Thermodynamic and Liquid Profiling Update

CMOS 2012 Congress
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Nowcasting Scientific Session

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radiometrics

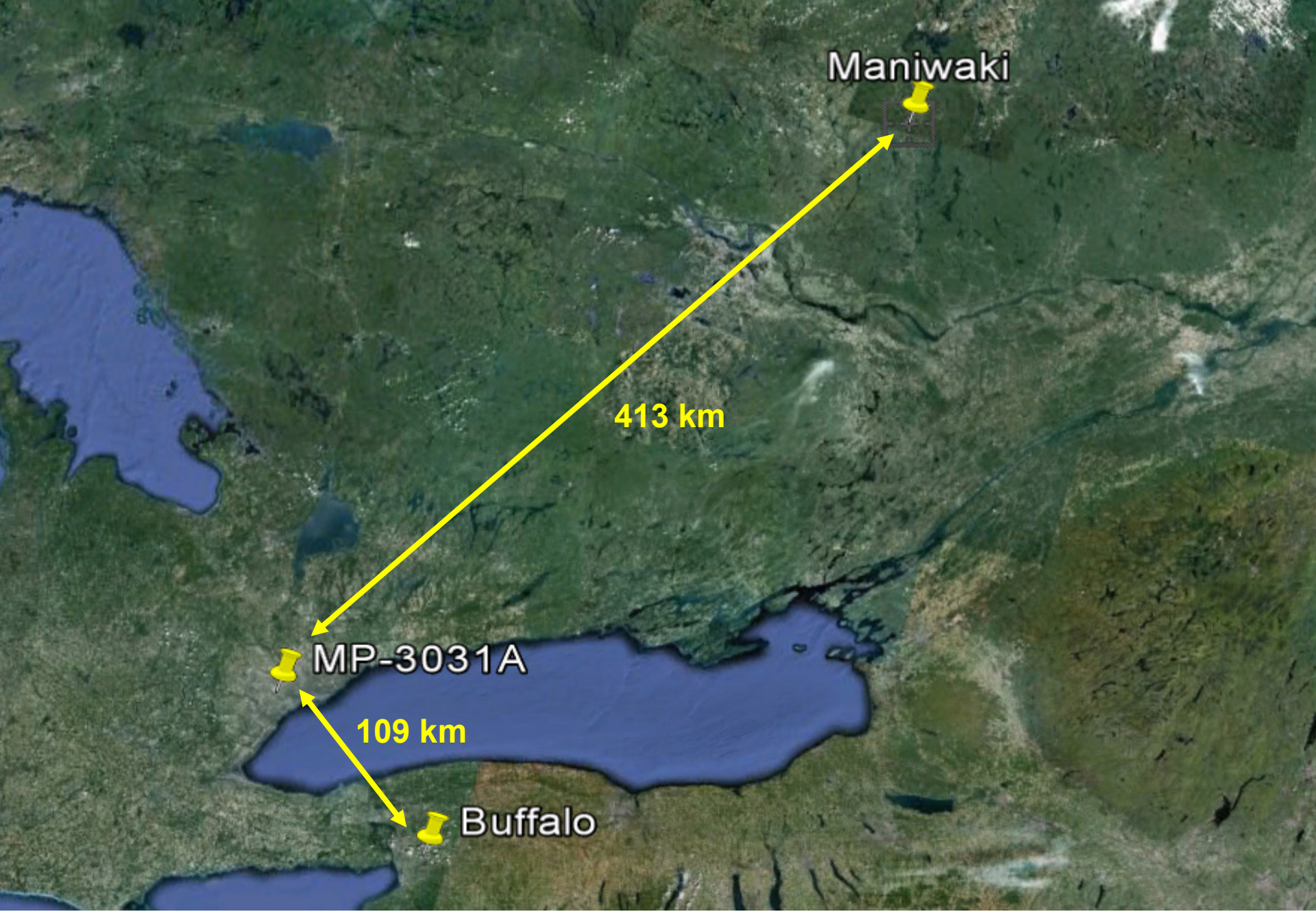
Presentation Summary

- Observations during heavy rain and fog at Pearson International Airport
- Radiosonde equivalent observation accuracy
- Radiometer and radiosonde liquid profile comparisons
- Thermodynamic profiling network roll out

