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USING PROFILER DATA - A REAL WORLD EXAMPLE

SCOTT AFB IL 62225

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Steven D. Kays
National Weather Service Forecast Office
Topeka, Kansas

1. Introduction

Colorado wind profilers are providing the first look at new technology that will be with us in the weather service of the future. The basic data are available in pibal format in AFOS under key DENWPDERL. Program "WINDPRO" plots the vertical wind profile in standard upper air (pseudo) graphic format on a time versus height plot. (See Figure 1 and Figure 2 for sample plots.) Data are plotted for each hour. The most recent profile is presented on the far left with each preceding hour (to eight hours) successively to the right. A map of the Colorado profiler sites is presented as Figure 3.

2. Real World Example

Computer problems at NMC precluded WSFO Topeka from receiving a complete and timely receipt of all the evening models during the mid-shift on June 1, 1988. LFM/MOS guidance was available but NCM guidance was generally unavailable. MRF output was available to 36 hours only. It is difficult to make any reasonable comparison of models or forecast by a model of the day concept under such circumstances. In this real life situation, profilers provided a bit of help.

With a good negatively tilted trough approaching Kansas (Figure 4), the main forecast problem was one of timing and extent of precipitation over the state. What little NCM guidance was available forecast a 700 mb trough over far western Kansas by 12Z (not shown). As seen in Figure 5, the MRF continued to position the trough at 500 mb near DEN at 12Z. However, the Stapleton profiler (Figure 2) shows north-northwesterly winds at 500 mb as early as 05Z. Flagler data (Figure 1) indicate the 500 mb trough, or perhaps closed low, passed at 06Z. By 08Z (the last data that would be available for use before forecast transmission), the Flagler profile shows the trough to the east or northeast, thus discrediting the slow movement of the MRF.

The 500 mb 12-hour verifying conditions are presented in Figure 6. SWIS was available during this time but clouds were dissipating rapidly in the vicinity of the upper low as the early morning passed making positioning of the upper trough by satellite alone difficult. A few thunderstorms were indicated by



Limón radar along the Colorado border southwest of Goodland from around 05Z to 08Z. However, by forecast time only a few light rain showers remained over eastern Colorado.

One note of caution: The 95 knot wind at FLGLR on the 09Z profile for around 650 mb or around 12,000 feet MSL is obviously in error. Although thunderstorms had occurred earlier in eastern Colorado, none were present near FLGLR at this time. It must be assumed that some electromagnetic interference caused this anomaly. Such errors do slip through the quality control algorithms occasionally. However, they are usually quite glaring and can be easily discounted.

3. Conclusion

Profiler data will not always imply the exact direction to go with the forecast. However, by this simple example, it is shown the profiler data can be helpful in eliminating numerical guidance that is not conforming to the "real world."

Acknowledgement

I wish to thank Dr. Richard McNulty, DMIC at WSFO Topeka, for his helpful suggestions and critique of this technical attachment.

