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CENTRAL REGION TECHNICAL ATTACHMENT 91-05

HOW COULD THE NGM MOS POP'S BE 90 OR 100 PERCENT
WHEN THE NGM QPF APPARENTLY CALLED FOR NO PRECIPITATION?Eli Jacks
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During this past December, two separate cases came to our attention where the above mentioned disparity occurred at DCA. We examined each case individually and concluded that the problem was the same in both cases.

Figure 1 displays the FWC and FRHT output from the NGM initialized on December 3, 1990, 0000 UTC. Note that the NGM MOS for DCA called for a 90 percent PoP for the 12-h period ending 0000 UTC on December 4, while the NGM itself forecast no precipitation to fall during that time. Figure 2 paints a similar picture for the NGM run initialized on December 17, 1200 UTC. In this case, the PoP for DCA for the 12-h period ending 1200 UTC on December 18 was 100 percent with no precipitation forecast through the 42-h projection.

Here's the problem. Both the graphical output depicting forecast precipitation amount and the FRHT message that the forecaster sees are obtained from the NGM "C" grid. However, the MOS forecast program is constrained to use precipitation forecasts that are interpolated to the coarser LFM grid. Thus, even though the same model is used, there can be subtle, but important, geographical differences in the placement of forecast precipitation boundaries due to the method of interpolation. In fact, precipitation displayed on the LFM grid tends to have a greater areal extent and lesser maxima than that displayed on the "C" grid. It turns out that these differences were responsible for the observed disparities.

For a clearer picture of what happened, refer to Figures 3 and 4. Here, the NGM forecasts of the 12-h precipitation amount ending 24 hours after initialization for the December 3 and December 17 cases, respectively, are graphically displayed. Note that these precipitation amount forecasts were important predictors in the NGM MOS equations that produced the PoP forecasts in question. In the top portion of Figures 3 and 4, the NGM precipitation amount forecasts on the "C" grid are shown, while the same forecasts interpolated to the LFM grid are shown at the bottom. Note that in each case, the precipitation boundary was forecast to lie north of DCA on the "C" grid, while the precipitation forecasts interpolated to the LFM grid and then to DCA indicate that DCA would have precipitation. We verified that this was true for each case by retrieving the actual forecast precipitation values used to produce the NGM MOS PoP forecasts. In both cases, the NGM forecast values were

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measurable and contributed towards the high PoP. For academic purposes, we'll mention that measurable precipitation verified in both cases.

While, on one hand, using NGM data from the relatively coarse LFM grid has the benefit of smoothing the NGM forecast data to some degree, there is also the potential that this type of situation will "pop up" from time to time. Certainly, it is disturbing to have seen it twice in such a short time span. While we have no particular evidence, we wonder whether any of the recent changes to the NGM played a role in how the precipitation boundaries were placed. In any event, we just wanted to bring our findings to your attention.

NMCFWCDCA
FOUS14 KWBC 030524
DCA ESC
POP/MX-MN
WIND 0310 0414 1112 1113 1514 1712 1810 3112
CLDS 0118/4 0019/4 0009/4 0009/4 0009/4 0019/4 0028/4 0226/4
90/ 50 90/ 49 90/ 50 50/ 37

NMCFRHT62
FOUEG2 KWBC 030000
OUTPUT FROM NGM 00Z DEC 03 90
TTPTR1R2R3 YVLI PSDDFF HHT1T3T5
DCA//426450 -0312 290210 40110500
06000556870 -1012 300519 40060402
12000718292 00411 300917 40030403
18000658795 01410 271317 52090402
24000749299 01705 211526 56130703
30004889499 00903 171928 59151105
36024019099 05003 131829 60151006
42064959999 07599 111920 60171106
48045019197 03203 132717 56130705

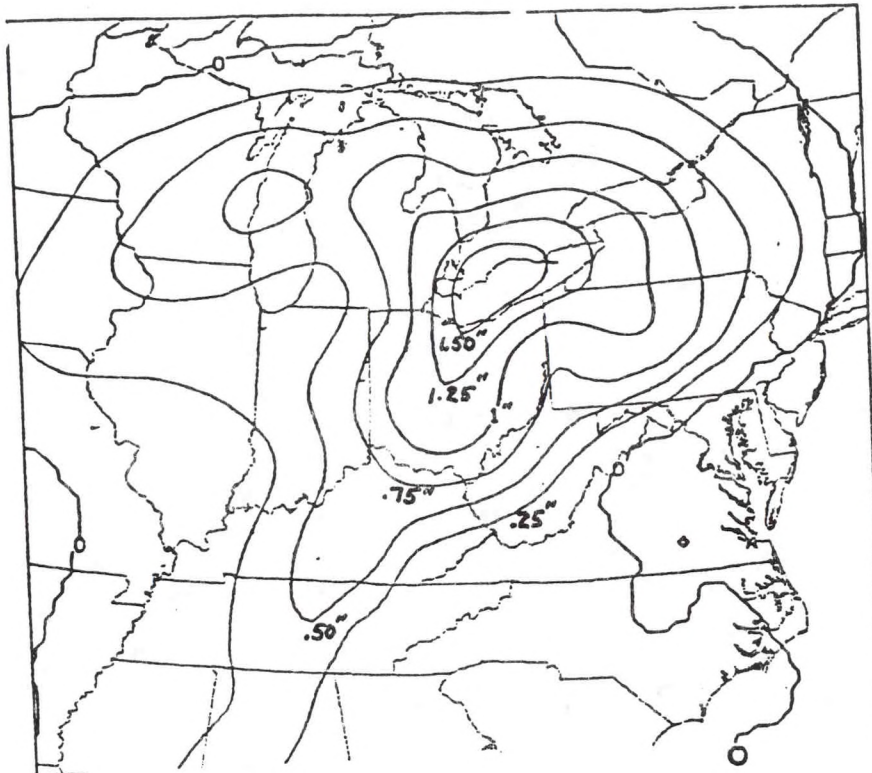
Figure 1. FWQ and FRHT output from NGM initialized 0000 UTC on 12/3/90.

