

Application of a Neighborhood POP Forecasting Approach to a County Warning Area

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Motivation

-A neighborhood approach to forecasting considers an area of deterministic grid point forecasts in order to quantify uncertainty.
 -The goal of this study was to compare POPs created through a simple neighborhood approach to those of the more commonly used and more sophisticated MOS.

Data and Methodology

-The approach (NBH) was tested at WFO Goodland ASOS sites: Goodland, KS, Hill City, KS, Burlington, CO, and McCook, NE.
 -NBH used a single, static POP table, trained on events from the Hazardous Weather Testbed Spring Experiments in '07 and '08
 -Two parameters were considered: neighborhood average QPF and the number of points with QPF ≥ 0.01 inch.
 -An 11x11 grid point area was centered on each site, and the method was tested from April 2012 to April 2013 on a 20 km grid.

Data and Methodology (cont.)

Consider QPFs in a theoretical 3x3 grid point neighborhood:

0.90	1.10	1.25
1.00	1.35	1.40
1.00	1.55	1.75

of cases where 9 of 9 points ≥ 0.01 inch and Ave precip > 1.0 inch \rightarrow 8739 cases

of the 8739 cases where precip was observed (≥ 0.01 inch) \rightarrow 6773 cases

$$\frac{6773 \text{ cases}}{8739 \text{ cases}} = 77.5\%$$

	<0.01	0.01-0.05	0.05-0.10	0.10-0.25	0.25-0.50	0.50-1.0	>1.0
0	7.0	-	-	-	-	-	-
1	23.5	30.7	21.1	0.0	-	-	-
2	26.0	31.6	30.0	31.0	-	-	-
3	26.5	33.3	38.7	36.7	38.9	0.0	-
4	23.9	33.7	38.7	42.9	44.7	66.7	-
5	25.5	34.4	42.5	44.4	49.0	50.0	100.0
6	22.2	36.4	42.9	48.2	50.0	54.4	66.7
7	-	38.6	45.6	48.6	53.5	52.7	63.6
8	-	38.9	48.8	51.2	57.0	58.3	55.4
9	-	38.7	51.6	64.4	75.2	78.3	77.5

For the 11x11 point neighborhood used in this study, this table would be much larger (122 rows instead of 10)

