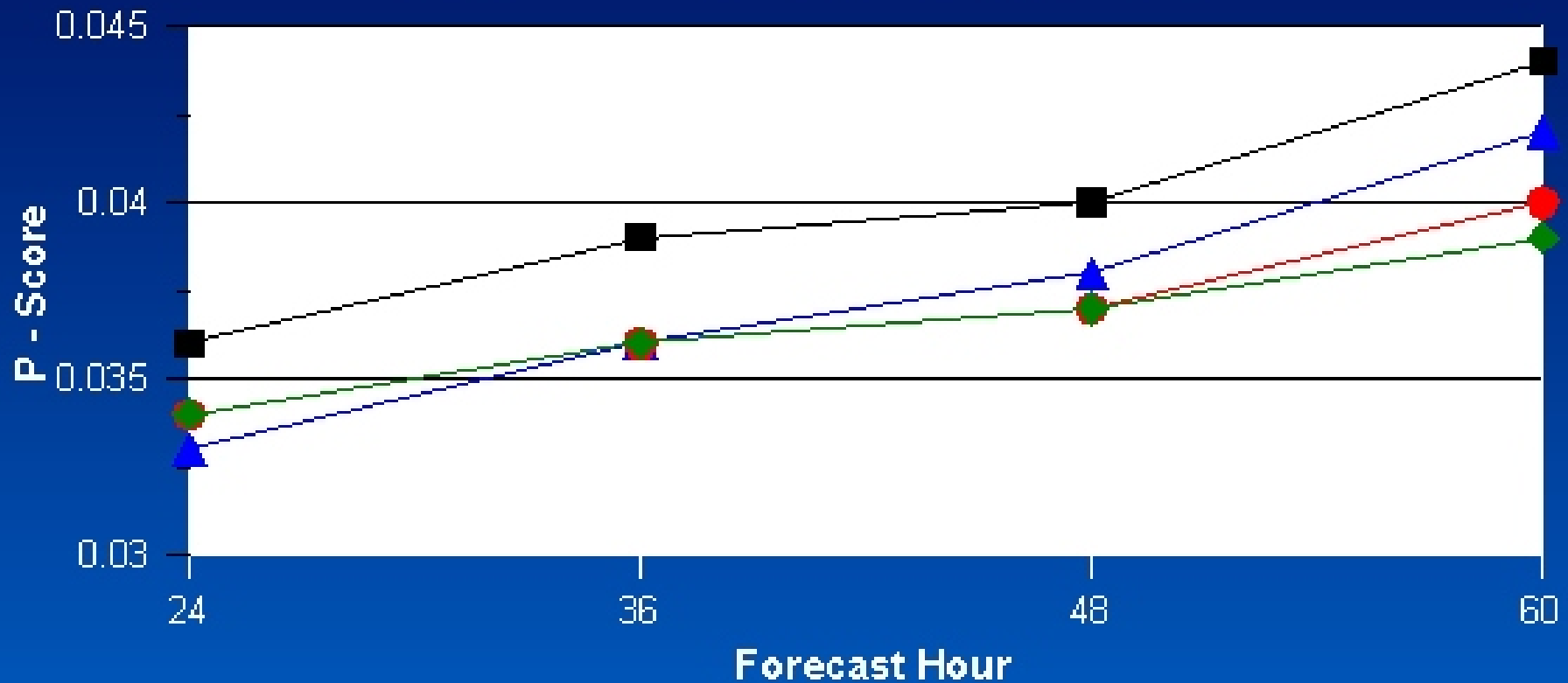
—▲— ETA MOS

—◆— MRF MOS

Verification: 12h PQPF ≥ 0.50 "

