SUPPLEMENTING NUMERICAL GUIDANCE WITH SATELLITE IMAGERY

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Constant and careful monitoring of satellite photos received by National Weather Service Forecast Offices can help the operational forecaster discover developing weather features which may not be evident on computer model predictions.

This short case study is an illustration of how satellite imagery can be used to supplement and/or update numerical guidance to give the forecaster a better understanding of the present synoptic situation.

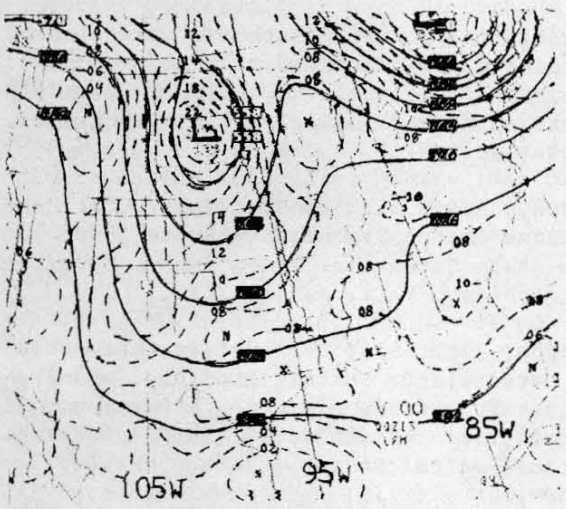

Figure 1. Initial 500mb LFM analysis for 0000 GMT 13 May 1976.

The Limited Fine Mesh (LFM) computer model analysis of the 500 millibar (mb) surface valid at 0000Z 13 May 1976 (Fig. 1) shows a weak area of vorticity centered over southern Georgia. The 12 hour LFM forecast (Fig. 2) moves this area of vorticity east-northeastward to just off the Savannah, Georgia, coast, well south of North Carolina where a weak stationary front was located (Fig. 3).

The Enhanced Infrared (EIR)[1] satellite photo from 2130Z 12 May 1976 (Fig. 4) pictured a band of multilayered cloudiness along the Gulf Coast extending northeastward into the southern half of South Carolina (E to F). By 0030Z 13 May 1976 (Fig. 5), cloudiness was gradually moving southward out of Georgia, while increasing in coastal South Carolina and southeastern North Carolina.

At 0330Z (Fig. 6), a small but definite vorticity comma-shaped cloudmass had taken shape with its head near Florence, South

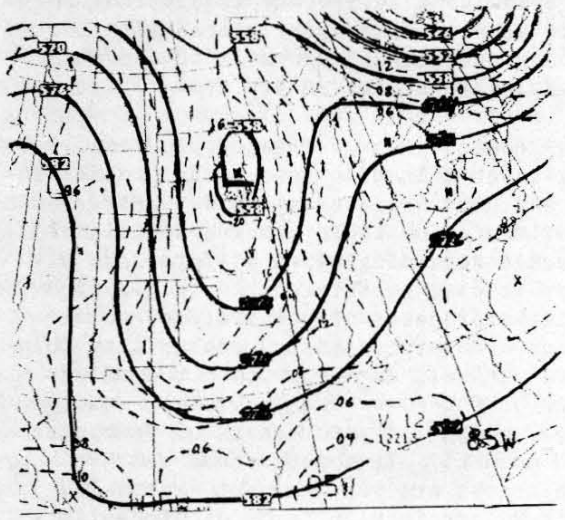

Figure 2. 12-hour LFM forecast valid 1200 GMT 13 May 1976.

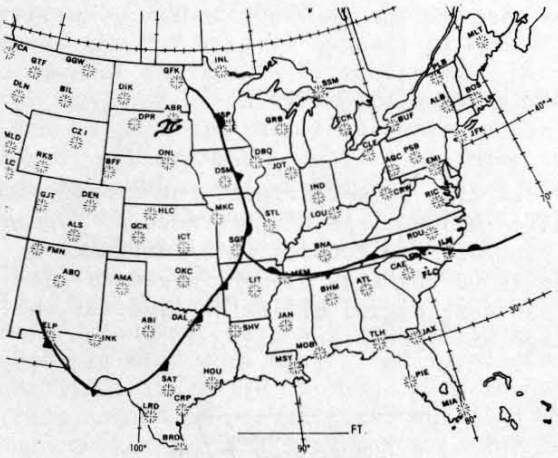

Figure 3. Surface features at 0000 GMT, 13 May 1976.