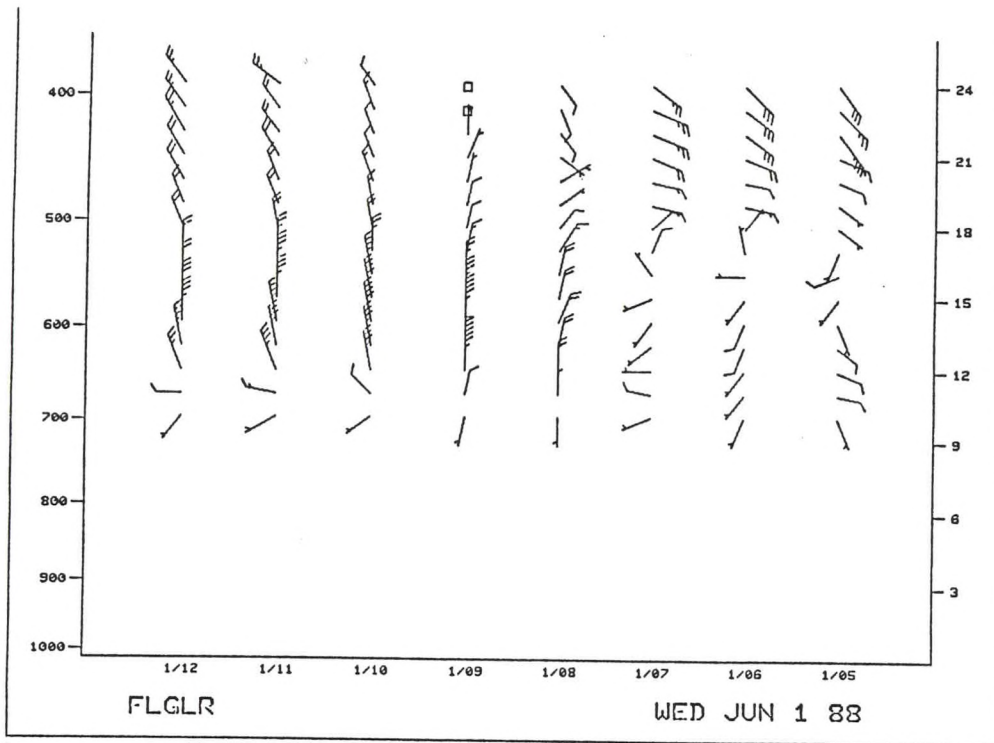


Fig. 1. Flagler profile.

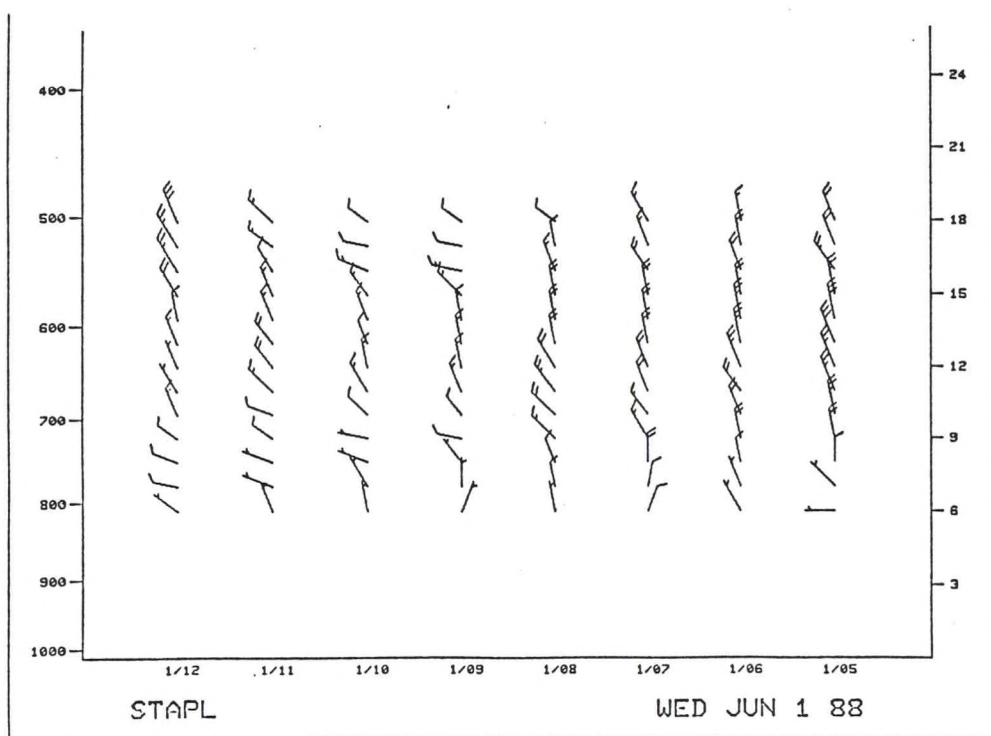


Fig. 2. Denver Stapleton profile.

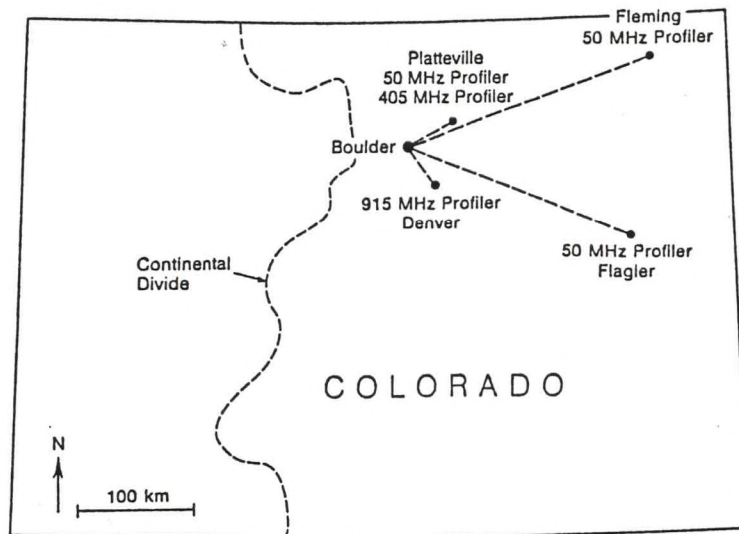


Fig. 3. Map of Colorado wind profiler sites.