Results

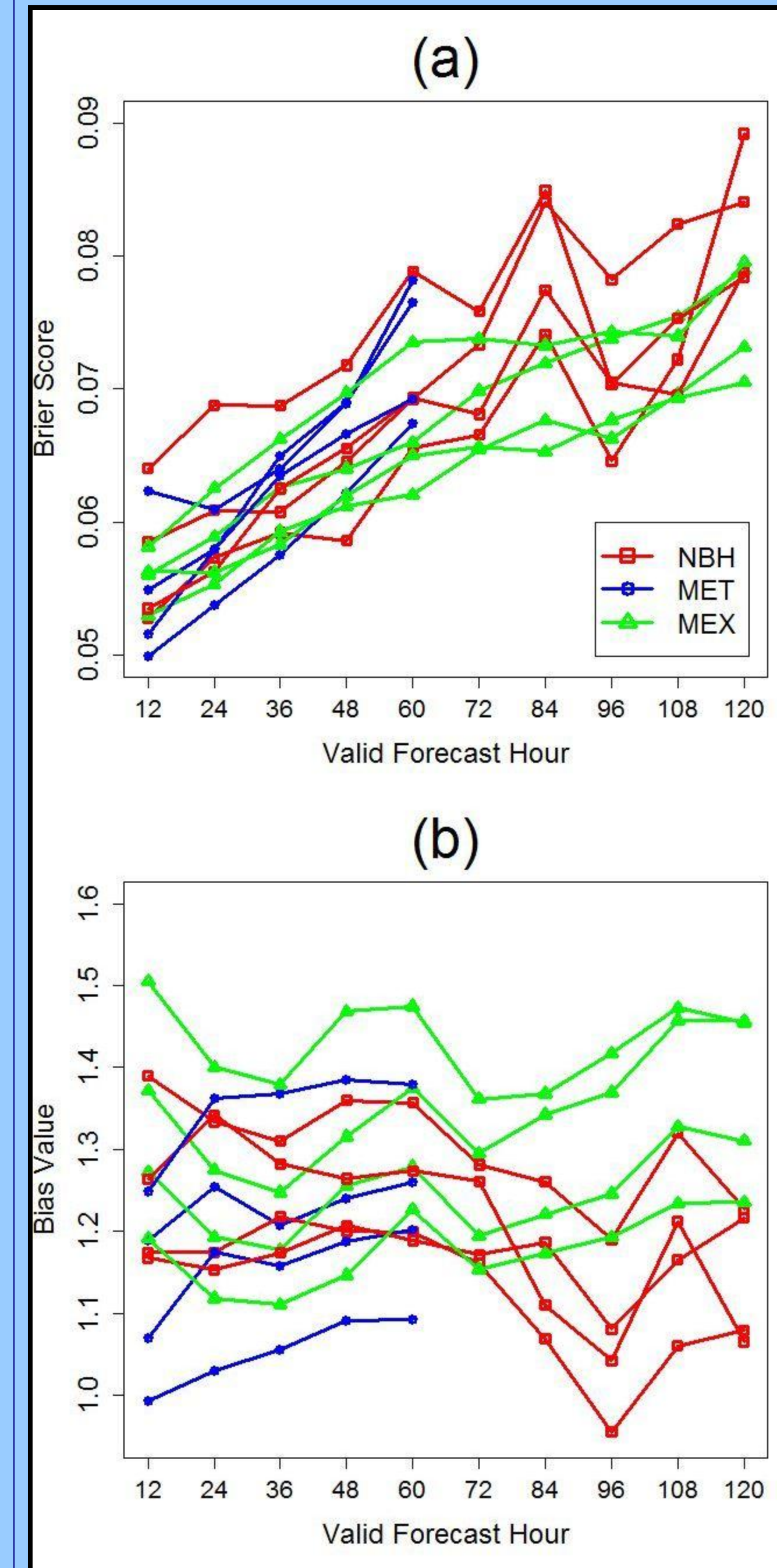


Figure 1. Brier scores (a) and bias values (b) over time for the four sites. The legend in (a) is shared with (b).

Results (cont.)

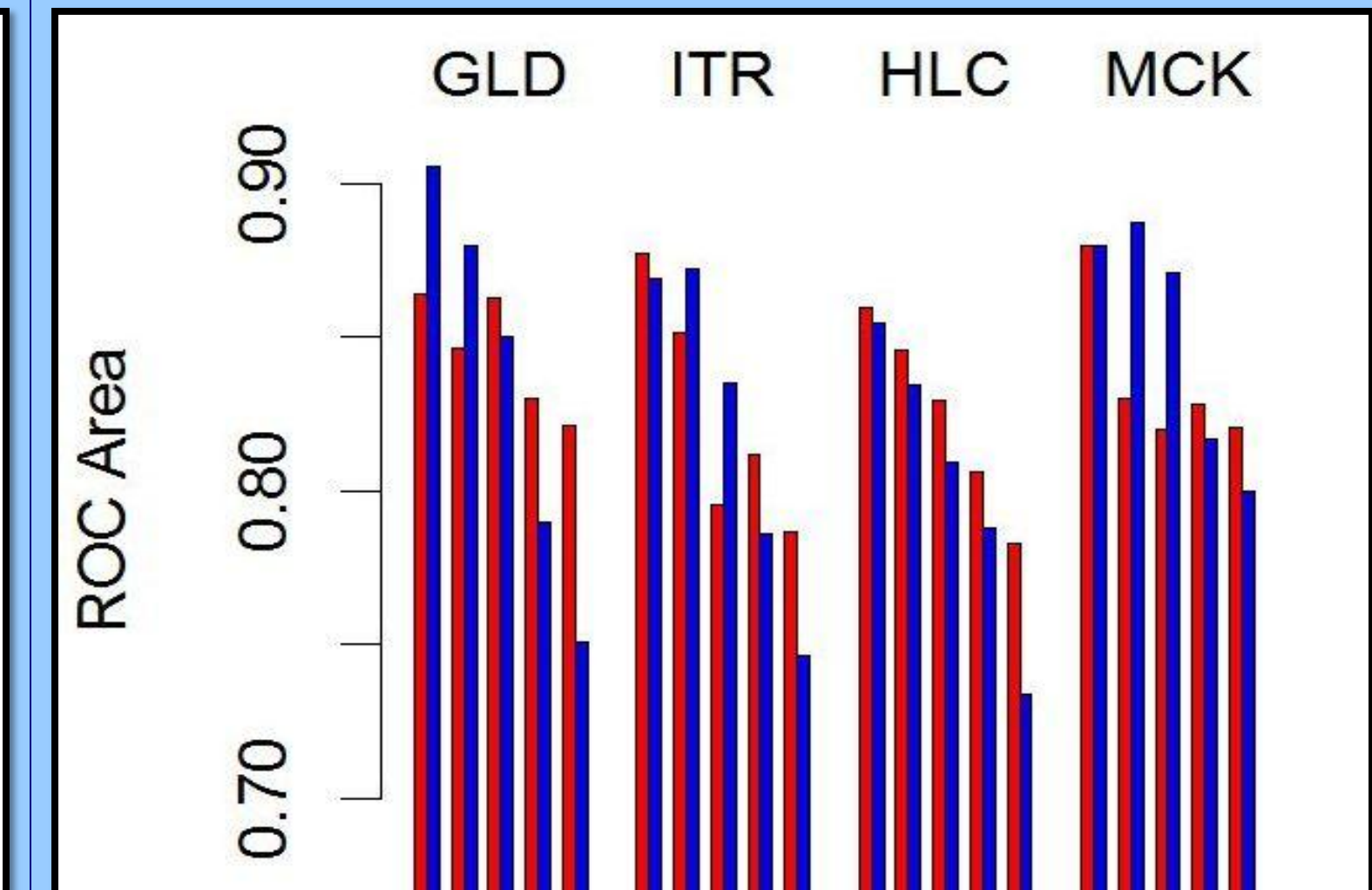


Figure 2. ROC areas for NBH (red) and MET (blue) at each of the four sites.

Conclusions

-NBH was competitive with NAM MOS (MET) and GFS MOS (MEX) for 12 hour time periods through 60 hours, according to Brier scores (Fig. 1a).
 -Bias values for NBH remained competitive with MOS through all time periods, suggesting that NBH's overestimates better compensated for underestimates relative to MOS (Fig. 1b).
 -NBH's ROC areas were higher (better) than those of MET for 13 of the 20 time periods (Fig. 2). MEX ROC areas (not shown) were consistently better than those of MET and NBH.