

WISP04

- Based at NCAR's Marshall site and ETL's Erie-1 site
- In situ measurements: UND Citation aloft, video disdrometer at the surface
- Marshall
 - SPolKa
 - 3 Radiometrics radiometers: 1101 (dual-channel), 3000 (12-channel profiling) and 89/150 GHz
 - Mobile GLASS

WISP04 Marshall Site



A comparison of remote and in situ measurements

■ Remote sensors

- NCAR K_a-band (0.86 mm) radar
- ETL's Radiometrics dual-channel radiometer
- Derive liquid water content (LWC) and radar estimated size (RES)

■ In situ

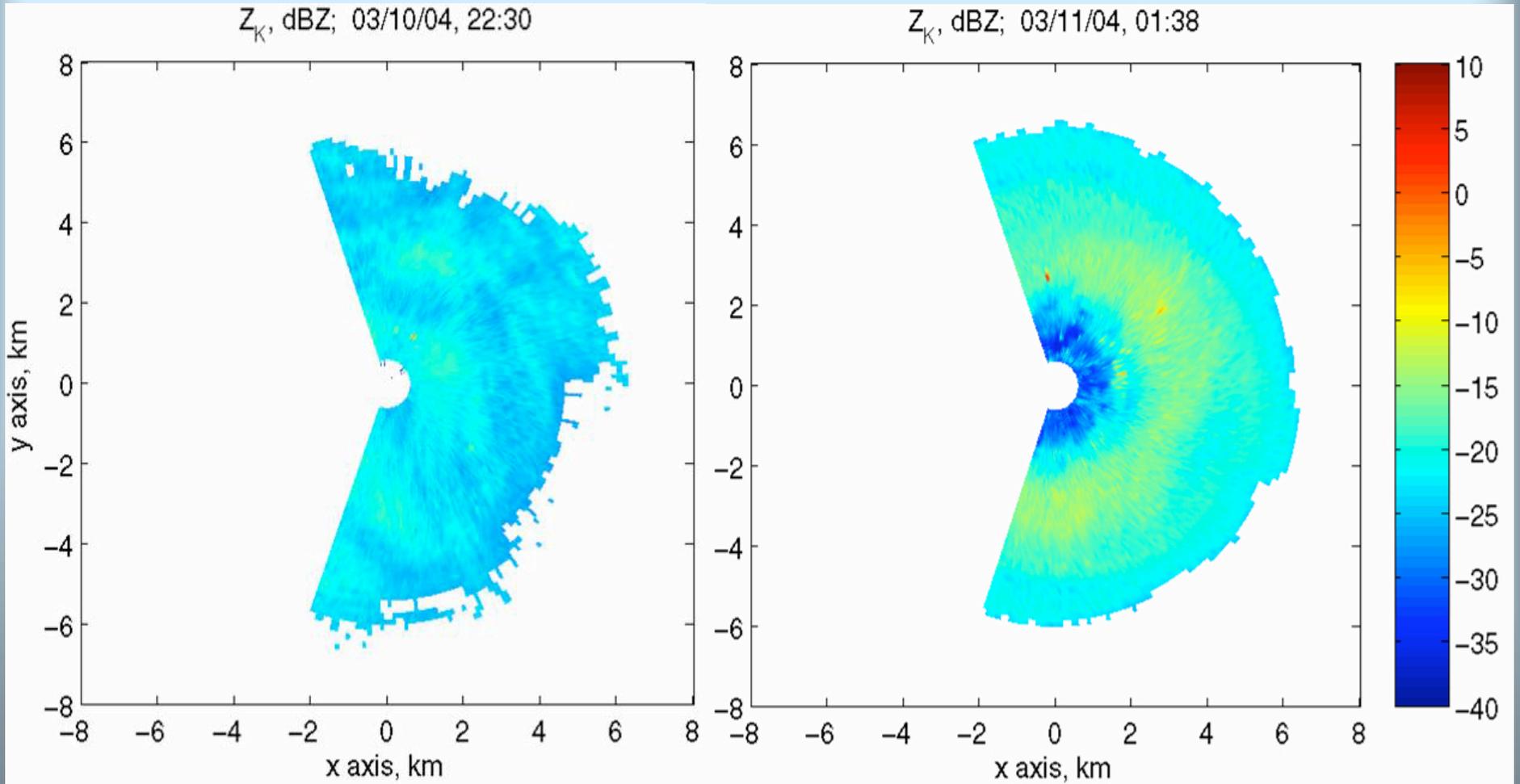
- UND Citation research aircraft
- Measures LWC (CSIRO probe) and drop size distribution (FSSP)
- Flew track between BJC and GXY

