IS THE MINOR PERTURBATIONS ON AN LFM
INITIAL 500 MB ANALYSIS SIGNIFICANT?

Allan V. Gustafson
WSFO Raleigh, N.C.

A 500 mb initial analysis produced by the LFM can show a minor perturbation that does not appear, or is weaker, on either the barotropic or baroclinic 500 mb analysis for the same time. If weather is associated with this disturbance, then this feature on the LFM can be accepted as correct and significant. Satellite pictures can aid considerably in this type of investigation.

Compare the 0000 GMT March 24, 1976, 500 mb initial analysis produced by the PE model (Figure 1) with that of the LFM model (Figure 2). Both models show an area of PVA over Oklahoma and eastern Texas. The LFM shows a minor vorticity maximum near the point where New Mexico, Texas and Mexico meet, with associated PVA over western Texas. The PE model shows no vorticity maximum and questionable PVA affecting this area. Is this minor perturbation on the LFM analysis real and significant?

The 0000 GMT March 24, 1976, IR satellite picture, enhanced with the "M" curve, shows a small comma-shaped cloud over western Texas, where the LFM indicates a minor perturbation with PVA ("A", Figure 3a). Radar indicated echoes with tops to 34,000 feet in this area. Obviously, something is happening there, and the forecaster must consider this. Another, larger, comma-shaped cloud is located over eastern Texas where both models show PVA ("B", Figure 3a). The subsequent movement of the two comma-shaped clouds are shown in Figures 3b, 3c, and 3d.
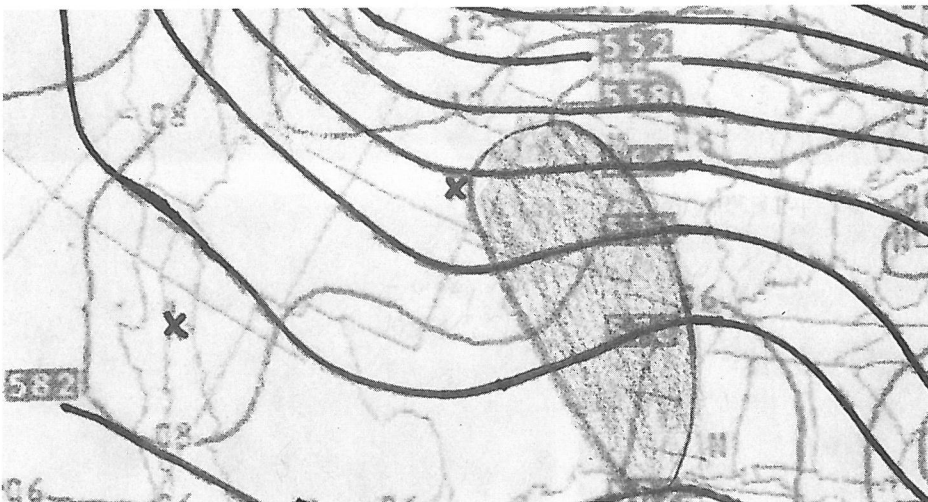