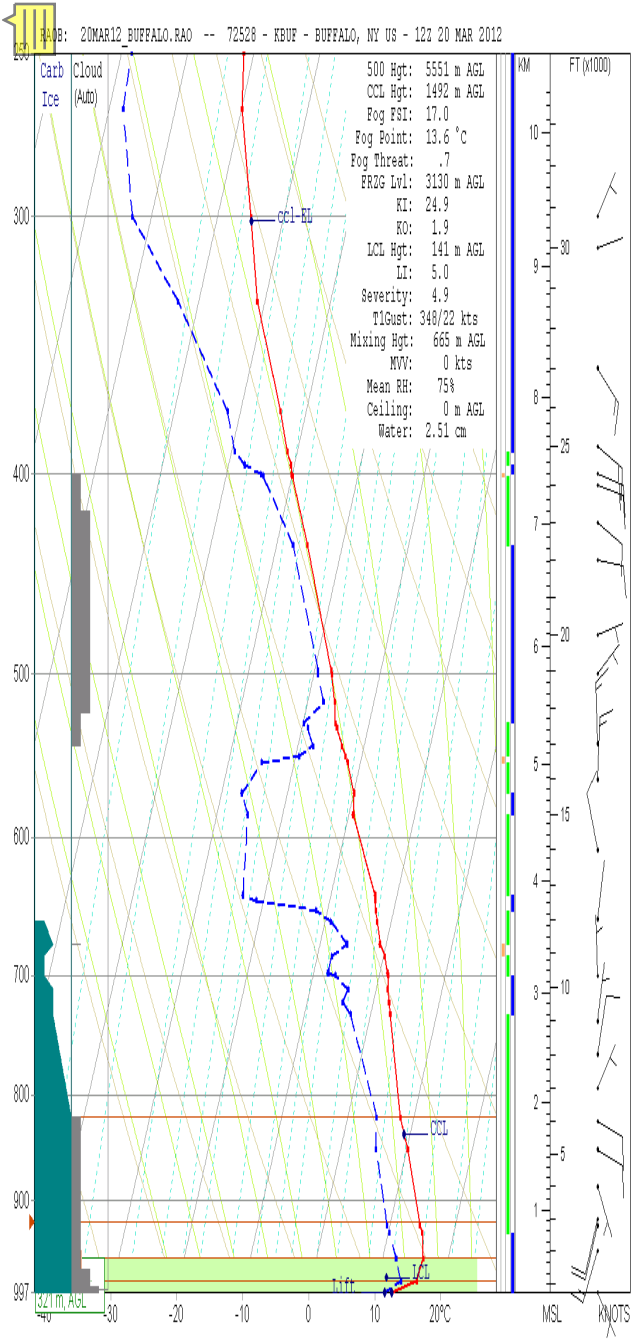
radiometrics

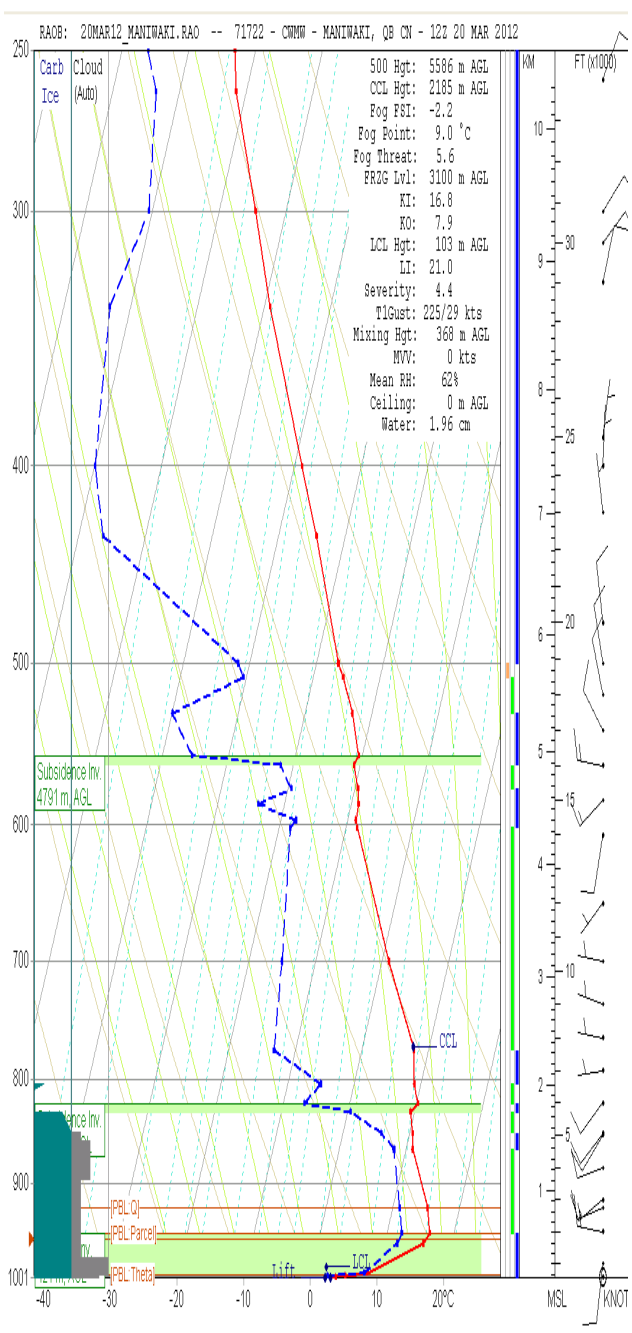
- Observations during heavy rain and fog at Pearson International Airport

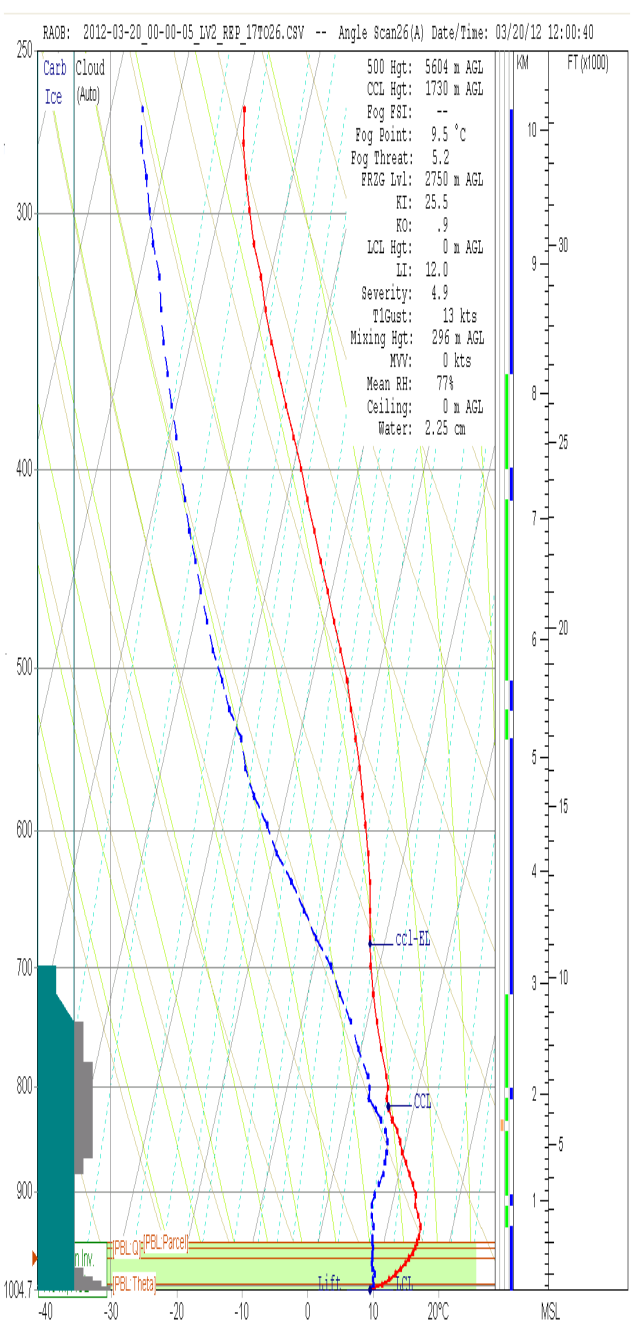
Microwave Profiler (MP-3031A) located <75 m from rain gauges