10 March 2004: Forecast Update

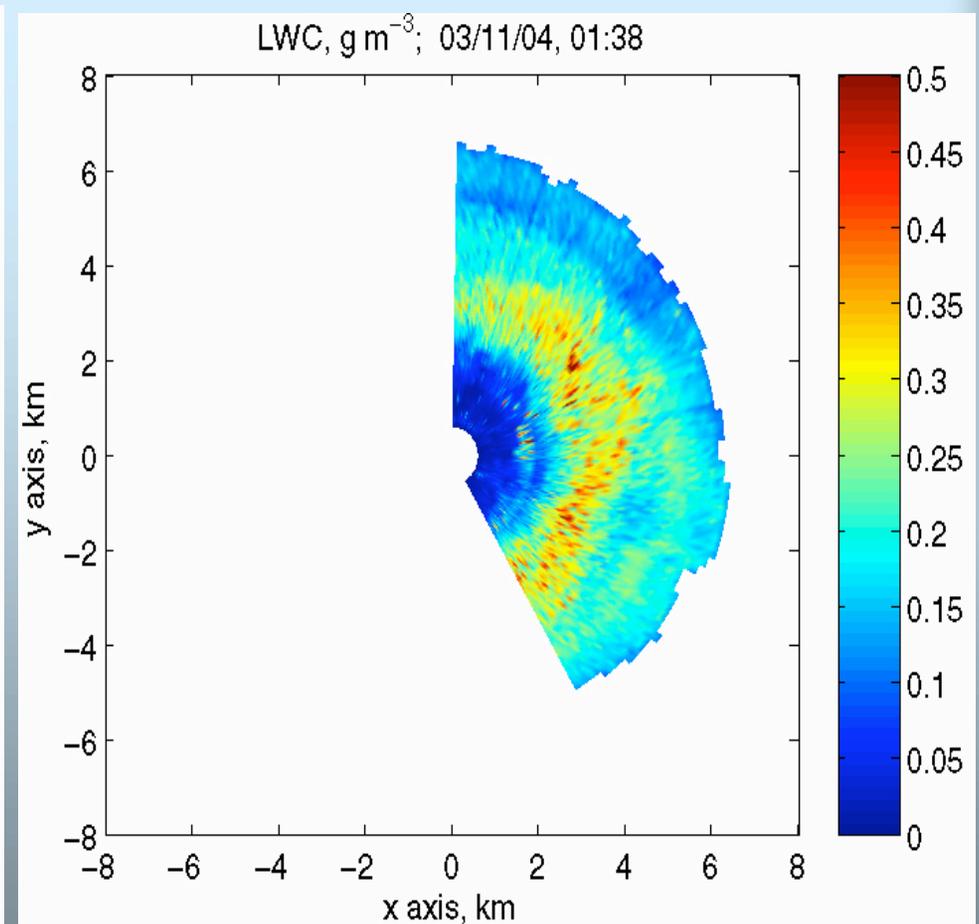
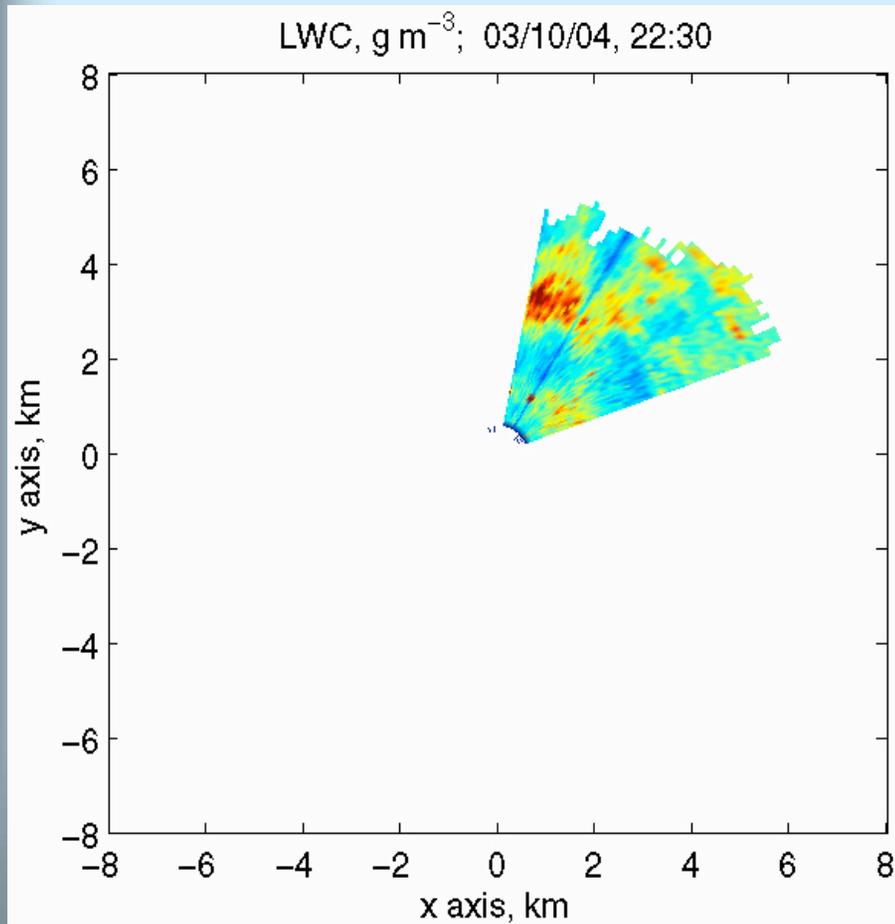
Leading edge of echoes south to Greeley. A second area of echo is present along I-76 near Fort Morgan that appears to have come around the Cheyenne Ridge and is moving up the Platte Valley, Akron is reporting overcast at 3200' AGL. Additional higher altitude cloud echoes are present along I-25 just east of Boulder county. These areas are beneath the upper level forcing zone. The precip band moved through Cheyenne about 9AM. The temperature dropped from 44F to 30F and they are presently reporting light snow and fog with an overcast deck at 2700' AGL. This feature will move over us in the next 2 hours. The radiometer at Boulder is already showing these clouds.

