STATISTICAL QUANTITATIVE PRECIPITATION FORECASTS BASED ON THE MEDIUM RANGE FORECAST MODEL

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GOALS OF THIS RESEARCH/DEVELOPMENT

- Update the 12- and 24-h MRF POP

- Develop probabilistic QPF for the MRF

  -PQPF -probability that (liquid equivalent) precipitation accumulation will equal or exceed its corresponding cutoff value

MRF PQPF PREDICTANDS

- Probabilistic forecast categories (inches of precipitation)
  - ≥0.01 (POP)
  - ≥0.10
  - ≥0.25
  - ≥0.50
  - ≥1.00
  - ≥2.00
  - ≥3.00 (24-h guidance only)
- Data set
  - hourly observations

MRF PQPF PROJECTIONS

- 12-h guidance
  -POP valid every 12 hours from 24 to 192 hours
  -PQPF valid every 12 hours from 24 to 156 hours

- 24-h guidance
  -POP valid every **12** hours from 36 to 192 hours (available at 00z to 00z and 12z to 12z)
  -PQPF valid every **12** hours from 36 to 156 hours (available at 00z to 00z and 12z to 12z)

PREDICTORS OFFERED

- MRF model data
  -vertical velocity
  -u- and v- wind components
  -relative humidity
  -moisture divergence
  -relative vorticity
  -k index
  -height falls
  -precipitable water
  -k index
  -model qpf
  -relative humidity * vertical velocity
  -Several atmospheric levels/layers -
  temporal averages -advections

- Climatic variables
  -relative frequency - .01 .1 .25 .50

EQUATION DEVELOPMENT SPECIFICS

- Dates of MRF developmental data set
  -1992-March 97 - every 5th day
  -April 97-Oct. 99

- Cool season
  - October-March

- Warm season
  - April-September

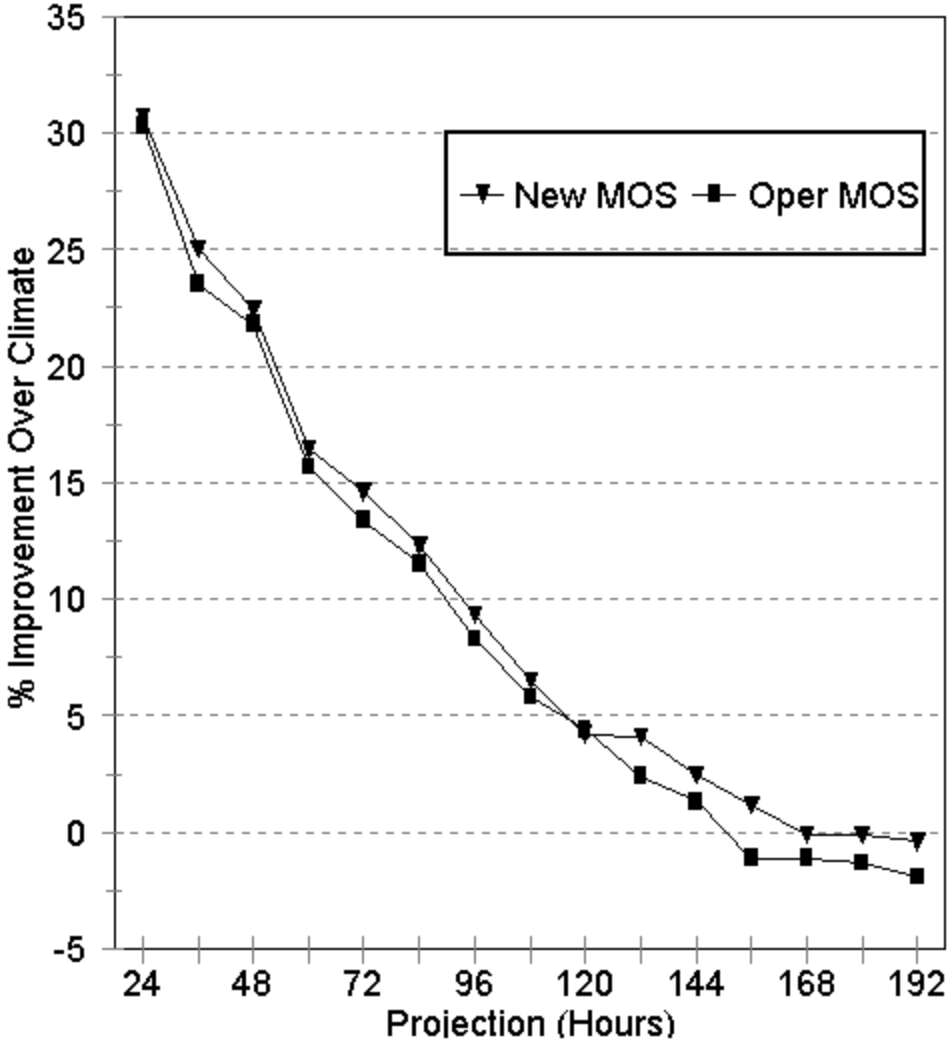
- Independent data
  -Last 15 days of each month
  -98 for warm season
  -98-99 for cool season