P-Score

March - April, 2002



■ NGM MOS

▲ ETA MOS

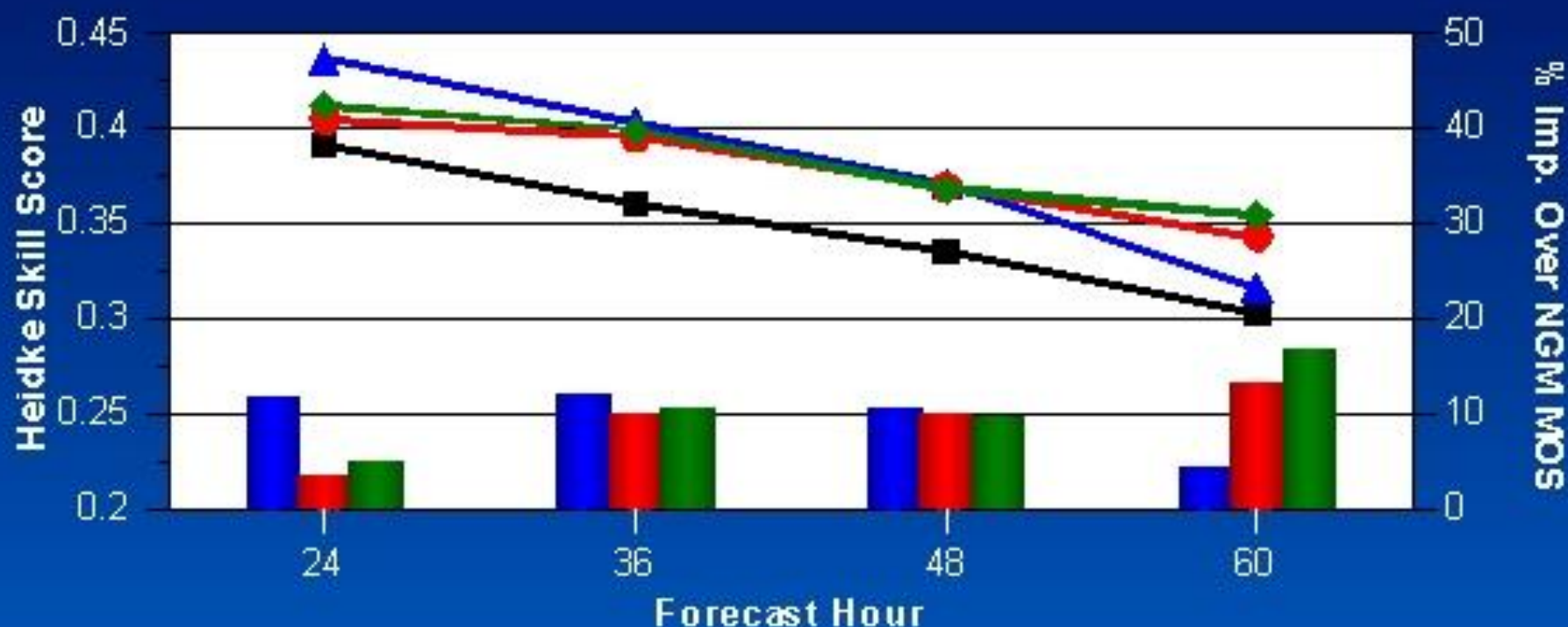
● AVN MOS

◆ MRF MOS

Verification: 12h BQPF (CAT)

Heidke Skill Score

March - April, 2002



—■— NGM MOS (Y1)

—▲— ETA MOS (Y1)

—◆— AVN MOS (Y1)

—●— MRF MOS (Y1)

■ ETA MOS (Y2)

■ AVN MOS (Y2)

■ MRF MOS (Y2)

Traditional MOS - Summary

- Produce guidance for PoP and QPF (probabilistic and categorical)
- Four distinct packages; three short-range, one extended range
- Verification
 - ▶ All three of the new packages (AVN, Eta, MRF) show considerable skill over the older (NGM) guidance
 - ▶ Eta tends to be most skillful at early forecast hours
 - ▶ AVN and MRF are most skillful at later forecast hours

Future Work

- “Near” future in the “traditional” MOS world
 - ▶ Additional extended range cycle (1200 UTC)
 - ▶ Combination of AVN and MRF into one package for 0000 and 1200 UTC
 - ▶ Use of finer resolution Eta model
 - Finer grid (32 km vs. 90 km.)
 - Finer temporal resolution (3 hrs v. 6 hrs.)
 - More forecast projections (60-84 hrs. vs. 48 hrs.)