In other words: get ready, here it comes!

Measured radar reflectivity images

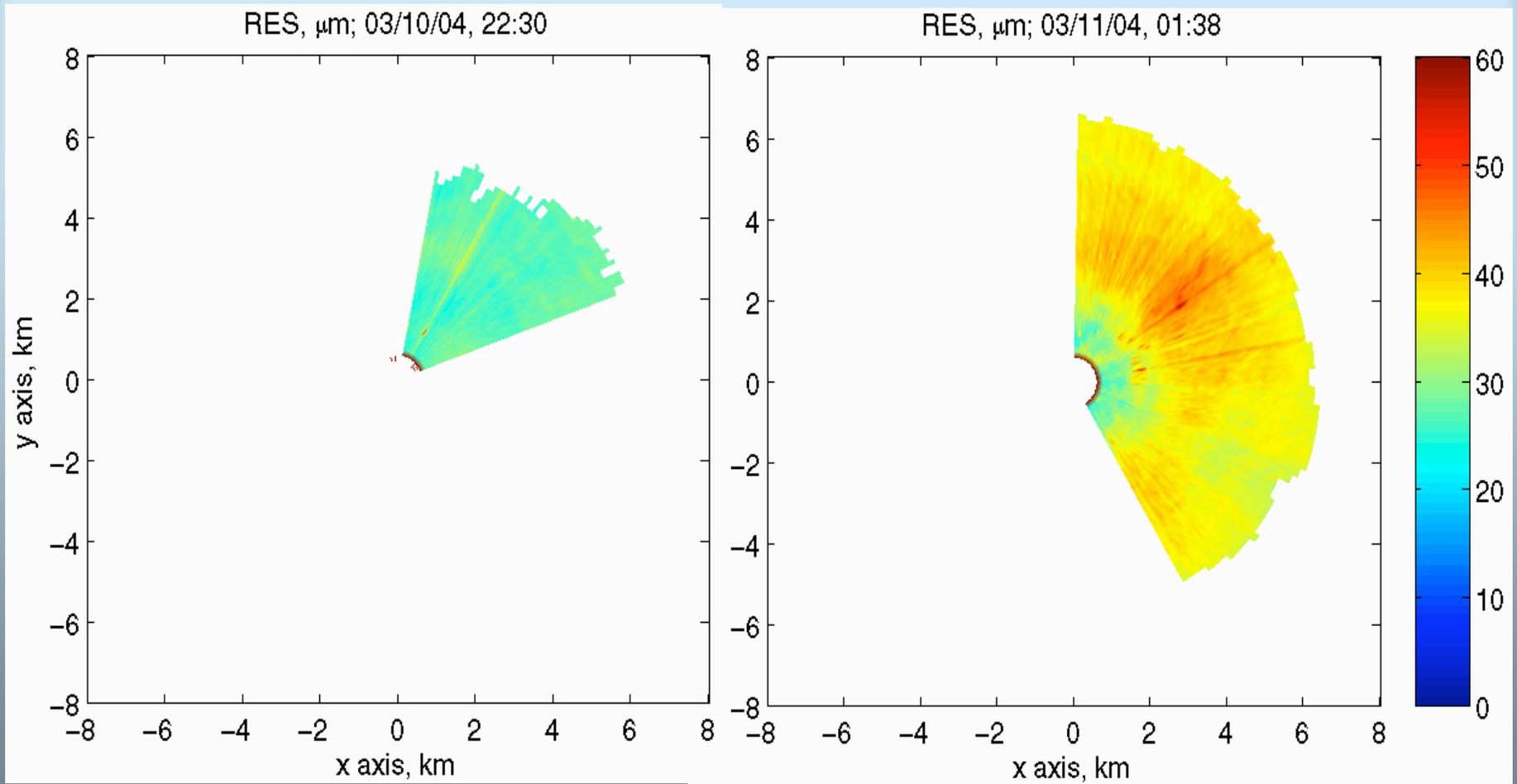


Retrieved LWC from remote sensors