1. See Appendix for details.

Carolina (FLO). The comma cloud's tail runs through eastern South Carolina and off the Georgia coastline.

The head of the vorticity comma had moved to the vicinity of Fayetteville, North Carolina, (FAY) by 0630Z (Fig. 7). The tail of the cloud extends southward to the ocean, then dissipates.

By now it is evident that either the vorticity maximum which was forecast to pass well south of North Carolina is moving farther north and up the Carolina coast, or this is a new area of vorticity not shown on the LFM forecast.

Radar reports give evidence of the effect of the comma cloud. No precipitation echoes were reported over land by the Wilmington, North Carolina (ILM) Weather Surveillance Radar (WSR-57) until 0633Z. It was around this time that the comma cloud moved into the proximity of the stationary front in southeastern North Carolina. From 0630Z through the remainder of the night Wilmington radar reported scattered areas of heavy showers over eastern North Carolina north of the front.

It is significant to note that the small vorticity comma cloud that developed did not contain clouds cold enough (i.e., high enough) to be enhanced by the old "MB" enhancement curve. This fact implies a relatively low level area of vorticity.

Also, this should serve as an example to the operational forecaster not to let his attention be drawn away from his own area of concern by more ominous-looking weather. In this case, the low level vorticity which developed over the Carolinas pales in comparison to the thunderstorms over the western Gulf States, but produced significant weather in the Coastal Zone.

APPENDIX

The MB enhancement curve used in these IR pictures is designed to contour the temperatures found in convective clouds. Basically, cloud tops are displayed normally (progressively whiter) until the -32° temperature is reached. Then the gray shades are repeated as follows: -32° to 41°C, medium gray; -42° to -52°C, light gray; -53° to -58°C, dark gray; -59° to -62°C, black and colder than -63°C white.

Figure 4. GOES-1 Infrared (IR) data, (MB curve), 2130 GMT, 12 May 1976.

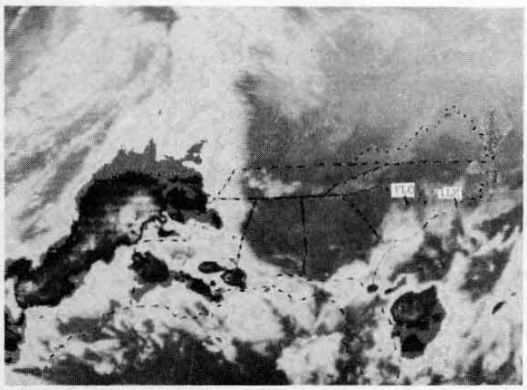

Figure 5. Same as Fig. 4, for 0030 GMT, 13 May 1976.

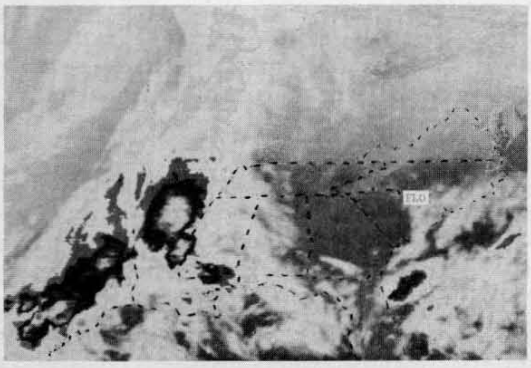

Figure 6. Same as Fig. 4, for 0330 GMT, 13 May 1976.

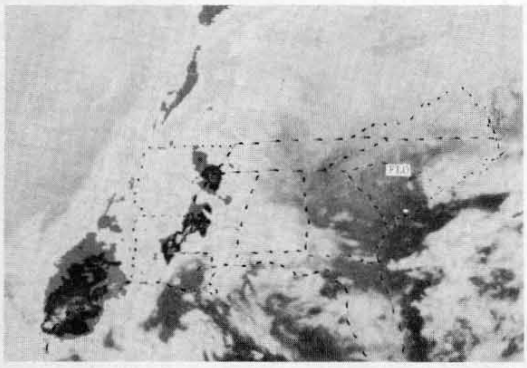

Figure 7. Same as Fig. 4, for 0630 GMT, 13 May 1976.