VERIFICATION

- Brier score
- Benchmarks
  -Climate (relative frequency)
  -Operational MRF MOS POP

BRIER SCORES - MRF 12-h POP

Warm Season - CONUS

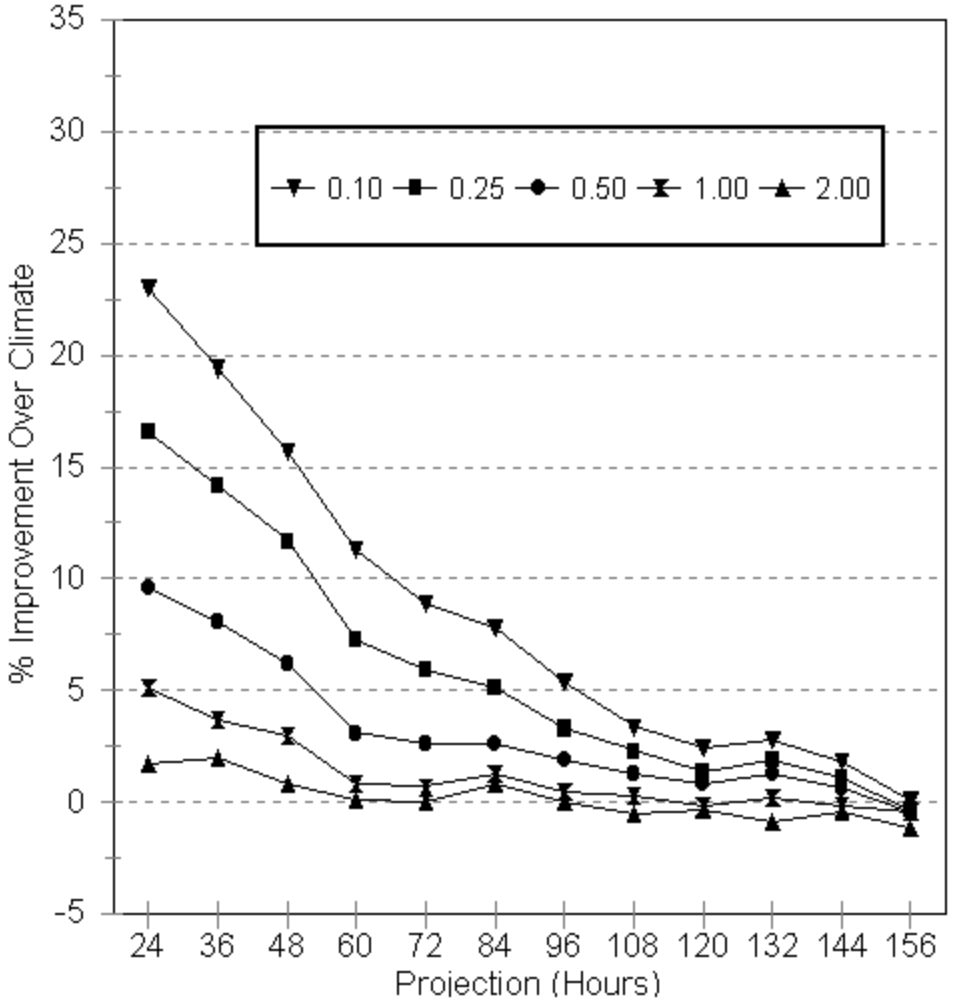


Approximate number of verification stations: 165

Dates: 4/16-30, 5/16-31, 7/22-31, 8/16-31, 9/16-30

BRIER SCORES - MRF 12-h PQPF

Warm Season - CONUS