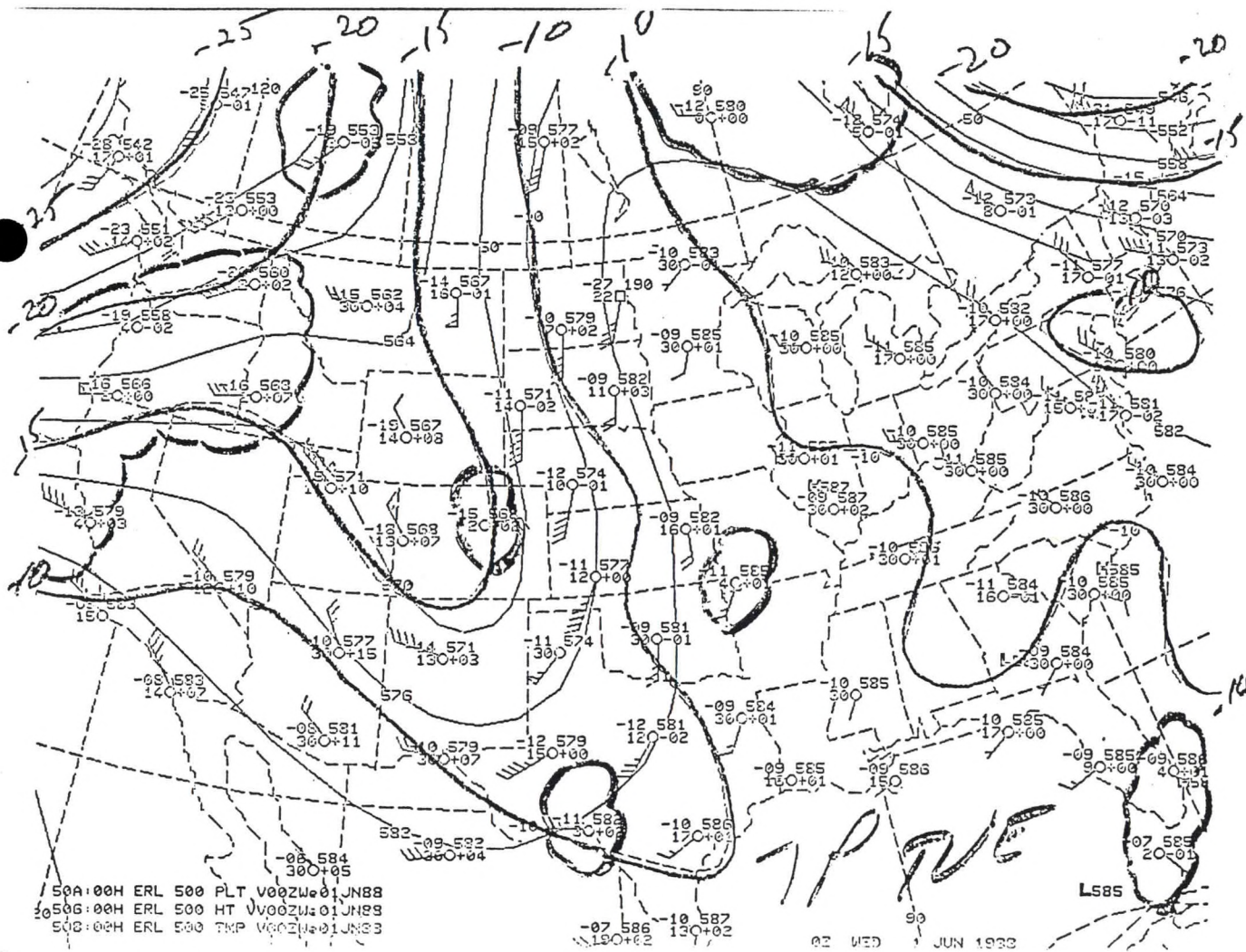


Fig. 4. 500 mb Data for 00Z, Wednesday, June 1, 1988.