Maniwaki and Buffalo (radiosondes) and Pearson (radiometer)

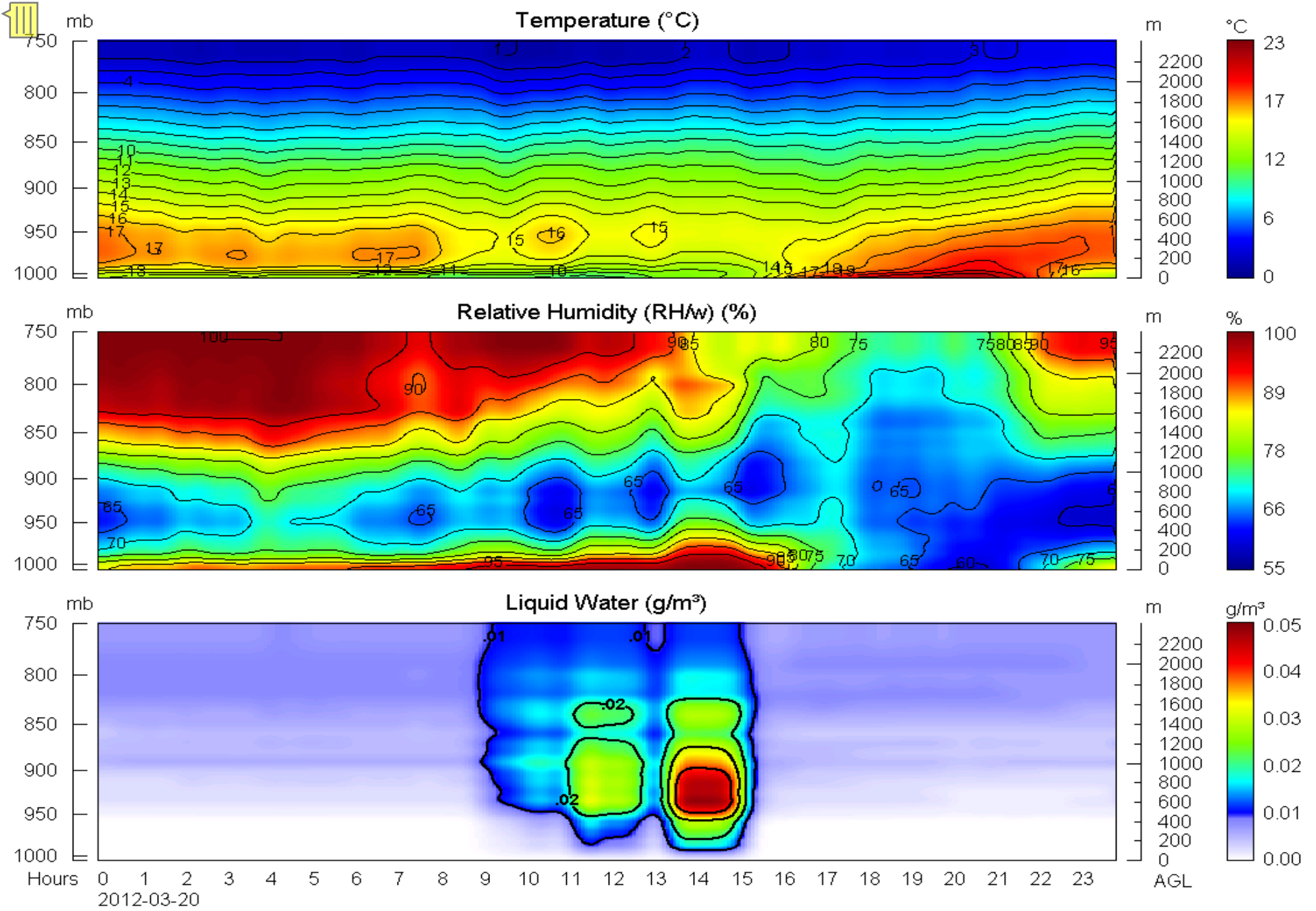






Buffalo and Maniwaki (radiosondes) and Pearson (radiometer) soundings

RAOB software
www.raob.com



Thermodynamic and liquid soundings to 2400 m during fog event

RAOB software
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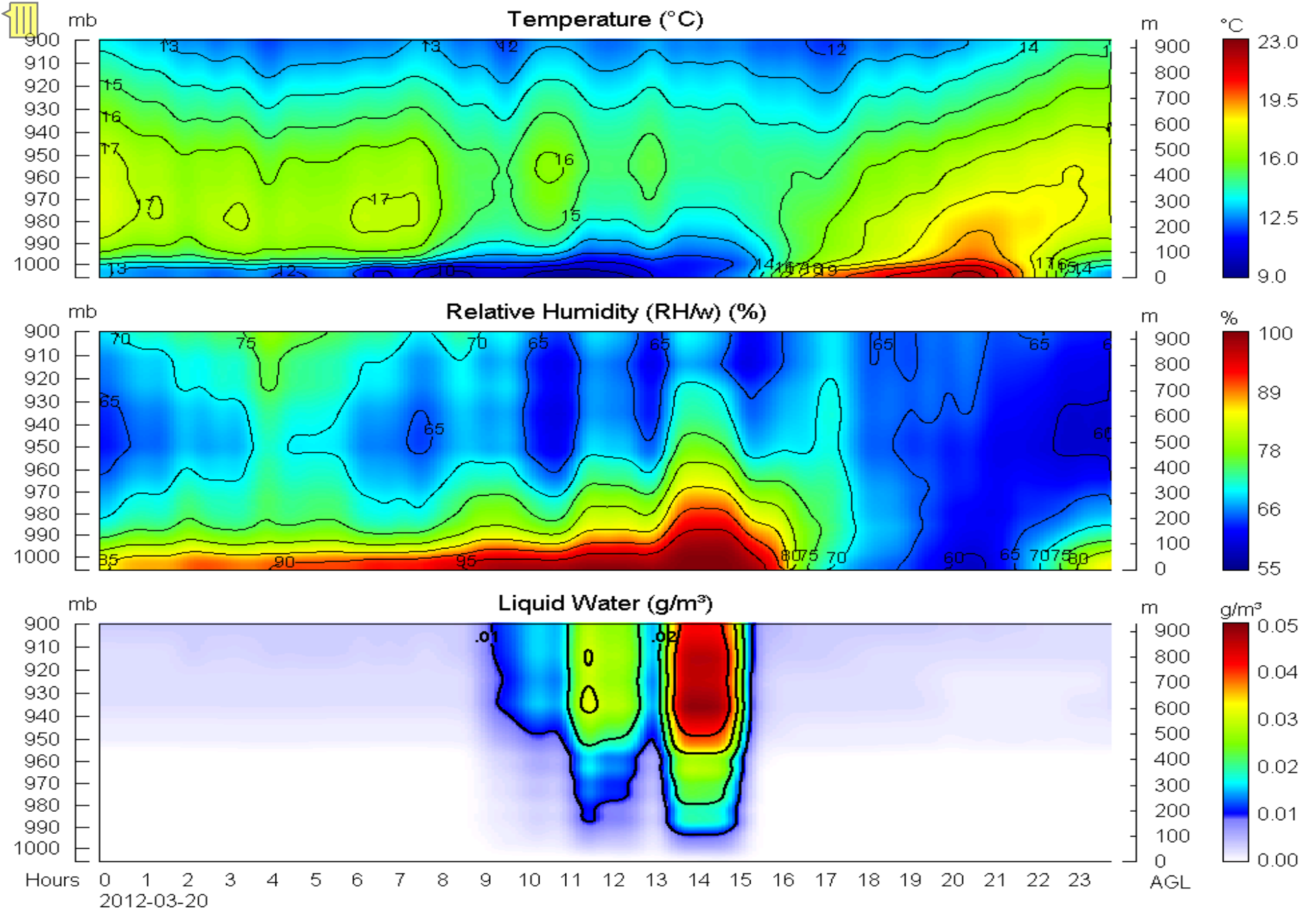

