

MP-3000A Sounding Accuracy

Observations by balloon-borne sensors (radiosondes) are widely used to characterize local atmospheric conditions for a variety of applications. However, local atmospheric conditions often change dramatically on time scales much shorter than typical 12-hr radiosonde sounding intervals. Therefore, more continuous upper air observations are needed for applications including air quality, plume dispersion modeling and local weather prediction¹. The MP-3000A microwave radiometer profiler provides continuous upper air temperature and humidity soundings to 10-km height with radiosonde equivalent observation accuracy², and liquid soundings.

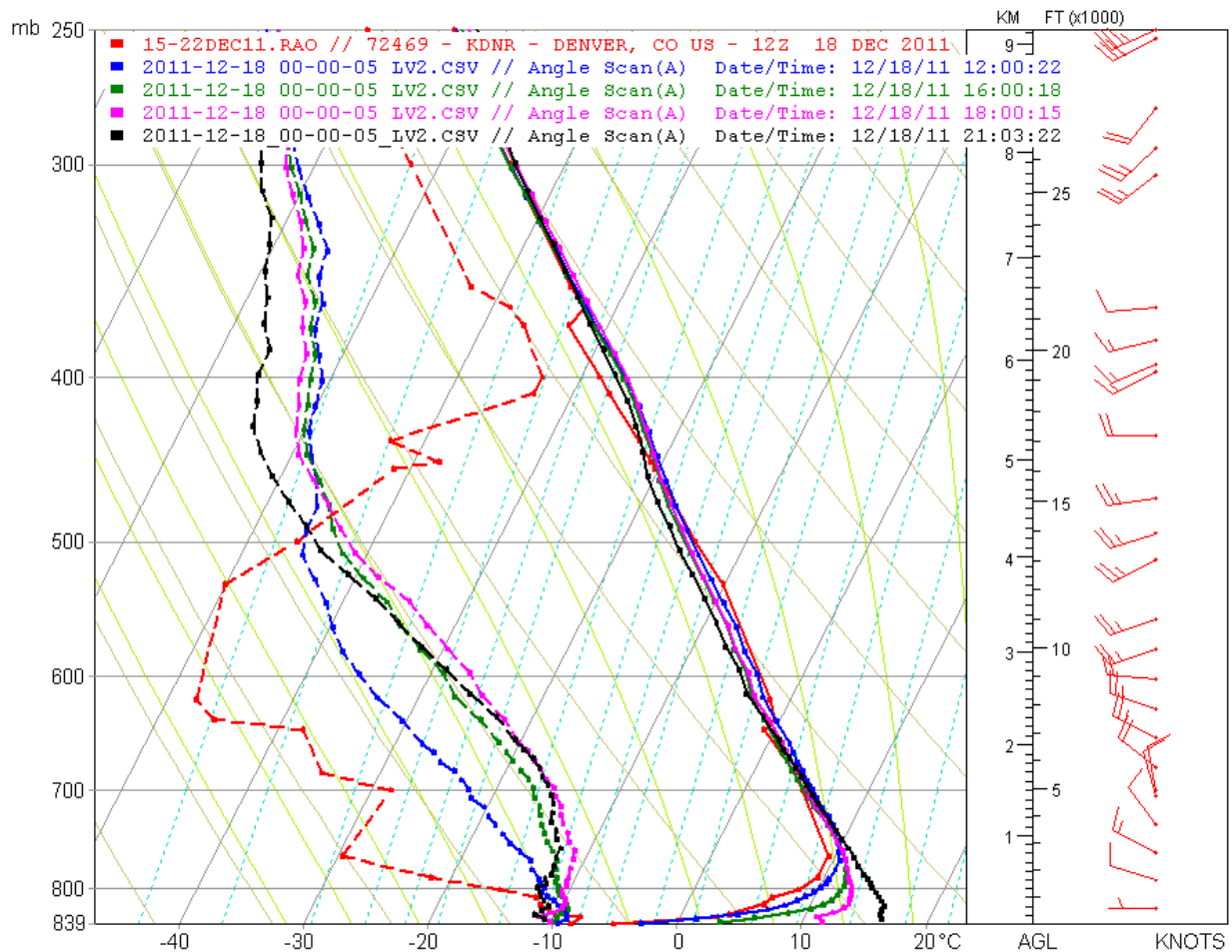


Figure 1. Simultaneous NWS radiosonde (red) and radiometer (blue) and sequential radiometer (green, pink, black) soundings showing stable to unstable transition.³

The U.S. National Weather Service operates a Radiometrics MP-3000A at its radiosonde launch site in Denver, Colorado. The radiometer uses off-zenith

¹ National Academy of Sciences, 2008.

² RDX TechNote: [Radiosonde Observation Accuracy](#).

³ RAOB software: www.raob.com

observations for optimum all-weather and boundary layer temperature retrieval accuracy⁴. Example radiosonde and radiometer soundings at Denver, Colorado (USA) are shown in Figure 1; average statistics from hundreds of NWS radiosonde-radiometer comparisons at Denver are listed in Table 1.

Height (km)	Temperature (C)	Vapor Density (g/m ³)
0.1	0.2 ⁵	0.5
0.8	0.3	0.5
10	0.9	0.5

Table 1. Radiometer - radiosonde difference statistics (standard deviation).

In general, the MP-3000A provides continuous upper air temperature and humidity soundings with radiosonde equivalent observation accuracy, during all weather conditions. Liquid soundings are also provided which are closely linked to local precipitation and stability. Stability and moisture measurements are valuable for a variety of applications including air quality, plume dispersion, wind energy, utility load forecasting and airport weather.

References

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⁴ Cimini et al, 2011; Ware et al, 2013.

⁵ Friedrich et al, 2012.