Western Region Technical Attachment
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INITIAL ANALYSIS: LFM OR ETA??

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Last June, the Eta model output replaced the Limited Fine Mesh (LFM) product suite on AFOS. This replacement was almost a one-for-one substitution for those products previously generated by the LFM and transmitted over AFOS. The 00-h products, or initial analyses within the ERL package, however, all continue to be produced from the LFM. For example, the 500 mb height and absolute vorticity products [50(6,7)] on AFOS were not replaced by the Eta model output, and are still generated via the LFM. The remainder of the forecast products in the ERL package are generated by the Eta model. This Technical Attachment is directed towards increasing the awareness of these initial analysis differences.

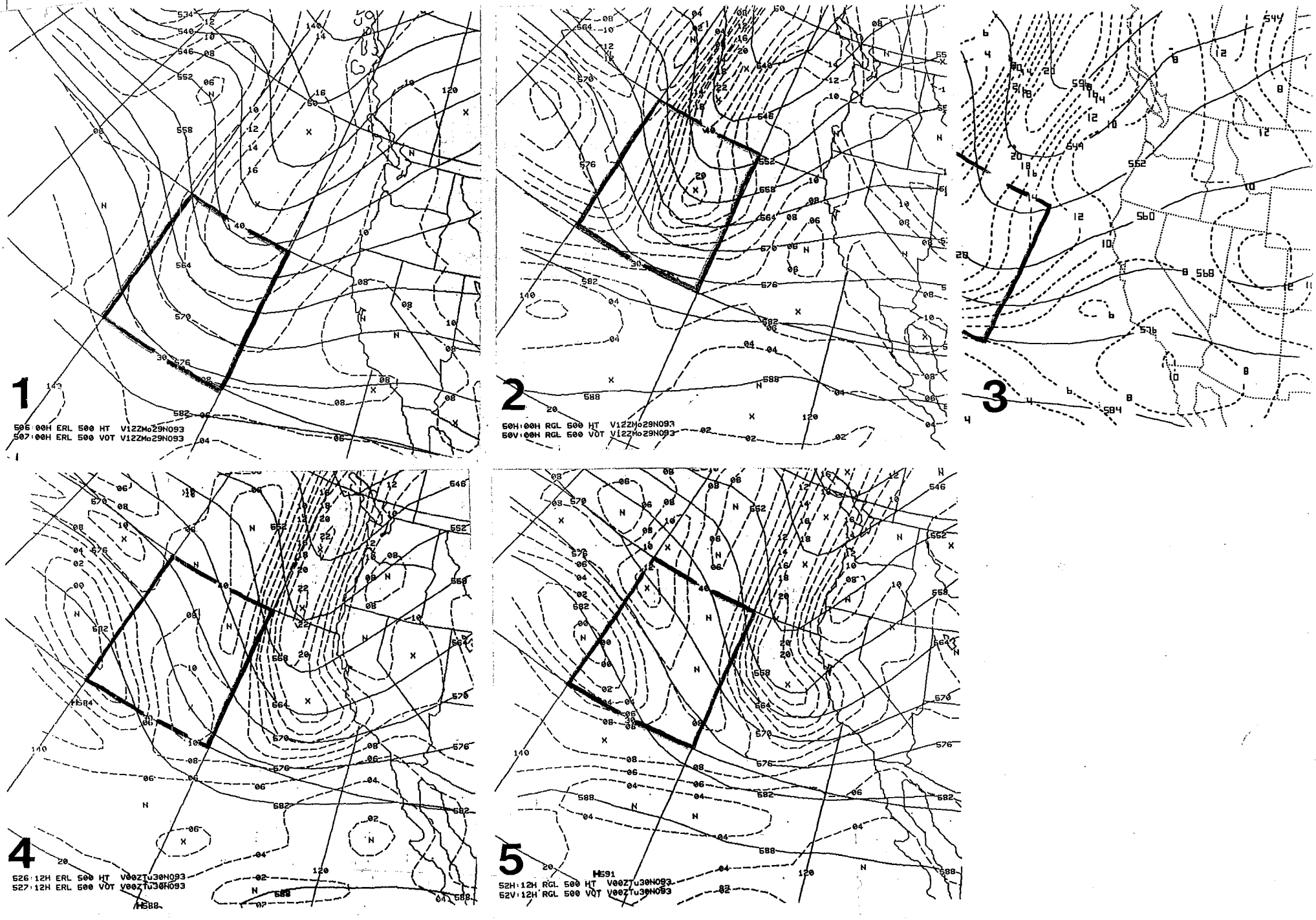
Although this incomplete substitution may not seem important, it creates the possibility of an erroneous evaluation of the model initialization. For example, the LFM horizontal resolution (190 km @ 60°N) is "large" compared to the resolution in the actual Eta model (80 km). This model gridpoint resolution difference, as well as the objective analysis (Cressman scheme), can smooth out important details such as the position or intensity of a 500 mb absolute vorticity maximum (or minimum). As an illustration, Figs. 1-3 are the 500 mb heights and absolute vorticity initial analysis fields for the LFM, NGM, and Eta model (via PCGRIDS), respectively. For this case, note the LFM vorticity field near 36°N 133°W. When compared to the 00-h Eta and NGM output, a noticeable difference appears. However, the 12-h forecasts for the Eta and NGM suggest similar placement and intensity of the vorticity maximum now located near 35°N 125°W (Figs. 4 and 5).

Evaluating the 00-h 500 mb heights and vorticity AFOS products from both the Eta model and NGM may be misleading. For example, if a forecaster evaluates and compares the initial analysis from the ERL [50(6,7)] and RGL [50(H,V)] products (Figs. 1 and 2, respectively), an inference may be made that the Eta model initialization of this particular vorticity maximum is much weaker than the NGM. This is an error, because the [50(6,7)] products are actually from the LFM! The initial analysis of the Eta model is currently only available via gridded data (i.e., PCGRIDS-Fig. 3).

The implications of not associating the [50(6,7)] product with the LFM can have forecasting repercussions. On a given shift, if the forecaster evaluates the initial 500 mb heights and vorticity panels, [50(6,7)] and [50(H,V)], and mentally associates them to the Eta and NGM models, respectively (while the former is from the LFM), the forecaster may discount the Eta model run because of a "poor" initial analysis. In reality, however, the forecaster discounted the LFM and *not* the Eta model run. In an extreme case, the forecaster may totally "throw out" a particular Eta model run due to the "poor" LFM initial fields. This actually occurred operationally for the case given here.

Currently, the best real-time evaluation of the Eta model 00-h 500 mb heights and absolute vorticity should be made using PCGRIDS or FAIS. However, the western extent of the PCGRIDS domain is 140°W@45°N, which limits the ability to assess the Eta model initial

analysis over the near-eastern Pacific Ocean (the FAIS domain is about 5° further west). With upcoming changes, including NMC modelling enhancements, this "data void" will hopefully be rectified. Until these changes are implemented (mid-1994), the ERL package distributed over AFOS will consist of the LFM initial analysis fields and the forecast fields from the Eta model.



Figures 1-5. 500 mb heights and absolute vorticity from the 1200 UTC NMC model runs 29 NOV 1993 for (1) 00-h analysis - LFM (2) 00-h analysis - NGM (3) 00-h analysis - Eta via PCGRIDS (4) 12-h forecast - Eta (5) 12-h forecast - NGM. Note: Figures 1 and 4 are both from the ERL package, however are generated via the LFM and Eta models, respectively.