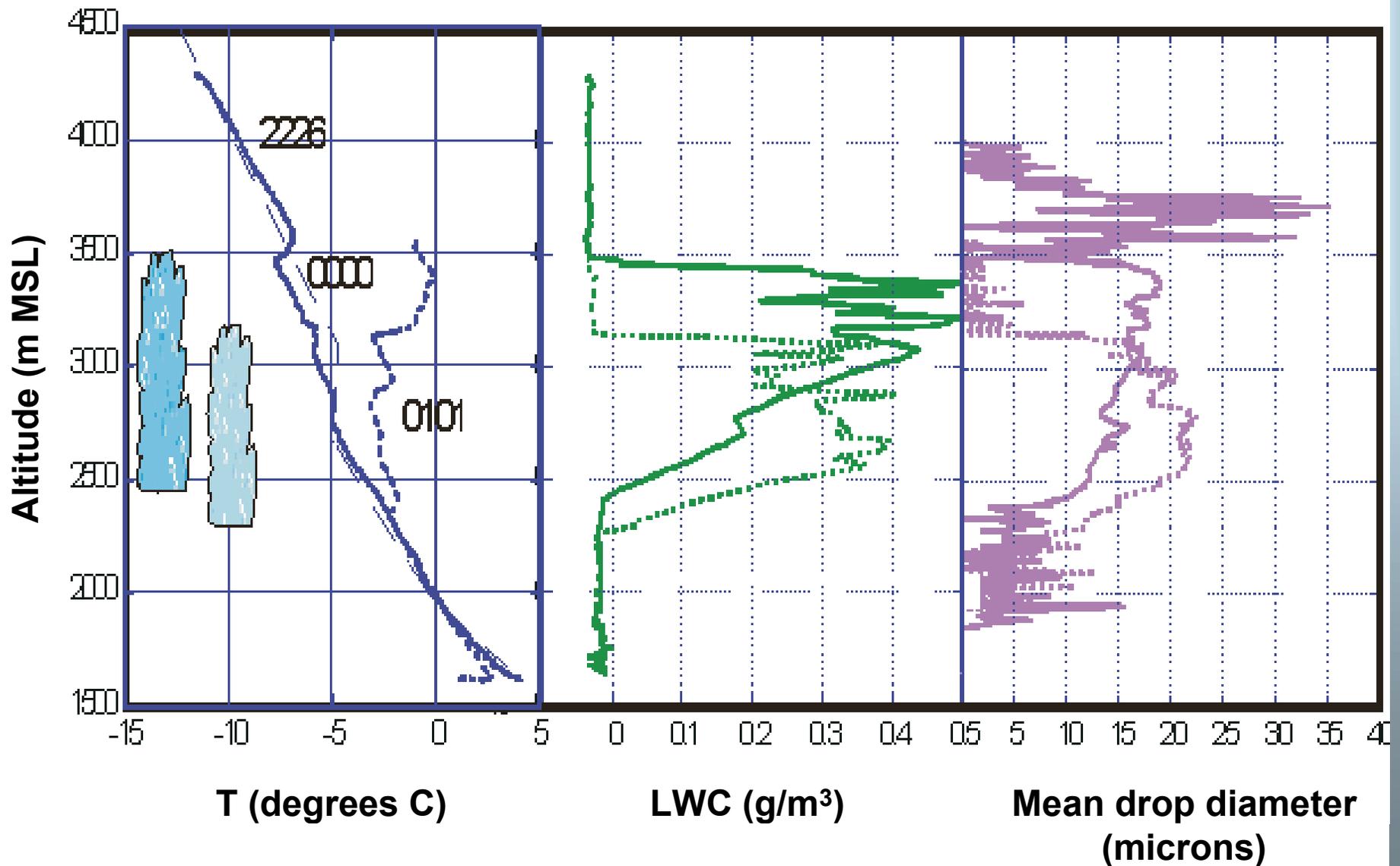


Retrieved RES from remote sensors

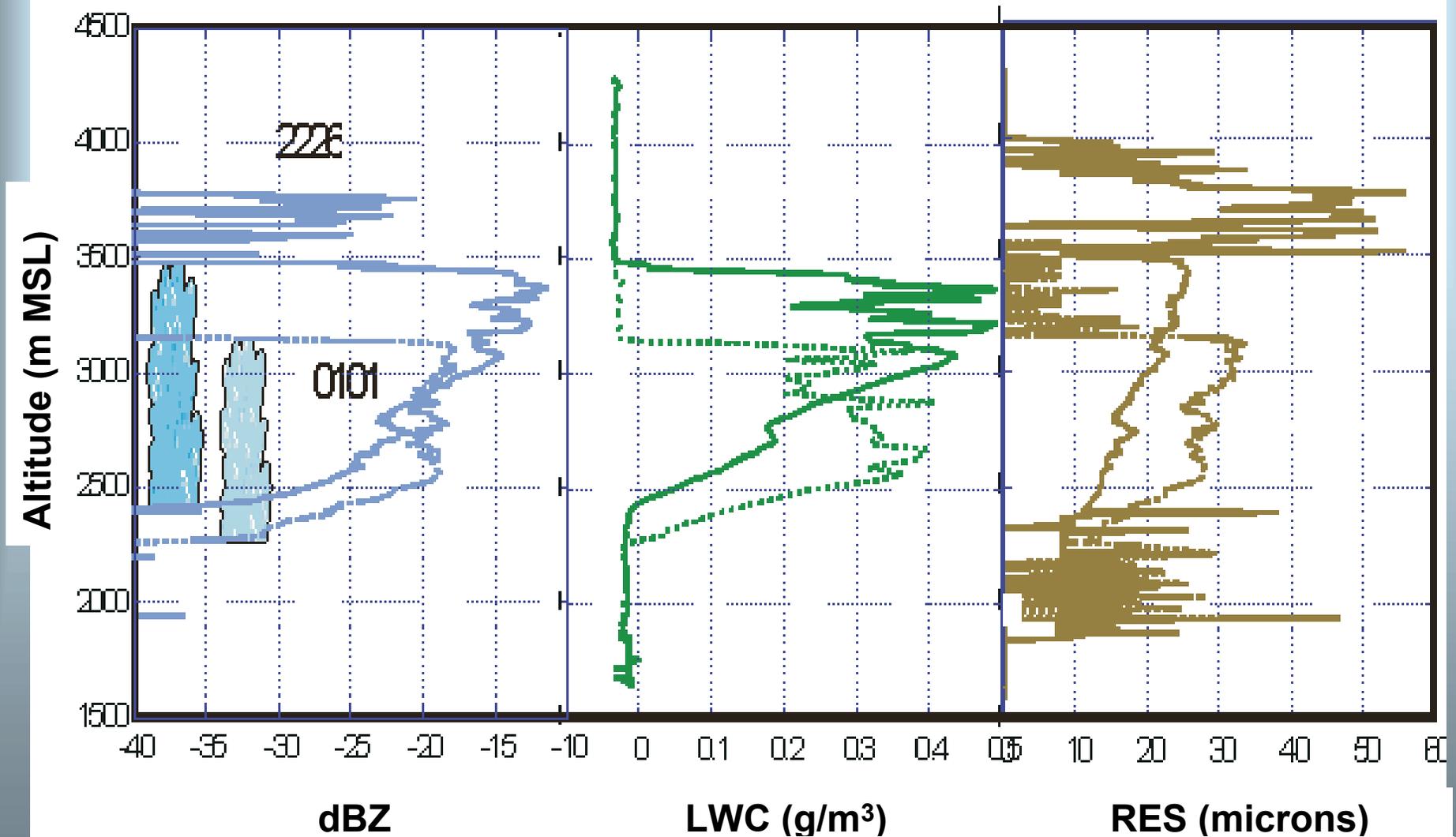
$$\text{RES} = [\langle d^6 \rangle / \langle d^3 \rangle]^{1/3}$$