Same as previous to 900 m height

RAOB software
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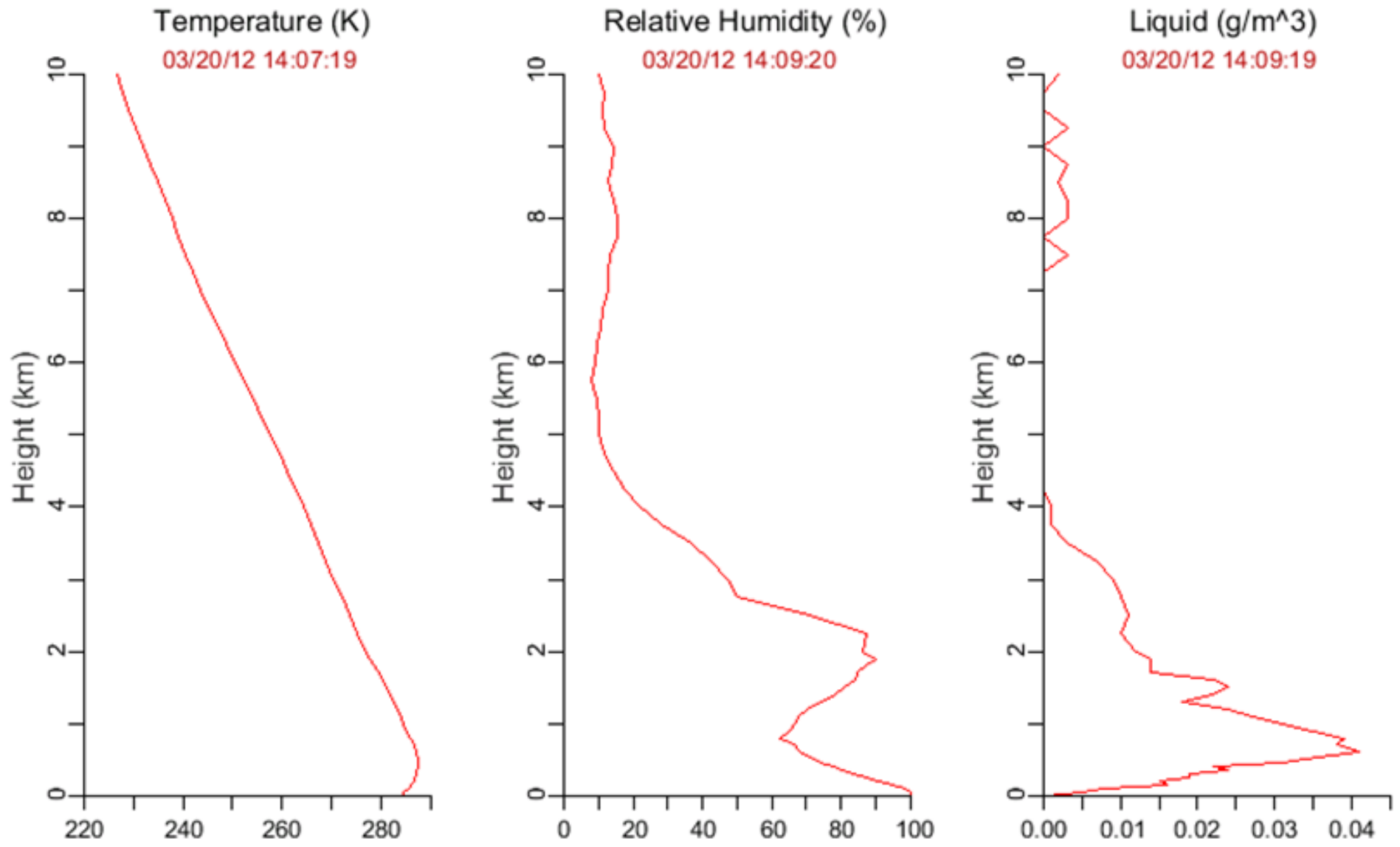
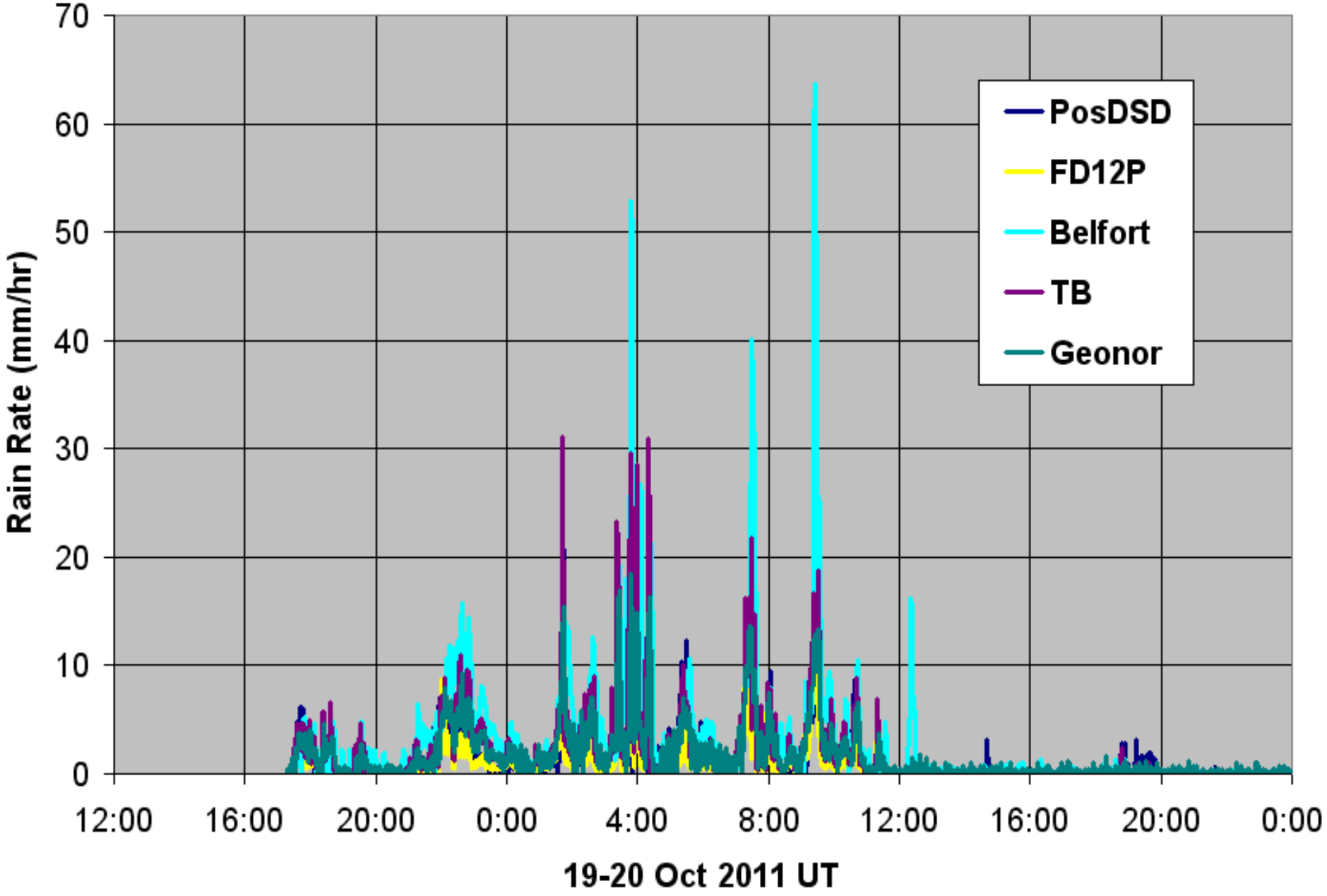
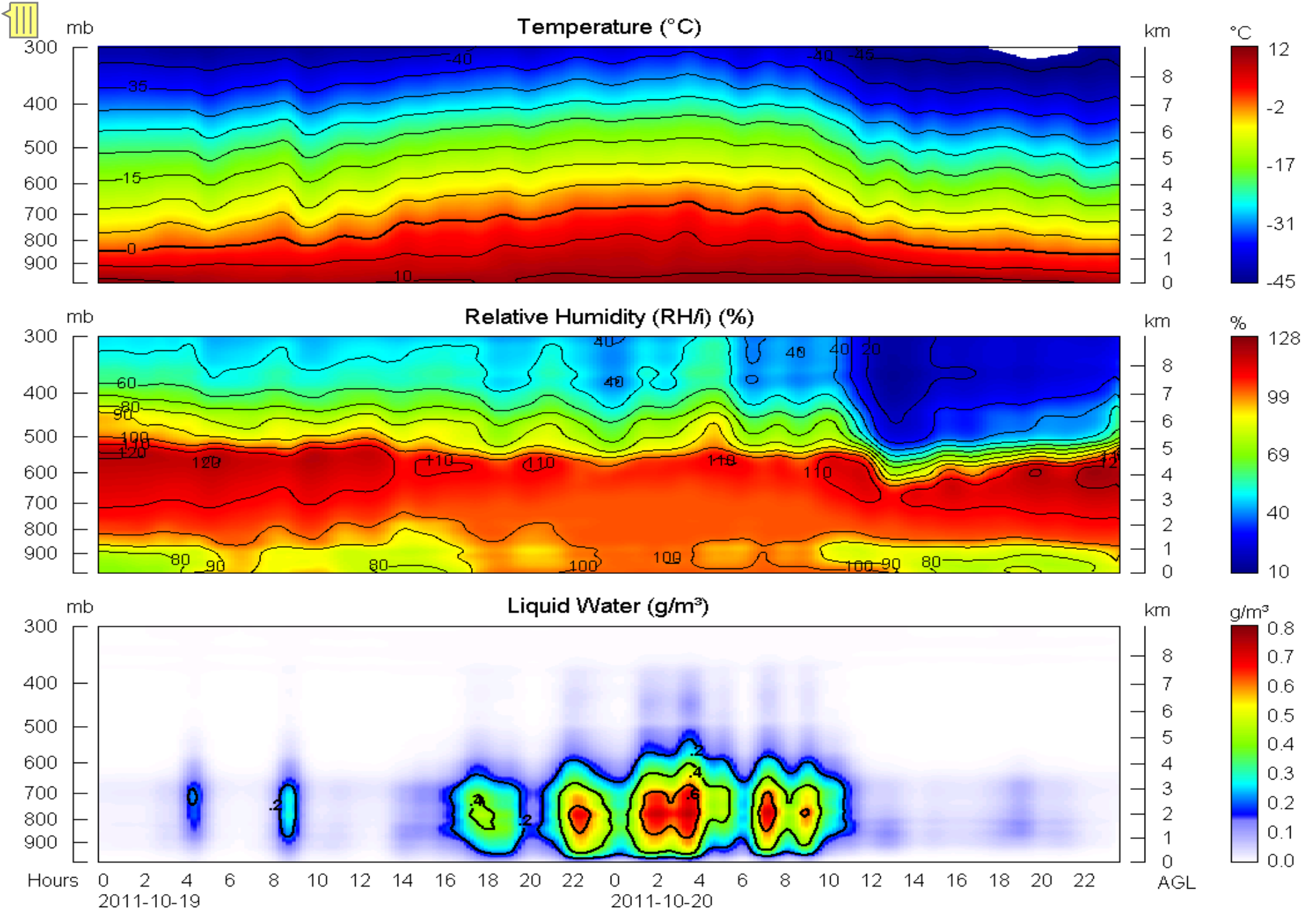


