9.1.3 ARCHIVAL OF POKER FLAT MST RADAR DATA

A. C. Riddle

Cooperative Institute for Research in the Environmental Sciences
University of Colorado
Boulder, CO 80309

B. B. Balsley and K. S. Gage

Aeronomy Laboratory
National Oceanic and Atmospheric Administration
Boulder, CO 80303

The Poker Flat MST radar has operated almost continually from early 1979 to early 1985. The data recorded during that time resides on some 1100 magnetic tapes. A second (compressed) data set containing only the derived parameters of velocity, width and signal to noise of the primary echo at each height, plus the noise on each spectra, occupies another 250 tapes. While the processing to generate the compressed data set does correct some known errors (such as incorrectly recorded dates or records taken when the transmitters were off) no attempt has been made to identify or remove spurious echoes. When the data are analyzed at the Aeronomy Laboratory, we have programs which can remove many types of spurious data and the knowledge to avoid analysis of data for which the problems cannot currently be rectified.

However, other users of the data set, a rapidly increasing group, do not have the advantage of insider knowledge or availability of programs to help them sort out the good data from the bad. Because the Poker Flat data set is such a unique and valuable resource, we are proposing to archive the data in forms more useful for analysis.

The archived data set would contain only the parameters for significant echoes with contamination from airplanes, unwanted ionospheric returns, frequency aliased Doppler signals and other sources removed. An example of the improvement already achievable is shown by comparisons between Figures 1 and 2. Figure 1 is a contaminated data set plotted with a program which removes only a few of the more easily detected contaminants. Figure 2 shows the same data plotted with a program having a more advanced contamination elimination facility. The improvement in reducing contamination while selecting more significant echoes is obvious. The archived set should be as good or better than that shown in Figure 2 and may occupy only 25-50 tapes.

For many users, data at time intervals of an order of one minute is not required. For their purposes, average data at half or one hour intervals would suffice. Data in that form will also be archived and the total data set may fit on only 1 or 2 tapes.

The archived tapes, together with documentation, will be available through the National Center for Atmospheric Research. From the persons at this meeting, or reading this paper, we solicit suggestions as to format for the archived data and preferred intervals for time averaged data. Testing of procedures to produce the archive quality data will commence soon and the complete data set is expected to be available within 2 to 3 years.