NMCFWDCDA
 FOUS14 KWBC 171625
 DCA ESC
 POP/MN-MX 100 41
 WIND 1205 1608 1710 1810 1913 1913 30/ 65 70/ 51 50/ 58
 CLDS 0136/4 0119/4 0009/4 0109/4 0236/4 0325/4 0227/4 0118/4

NMCFRHT62
 FOU62 KWBC 171200
 OUTPUT FROM NGM 12Z DEC 17 90
 TTPTR1R2R3 VVLI PSDDFF HHT1T3T5
 DCA//824751 -0614 230108 47010202
 06000605472 -0714 220801 50050303
 12000598176 00100 191816 54070506
 18000719494 01602 142021 59070907
 24000868591 01102 092125 63111308
 30000787096 -02303 062122 66171309
 36000665892 00405 032130 67191110
 42000787199 02303 022129 67171111
 48003737956 -2301 042330 62191208

Figure 2. FWC and FRHT output from NGM initialized 1200 UTC on 12/17/90

(a)



(b)

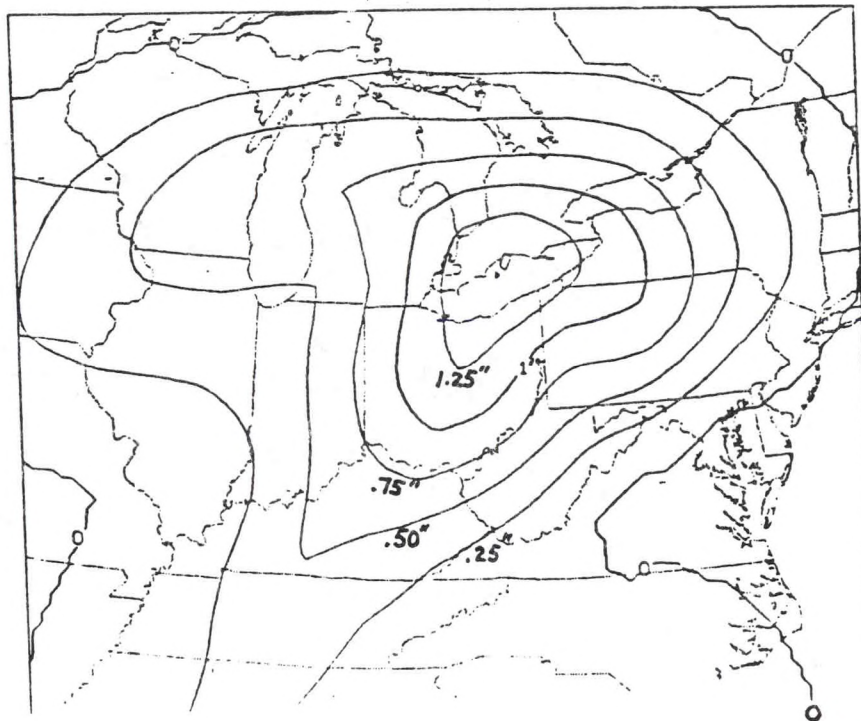


Figure 3. Forecasts of precipitation amount valid for the 12-h period ending 0000 UTC, 12/4/90 from the NGM initialized 0000 UTC, 12/3/90. The forecasts are shown as they appear on the NGM "C" grid (a) and after interpolation to the LFM grid (b).