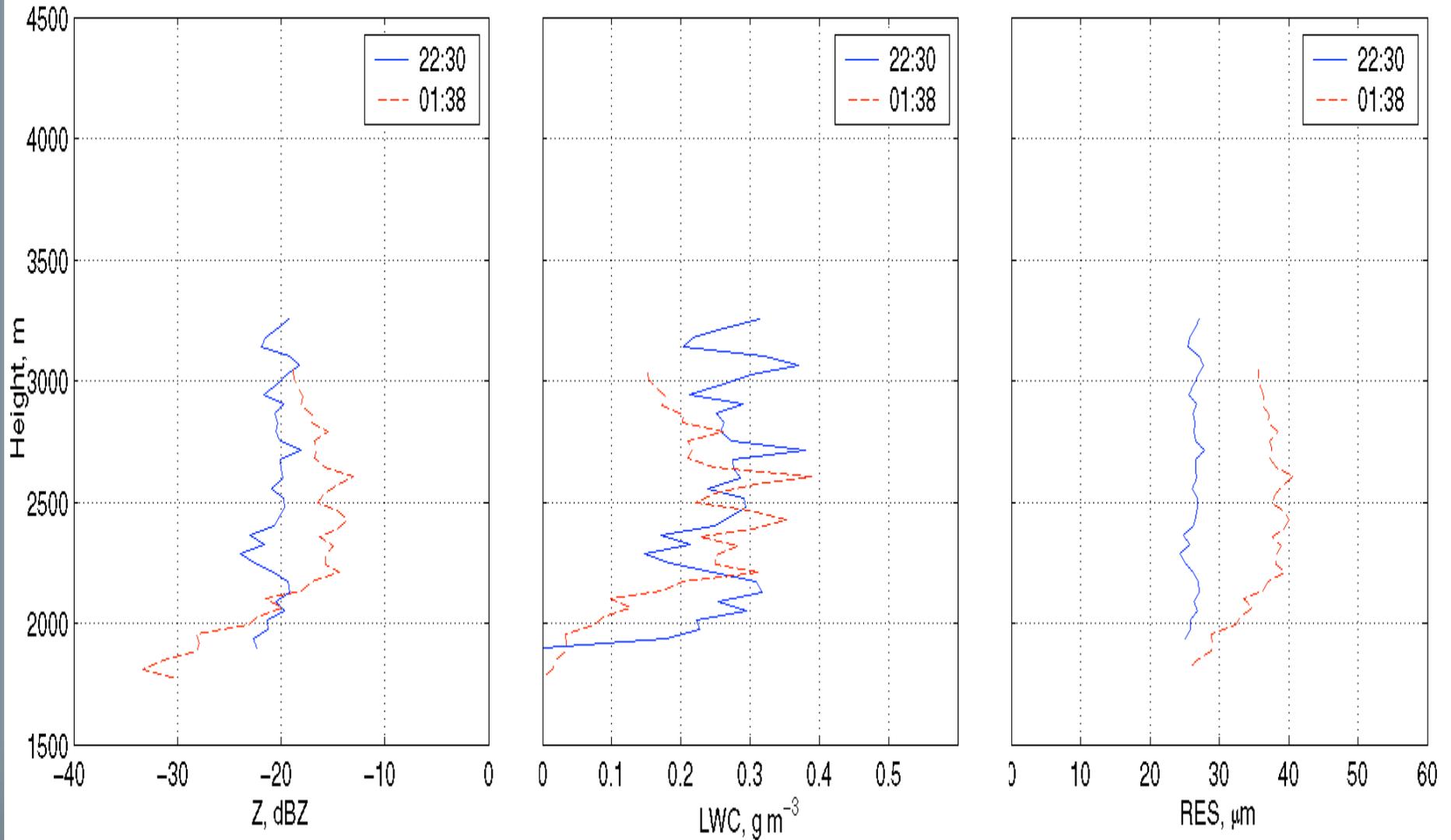
In situ data



Derived quantities from in situ data