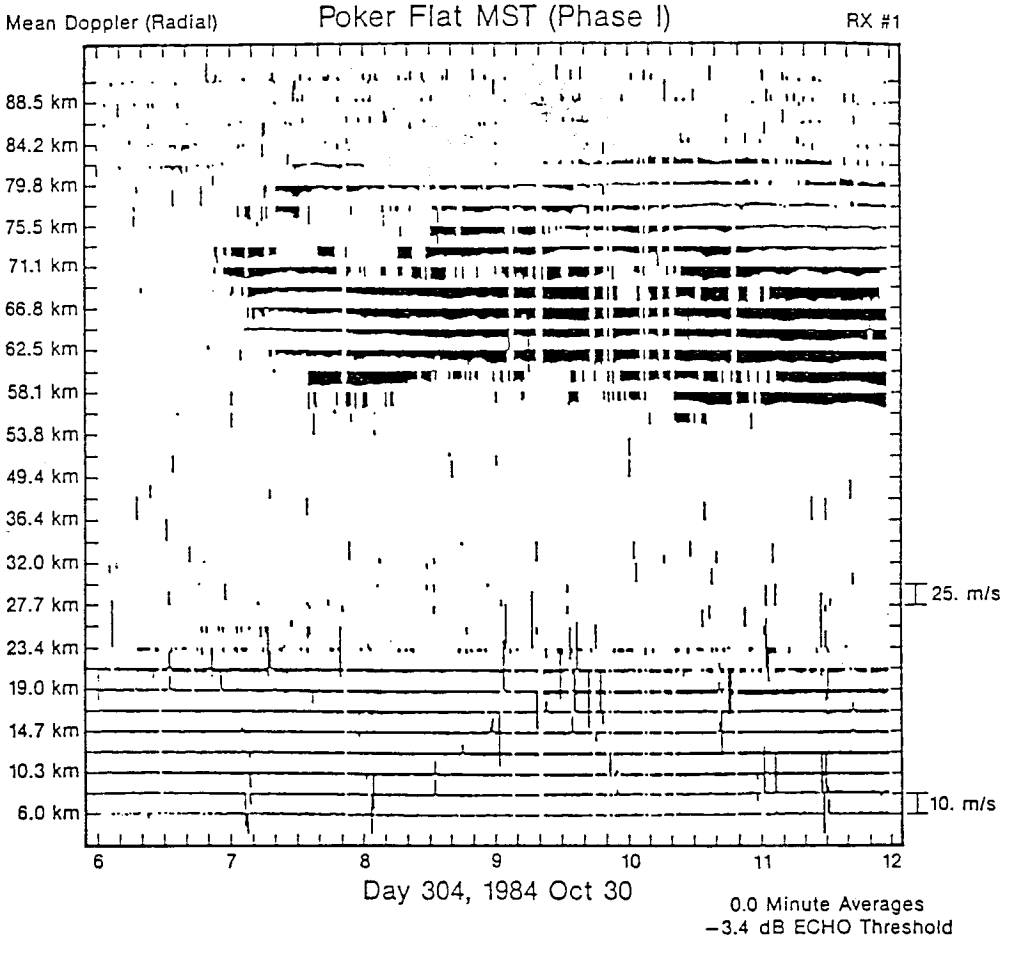

Figure 1. A fairly typical sample of Doppler velocities observed on Day 304, October 30, 1984, plotted by the "quick-look" program. Large contaminating velocities caused by airplanes, etc. can be seen at lower altitudes. Sporadic echoes above 80 km are due to meteors.

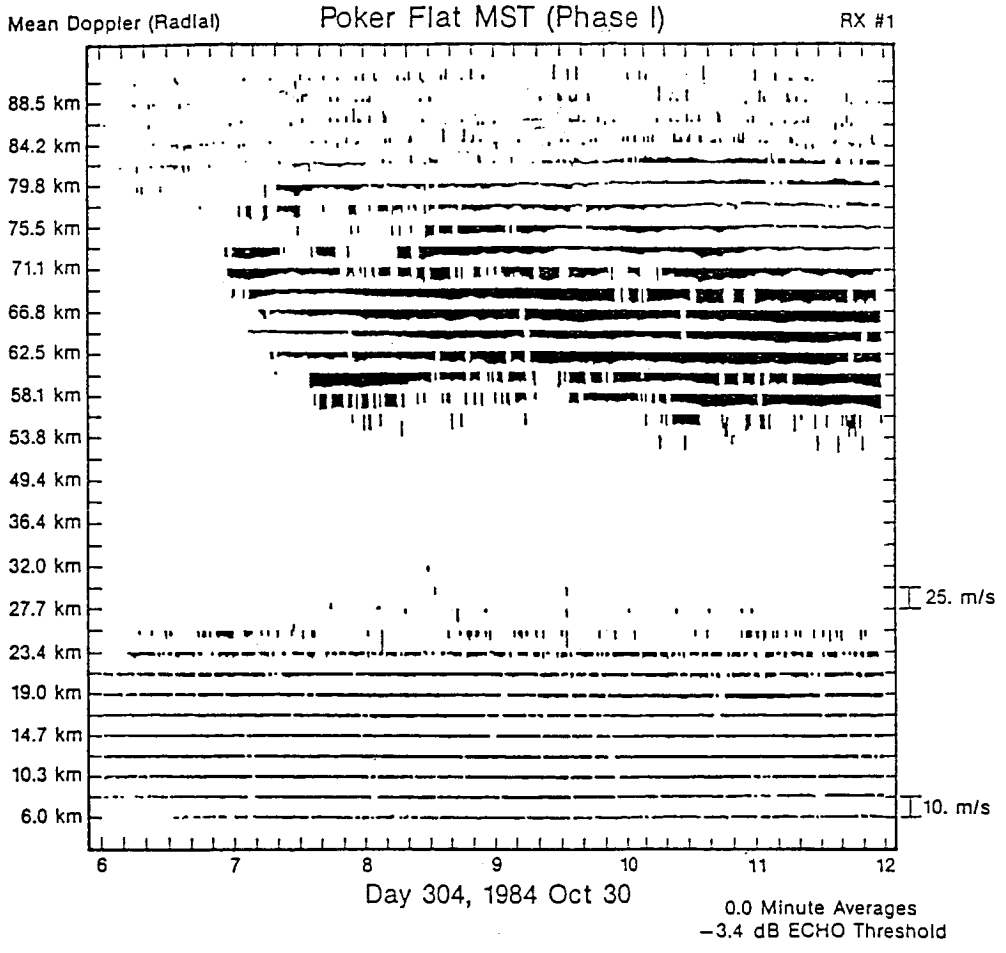

Figure 2. The same data set as Figure 1 subjected to some quality control. Data at adjacent heights and times were compared to obtain consensus. Airplane associated noise spikes have been removed and the data are now noticeably cleaner. In addition, the effective threshold signal-to-noise ratio is lower, which yields considerably more usable data at 23.4 km. In the mesosphere, the data quality and quantity is also improved. Other forms of interference remain. To eliminate these, more sophisticated quality-control strategies need to be developed.