Temperature, humidity and liquid profiles during 20 Mar 2012 fog event



Colocated (<75 m) radiometer and rain gauge measurements at Pearson Airport



Thermodynamic and liquid profiles to 9 km height during >60 mm/hr rain

RAOB software
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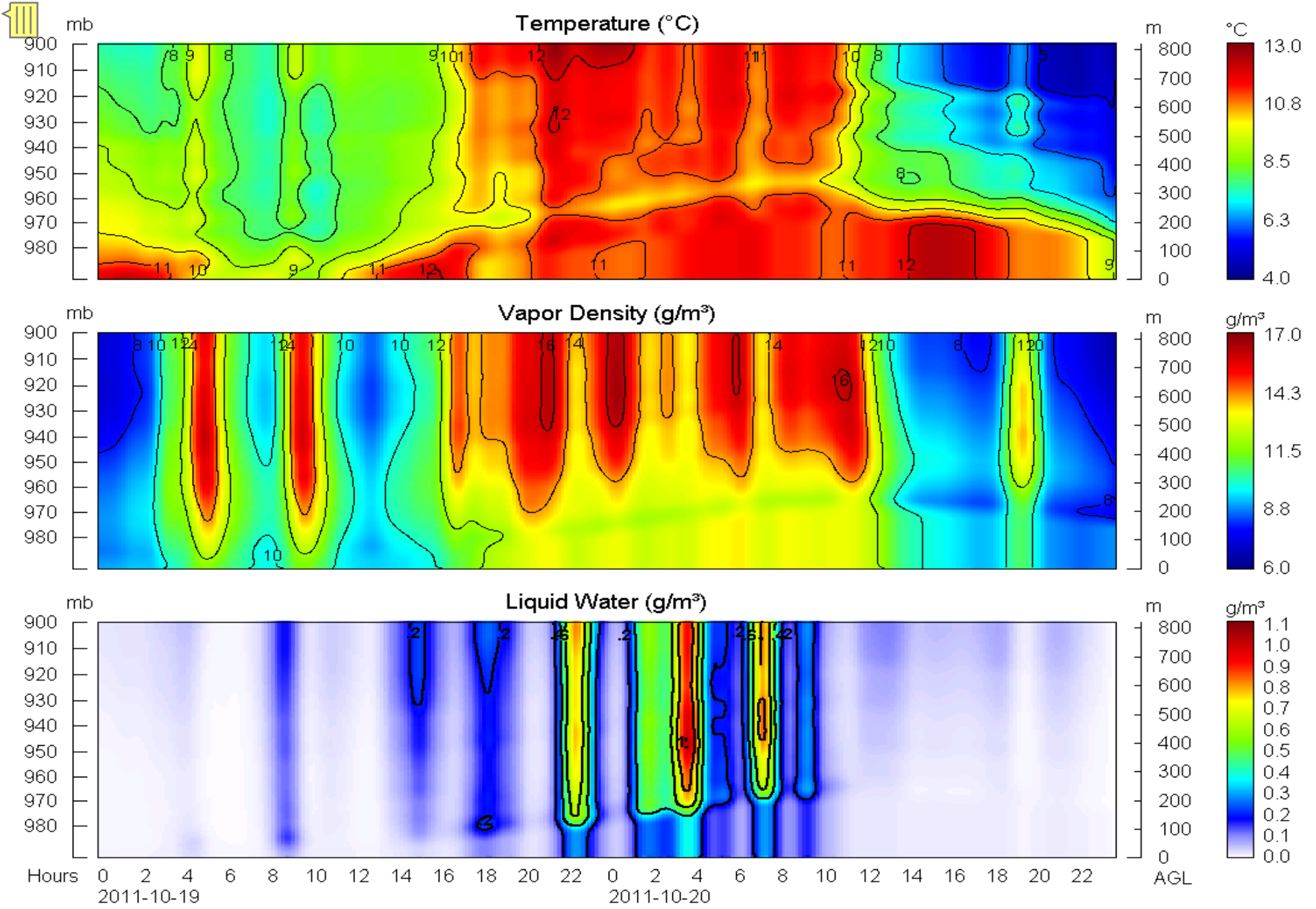