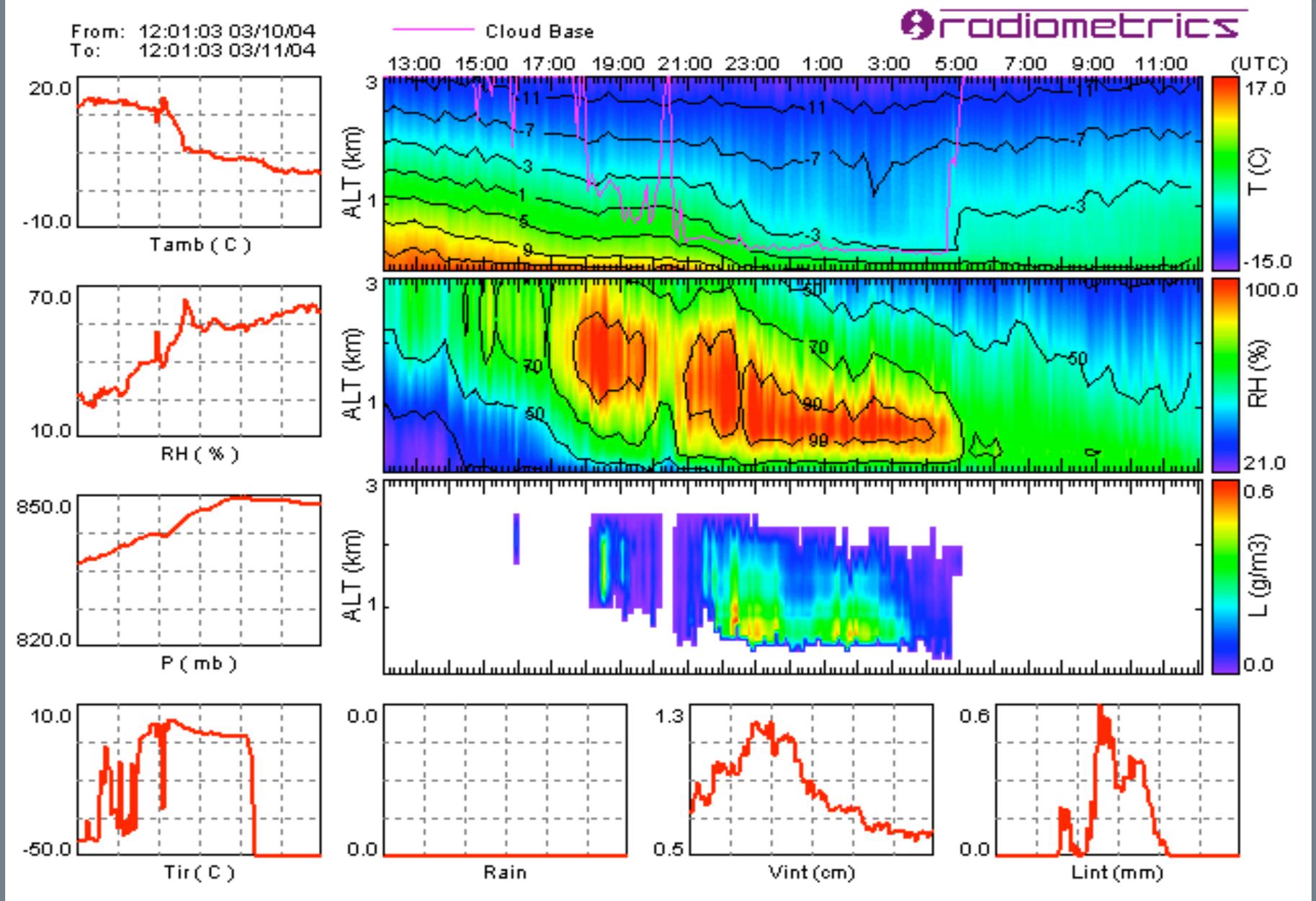
Comparison of remote retrieved profiles



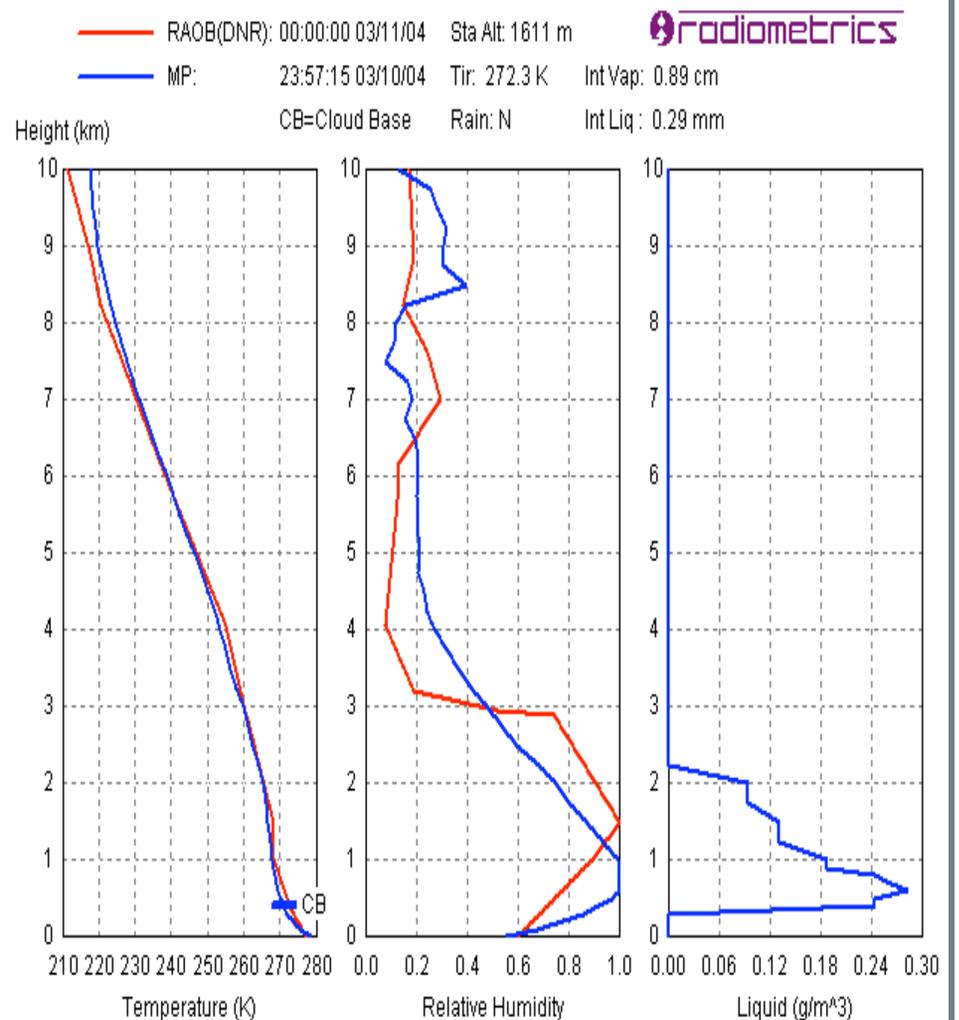
