CALIBRATION OF PQPF FORECASTS
BASED ON THE NCEP GLOBAL ENSEMBLE

THE USE OF LONG–RANGE CLIMATE FORECASTS
IN WATER RESOURCES DECISION MAKING

Zoltan Toth\(^1\) and Yuejian Zhu\(^1\)

Environmental Modeling Center, NCEP

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1. General Sciences Corporation (Laurel, MD) at NCEP, Zoltan.Toth@noaa.gov; (301) 763–8000/ext. 7268
**SUBJECT:** PQPF based on 20 per day NCEP global ensemble fcsts

**PROBLEM:**
- Ensemble - Model errors not represented
- => QPF (PQPF) has systematic errors

**GOALS:**
- “Calibrate” PQPF – eliminate bias in prob. fcsts
  - a) Adjust first moment
  - b) Adjust second moment
- Provide “traces” (ie., adjusted ens. fcst scenarios)
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CALIBRATION OF PQPF FORECASTS

METHODOLOGY:

1) First moment: Fcst precip amounts adjusted so their cumulative frequency distribution matches that of observed

STATS accumulated over: Preceding period, using decaying aver.
Each gridpoint
applied on: Each current ensemble fcst member

RESULTS: First moment bias removed
Second moment bias reduced
2) **Second moment:** “Normalized” spread in individual ens fcsts is adjusted so their composite cumulative frequency distribution matches that of corresponding observations.

**ISSUES:** Normal distribution assumed (after transformation?)
- Zero amounts treated as “virtual negative”
- Zero fcst adjusted if necessary for members with highest RH
- Sampling noise vs. need for details balanced

**EXPECTED RESULTS:**
- First moment retained
- Second moment bias further reduced/elimin.

**ADVANTAGES:**

- **Flexible:**
  - Global or regional (by combining gridpoint stats)
  - Station or various gridbox size application
  - Retains higher moments in fcst data if skillful
  - Traces provided (for joint probability distributions)

- **Oper. feasible:**
  - Data requirements
  - Computational process manageable
  - Adaptive, “learns” changes in model behavior

**PLANNED APPLICATIONS:**
- Global adjust. (based on US data) tested over South Africa (W. Tennant)
- Local adjustment tested over selected US region (M. Kane)

**PRIOR WORK:** Eckert, Hamill

**FUTURE:**
- Develop/test neural network calibration algorithm?
- Use experience gained through calibration in project to:

  **REDUCE/ELIMINATE NEED FOR POSTPROCESSING BY EQUIPPING THE MODEL USED IN ENSEMBLE FCSTING TO REPRESENT MODEL RELATED UNCERTAINTY**
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Ensemble Prob of Precip Amount Exceeding 0.5 Inch (12.7 mm/day)
Valid Period: 2001041112–2001041212

RAW CALIBRATED

BRIER SCORE (for 2.5 mm)
RESOLUTION (for trace)

LEAD TIME (days)

24 hours accumulated precipitation by end of 2001041212

UNIT:MM/DAY

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