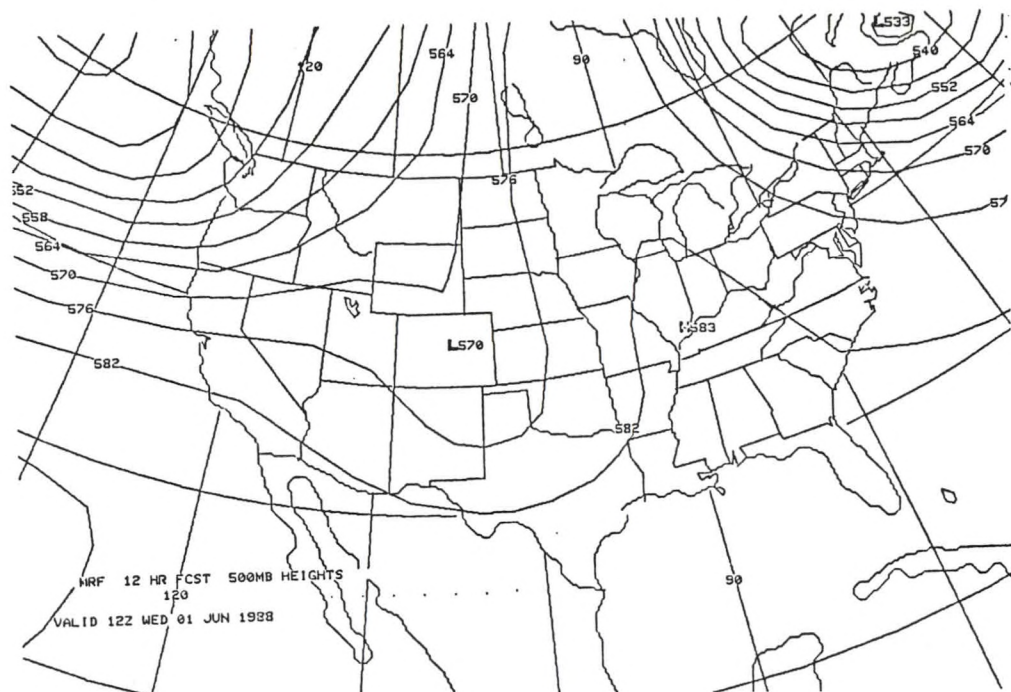


Fig. 5. 12-Hour MRF forecast valid at 12Z, Wednesday, June 1, 1988.

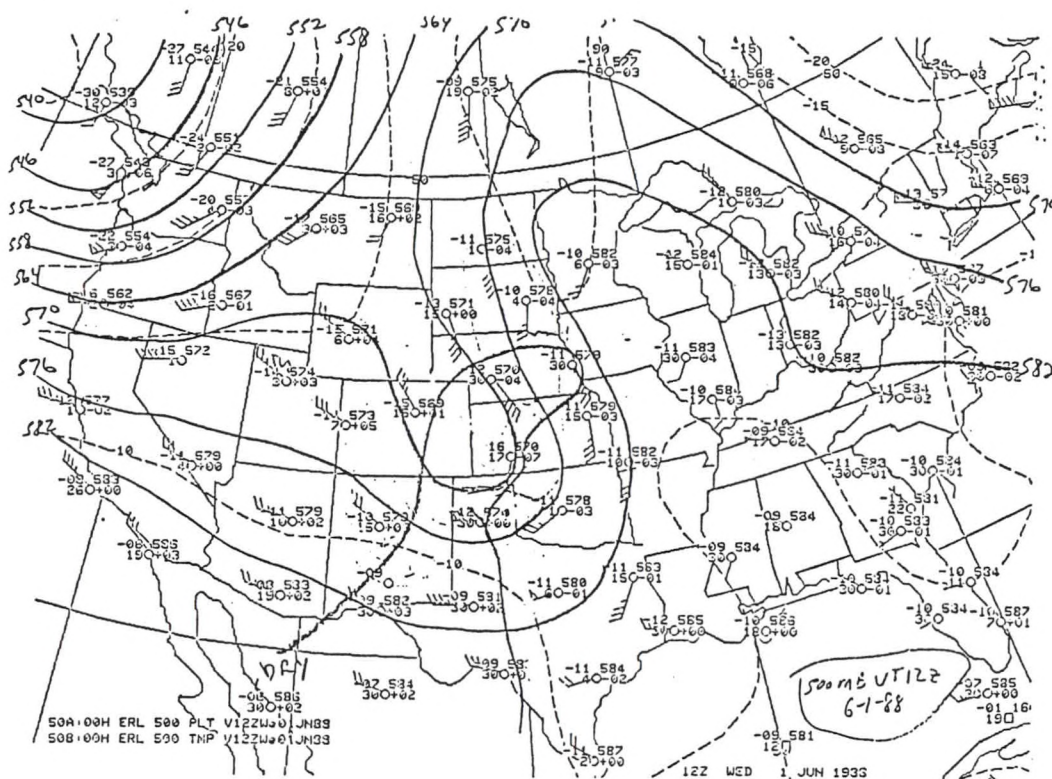


Fig. 6. 500 mb Verifying data for 12Z, Wednesday, June 1, 1988.