MOS Precipitation Guidance

Part I: A Current Overview

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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
For all but the NGM MOS, the QPF predictands were *conditional*
- The probability of \{0.10, 0.25, \ldots\} 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:

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<thead>
<tr>
<th>PoP/QPF 06</th>
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<th>24</th>
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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

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<td>PoP/QPF 24</td>
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- 24h forecasts not available in alphanumerics messages
- Forecasts valid 78 hours not in alphanumerics 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:

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- 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:

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- P: PoP only; RED: Not in alphanumeric message
- Warm Season 2004: 2 pkgs @ 0000/1200 UTC
Verification: 12h PoP

Brier Score  March - April, 2002

Brier Score

Forecast Hour

NGM MOS  ETA MOS  AVN MOS  MRF MOS
Verification: 12h PQPF $\geq 0.50''$

P-Score March - April, 2002

Forecast Hour

P-Score

NGM MOS
ETA MOS
AVN MOS
MRF MOS
Verification: 12h BQPF (CAT)

Heidke Skill Score  March - April, 2002

Forecast Hour

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.)