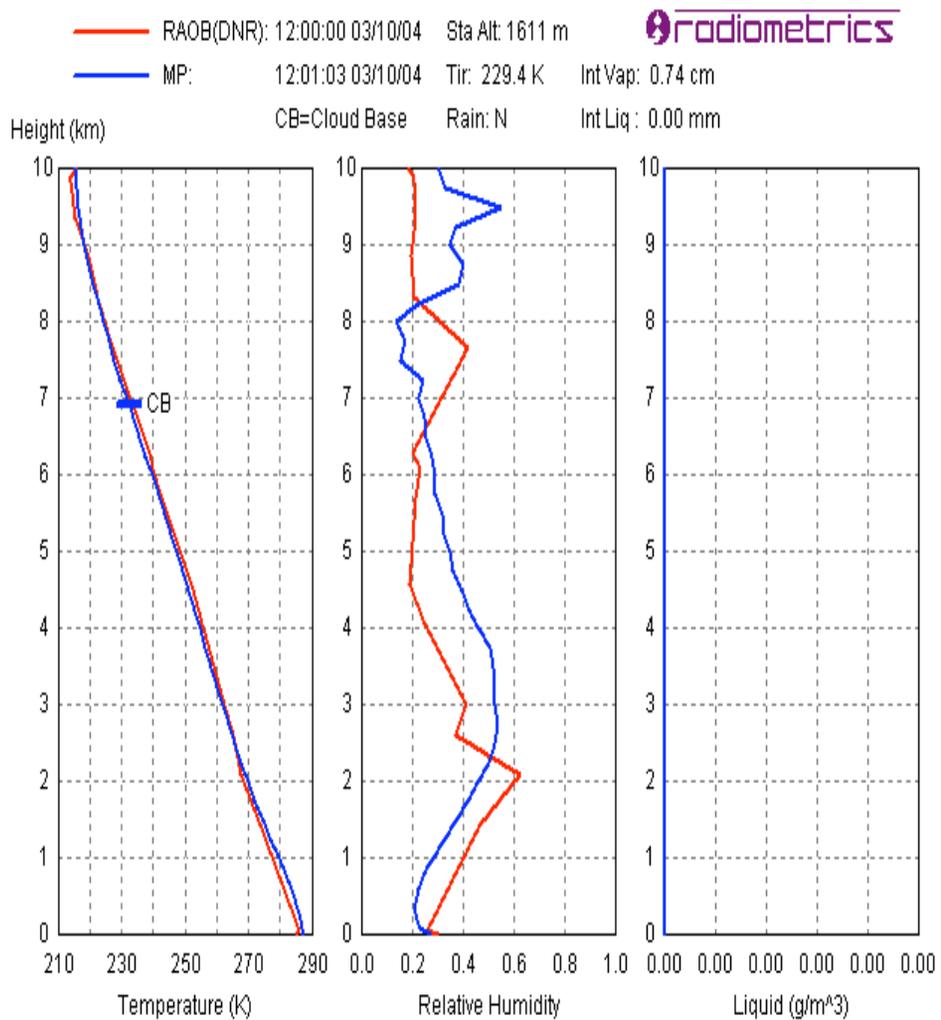
**Attenuation corrected
reflectivity**