Same as previous to 800 m height

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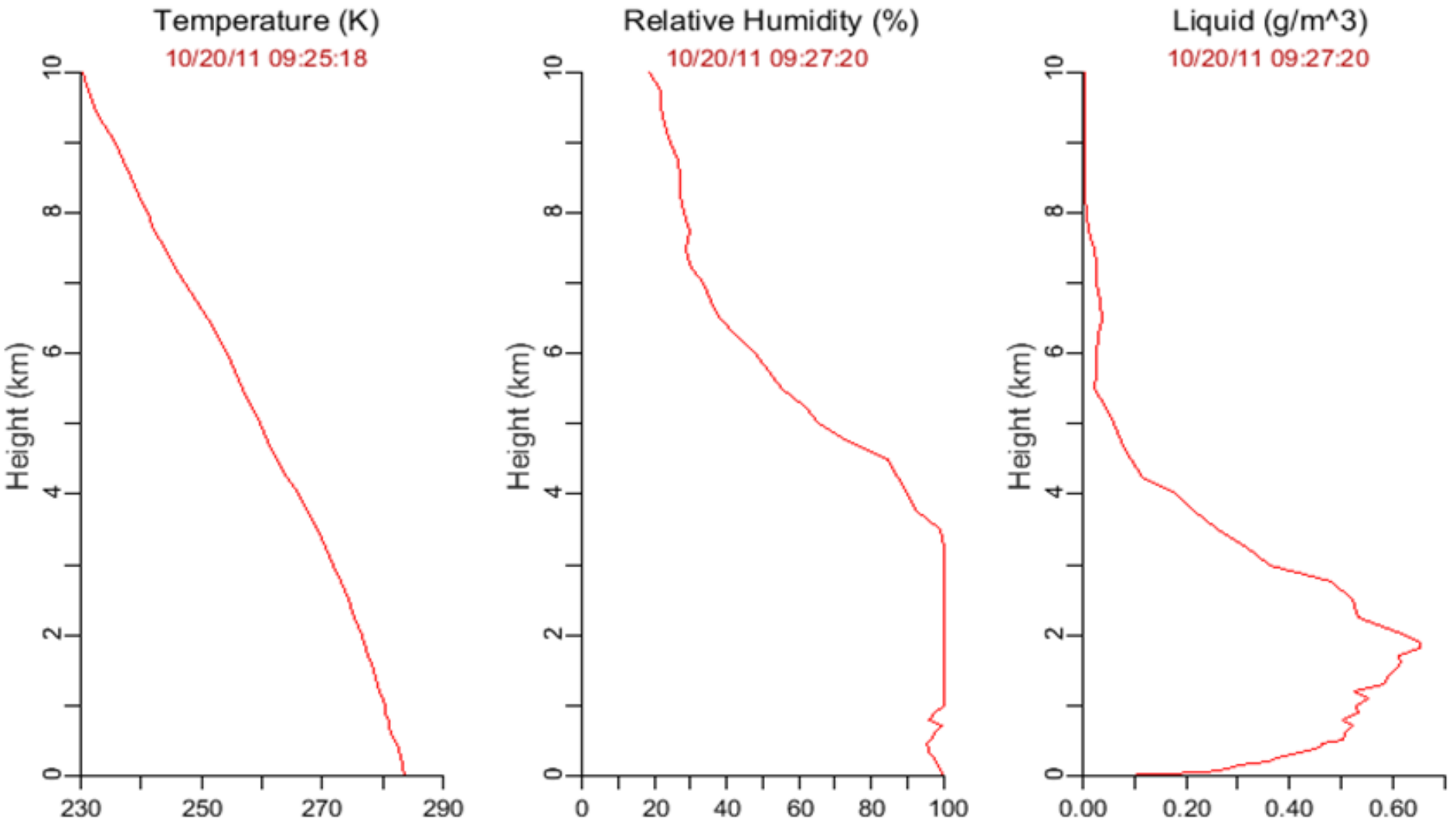
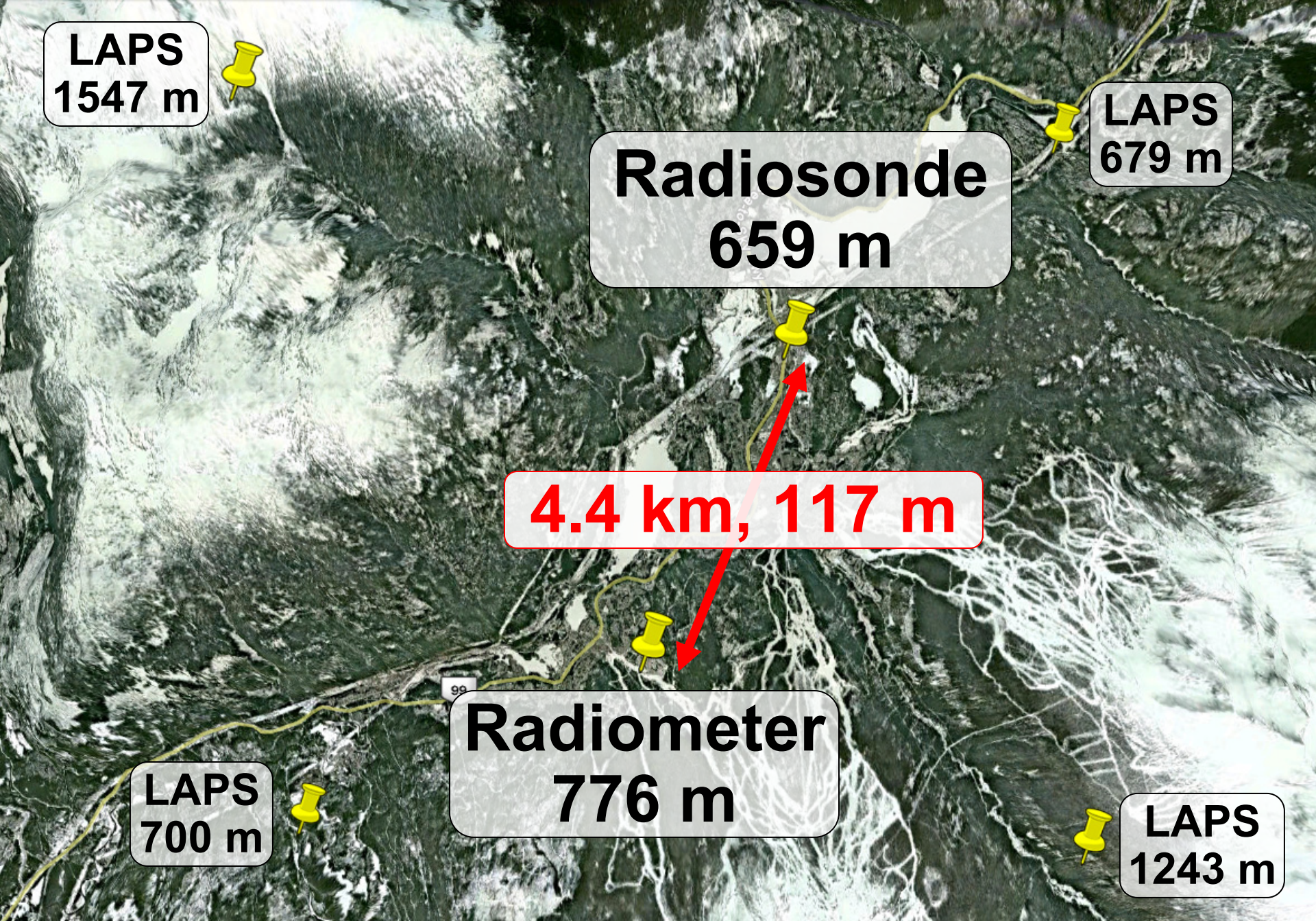


