

6.6 COLORADO WIND PROFILERS

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The Wave Propagation Laboratory (WPL) has operated a network of wind profiling radars in Colorado for several years. The current configuration of this network is shown in Figure 1. The 50-MHz profilers at Fleming and Flagler are two-beam systems with 50 m x 50 m collinear-coaxial antenna arrays that are phased to generate pointing angles 15 degrees off zenith toward the north and east. An identical system was installed near Norman, OK in May, 1985. The 915-MHz radar at Denver is a three-beam system. In addition to the same pointing angles that the 50-MHz systems have, this radar has a zenith-pointing position to correct for the effects of vertical velocity on the data obtained with off zenith pointing, particularly in stratiform precipitation. This antenna is an offset paraboloid with three offset feeds. The 50-MHz system at Platteville is also a three-beam system (with the same pointing positions as the 915-MHz system) with 100 m x 100 m collinear-coaxial antenna arrays. The 405-MHz profiler is a two-beam system; the antenna is a phased array with Yagi-Uda elements. The 405-MHz radar started operating in January, 1985. All radars operate continuously and unattended to supply hourly-averaged wind profiles to a central computer in Boulder in real time. A complete description of the radars and their data processing is given by STRAUCH et al. (1984).

During the past year several hardware and software changes have been made to improve reliability. Lightning protection was added on the primary power at the input to the equipment housing and lightning protection (surge suppression) was placed on the telephone lines and computer-telephone data lines. An annoying problem of restart after extended power fail was solved by adding a remote computer reset; previously, the on-site computer had to be reset manually after some power fail events.

We plan to continue to operate this research network to provide wind profiles for operational (NWS and FAA) and research meteorologists and to continue to evaluate the performance of various wavelength systems. Some of the changes that are planned are as follows:

1. The 405-MHz radar will be replaced with a more sensitive radar whose characteristics approximate those of a planned 30-station network to be installed in the central US late in this decade. The antenna will have 5-beam pointing positions.
2. The 50-MHz off-zenith pointing antennas at Platteville will be replaced and a switching system will be added so that four beam-pointing positions will be available.
3. We are studying what hardware changes would be needed to add a high resolution (chirp pulse) mode to the 915-MHz radar. This mode would be used to examine the reflectivity structure of radar scattering at 4- to 10-km altitude with 15-m resolution.
4. A collinear-coaxial element will be evaluated at 405 MHz. If the characteristics are suitable a full antenna array will be built.
5. A transportable 405-MHz system with a fully steerable 6-m diameter antenna is being considered. One of the uses of such a system would be to calibrate fixed beam systems.
6. The Denver and Platteville data are sent to the central computer on dedicated telephone lines; the other sites use dial-up transmission. The data handling will be modified so that Doppler spectra or spectral moments can be transmitted on the dedicated lines and archived by the central computer.

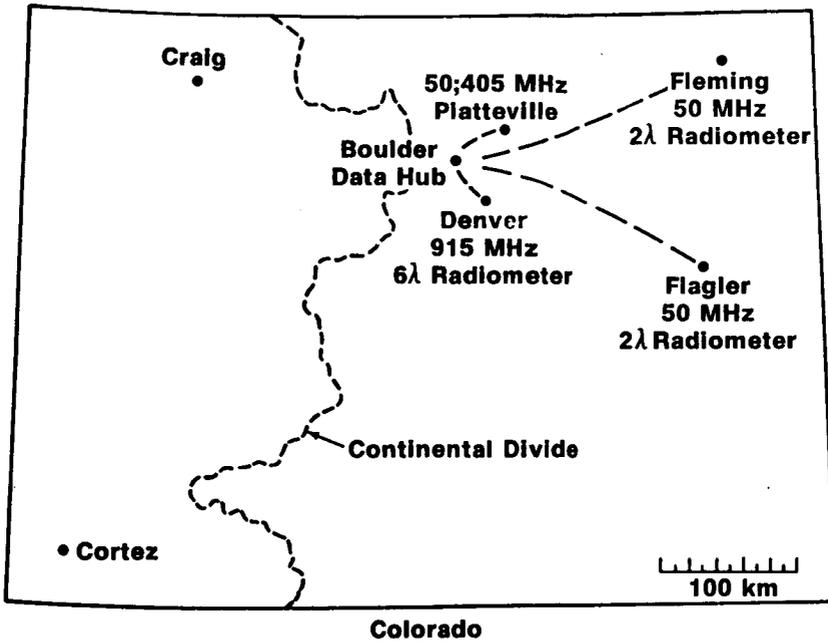


Figure 1. The Colorado wind profiling network.

REFERENCE

- Strauch, R. G., D. A. Merritt, K. P. Moran, K. B. Earnshaw, and D. van de Kamp (1984), The Colorado wind profiling network, J. Atmos. Oceanic Tech., 1, 37-49.