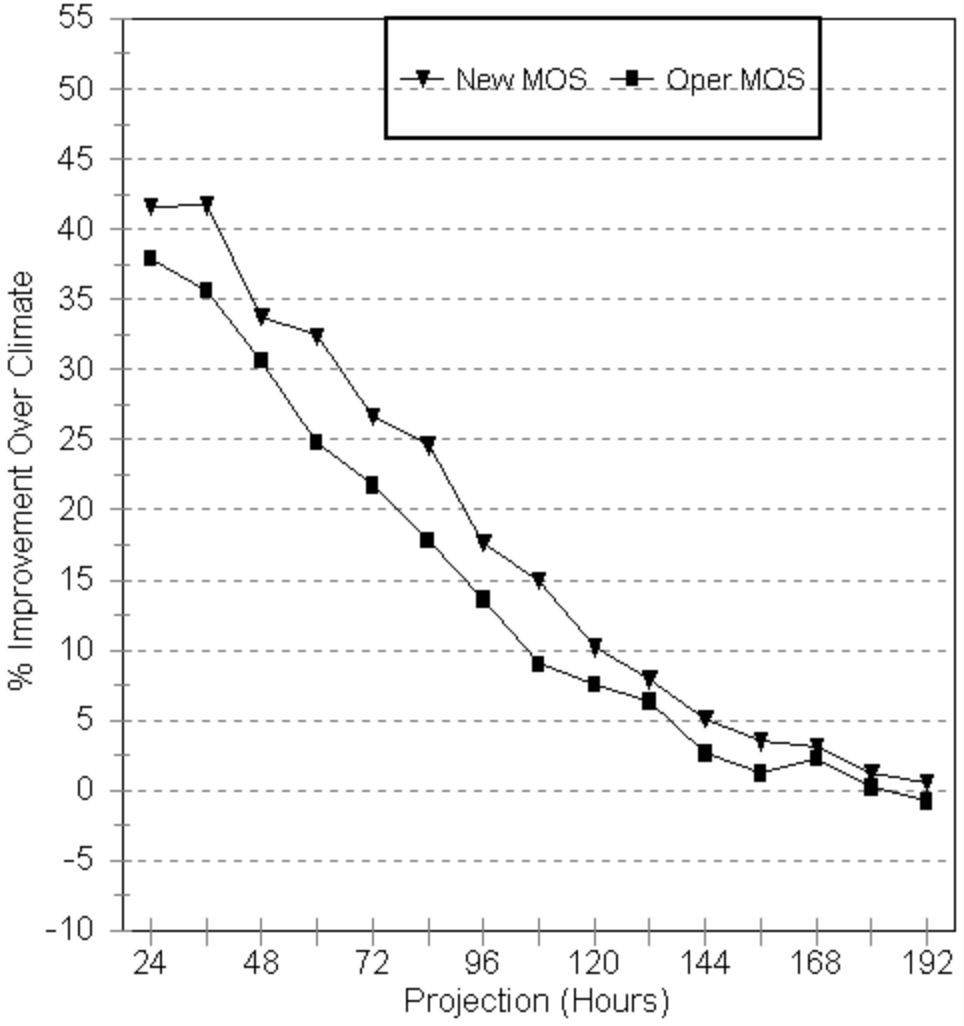


Approximate number of verification stations: 480

Dates: 4/16-30, 5/16-31, 7/22-31, 8/16-31, 9/16-30

BRIER SCORES - MRF 12-h POP

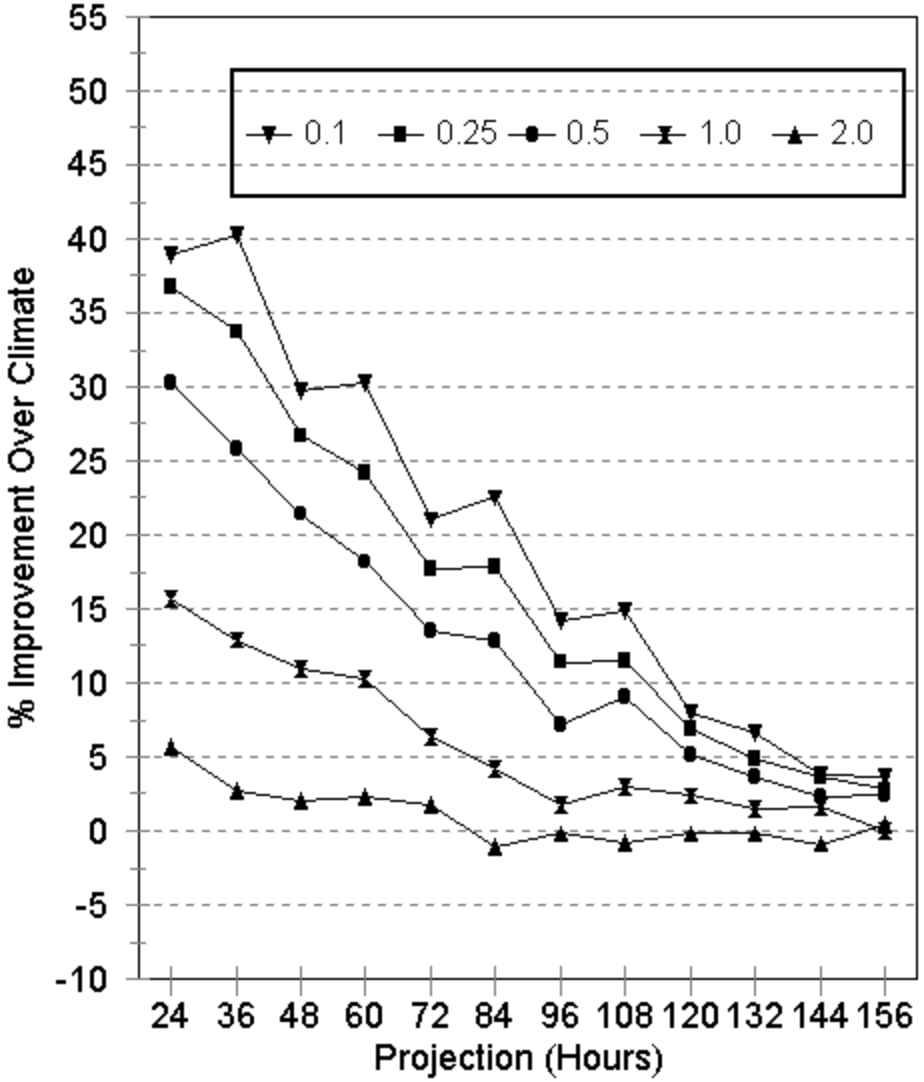
Cool Season - CONUS & AK



Verification Dates: Last half of each month of the 98-99 season

BRIER SCORES - MRF 12-h PQPF

Cool Season - CONUS & AK



Verification Dates: Last half of each month of the 98-99 season

CONCLUSIONS

- When comparing % improvement over climate - the new 12- and 24-h PoP forecasts improve over the operational MRF PoP for nearly all projections.
- New 12- and 24-h PQPF forecasts show improvement over climate for nearly all projections and cutoffs
- Next step - categorical forecasts