Figure 1. PE model analysis of 500 mb height and vorticity. Initial conditions 00 GMT March 24, 1976
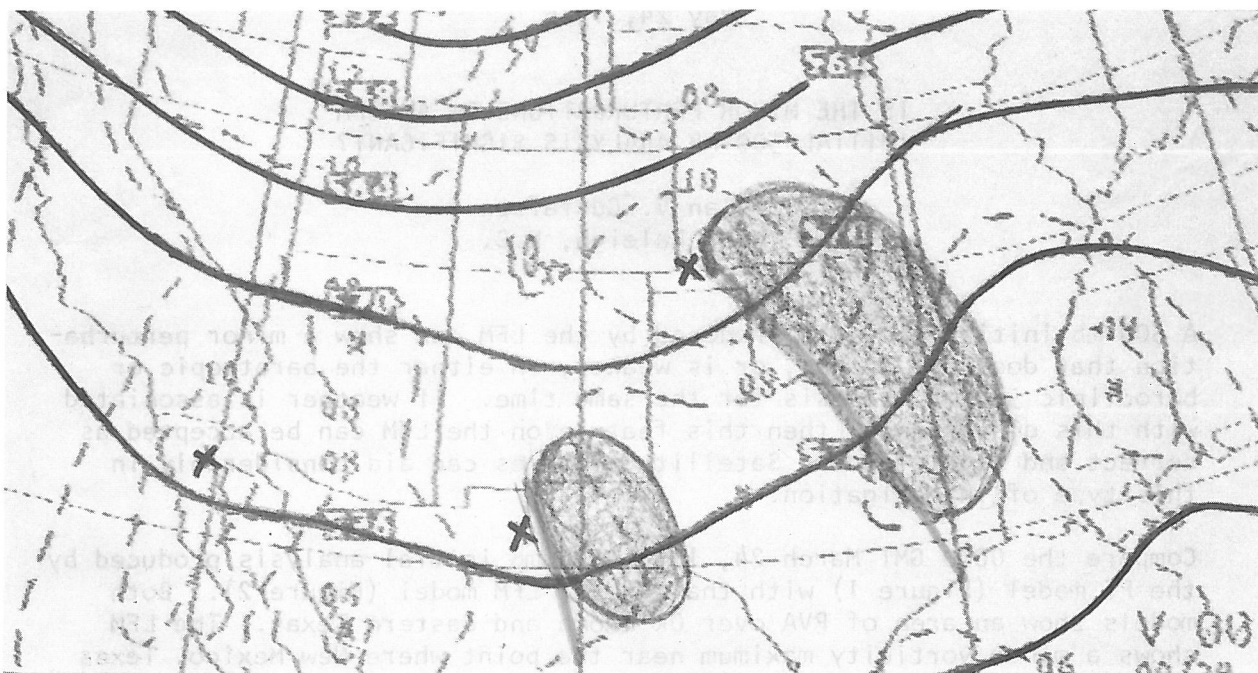
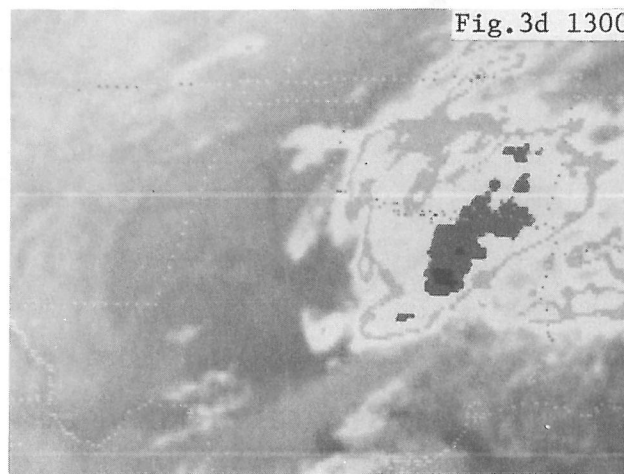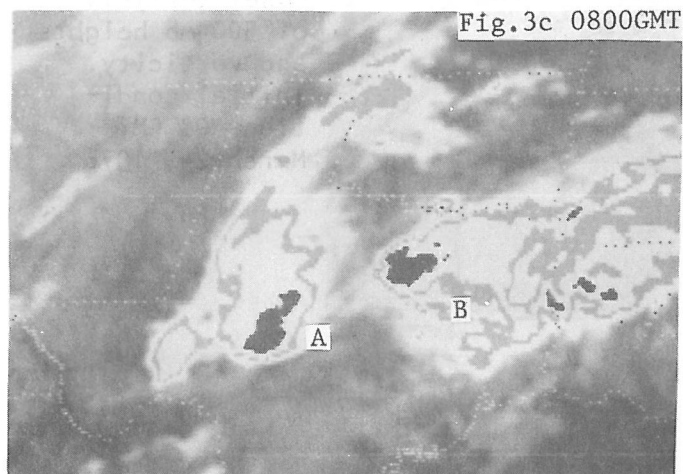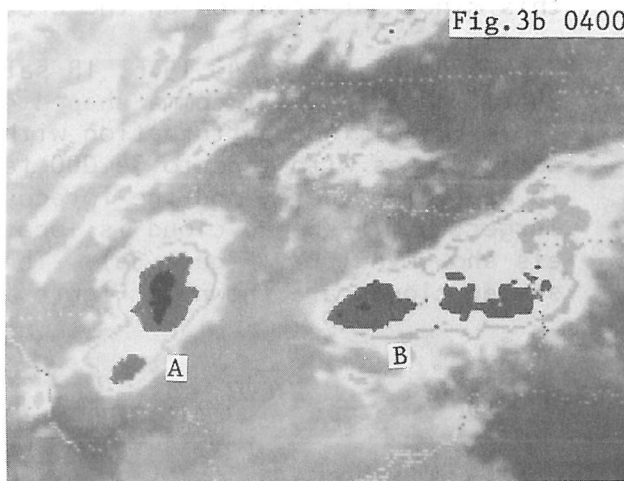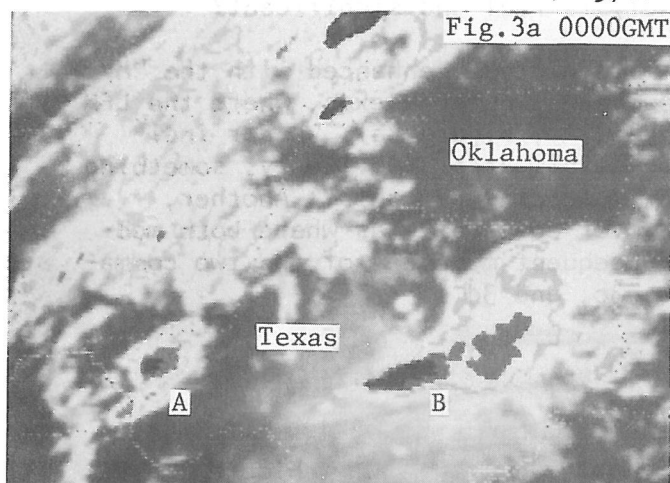Figure 2. LFM model analysis of 500 mb heights and vorticity. Initial conditions 00 GMT March 24, 1976.

Figure 3. GOES enhanced one-mile equivalent IR imagery, March 24, 1976.