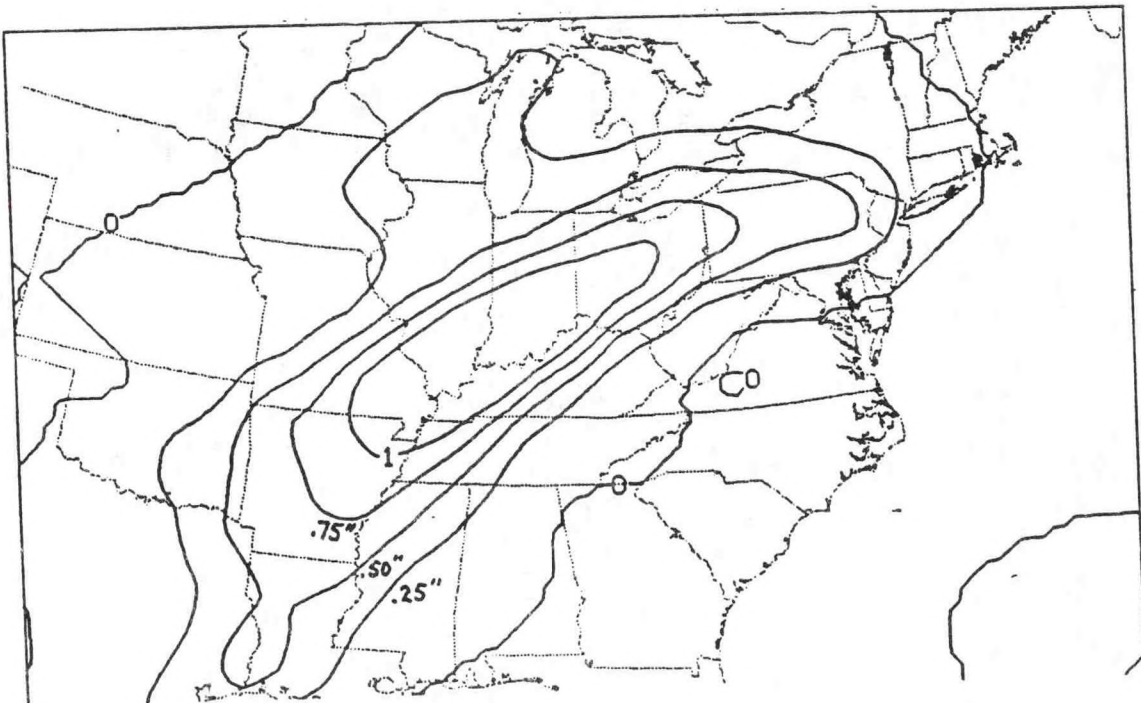
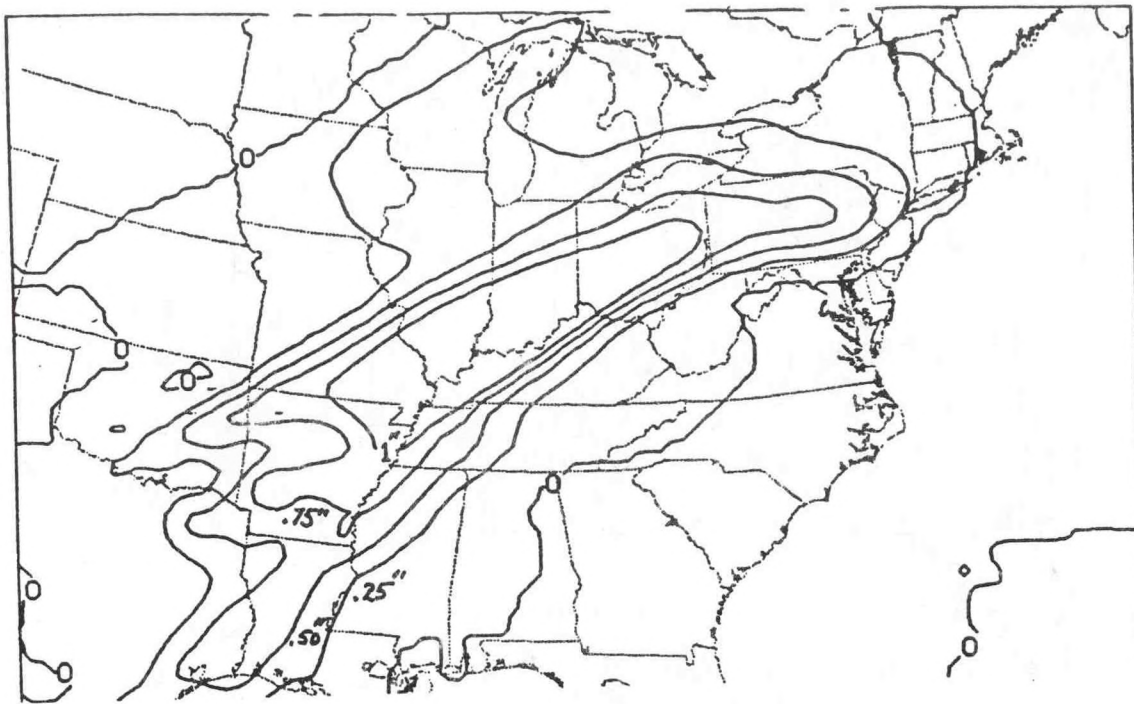


Figure 4. Forecasts of precipitation amount valid for the 12-h period ending 1200 UTC 12/18/90 from the NGM initialized 1200 UTC 12/17/90. The forecasts are shown as they appear on the NGM "C" grid (a) and after interpolation to the LFM grid (b).