Retrieved LWC profiles

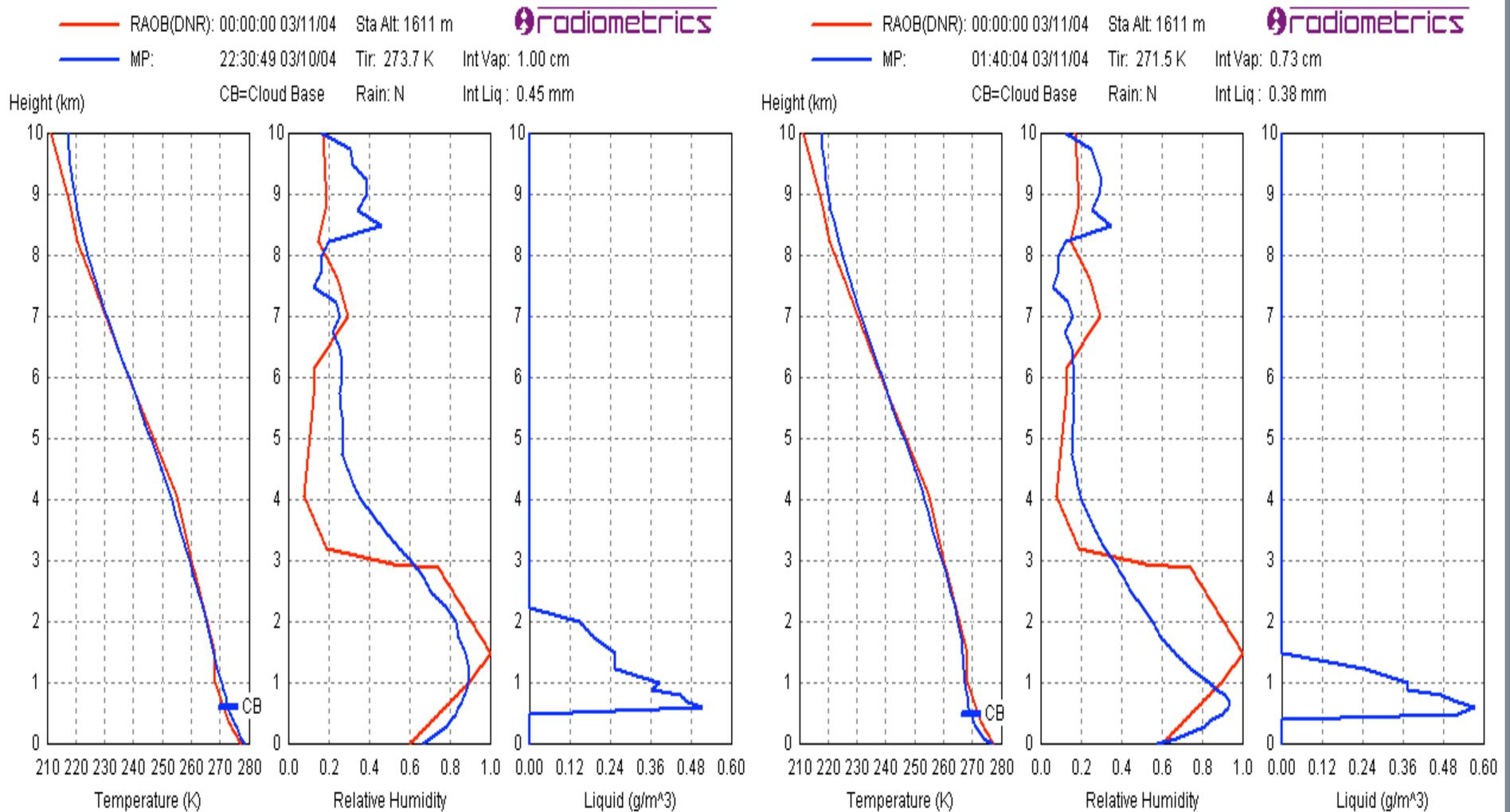
Retrieved RES profiles



Retrievals from zenith radiometric profiler observations at Boulder.



Radiometer retrievals at Boulder (blue) compared to
 radiosonde soundings at Denver (red).



Radiometer retrievals (blue) at Boulder at 2230 UTC 10 Mar 04 and 0140 UTC 11 Mar 04 (times of aircraft soundings). The 0000 UTC 11 Mar 04 Denver radiosonde (red) is also shown.