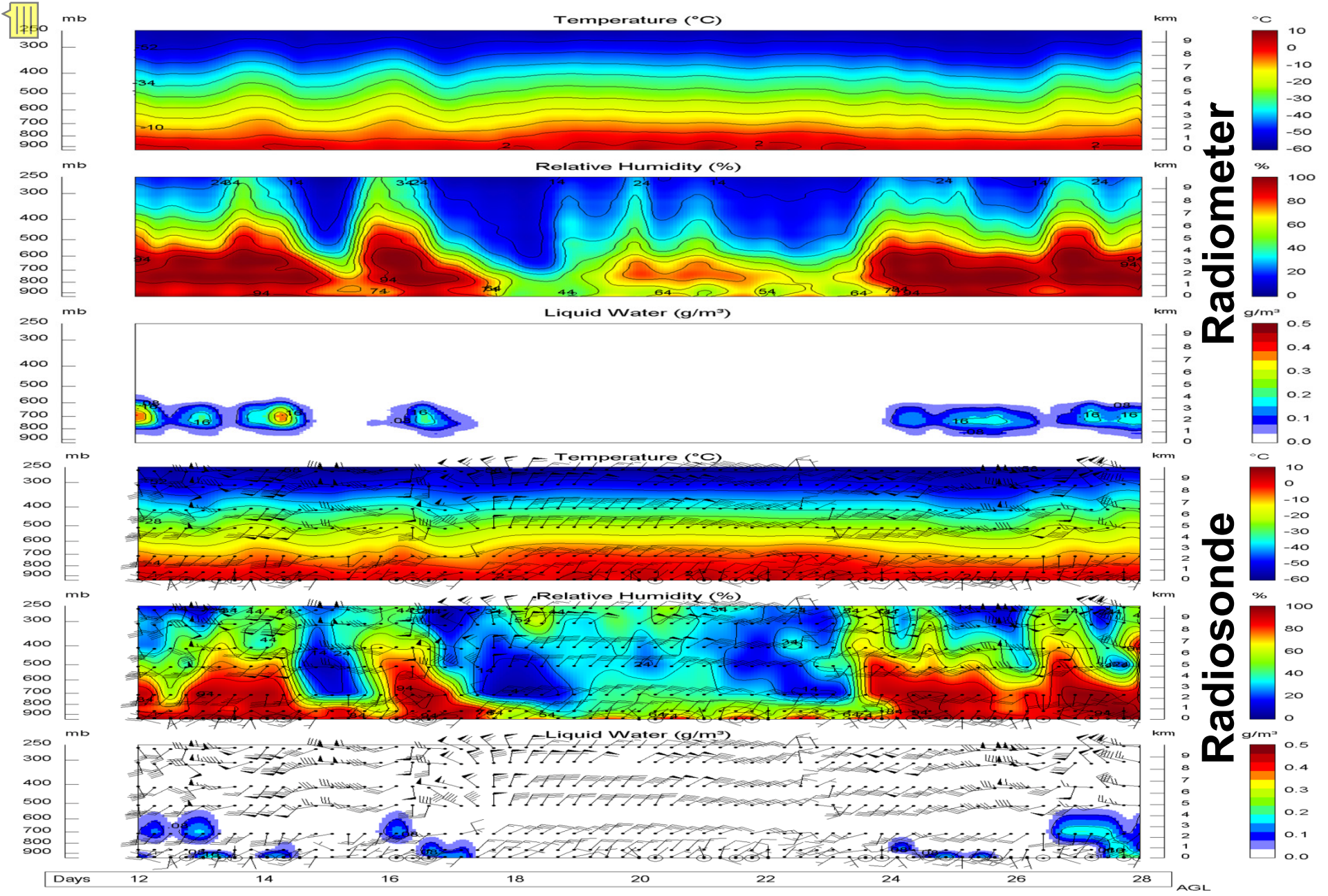
Thermodynamic and liquid profiles during rain rate >60 mm/hr

radiometrics

- Radiosonde equivalent observation accuracy



Radiometer, radiosonde and LAPS grid point locations and altitudes



Sounding comparisons (Ware, Campos, Joe, Cober, TECO 2010)

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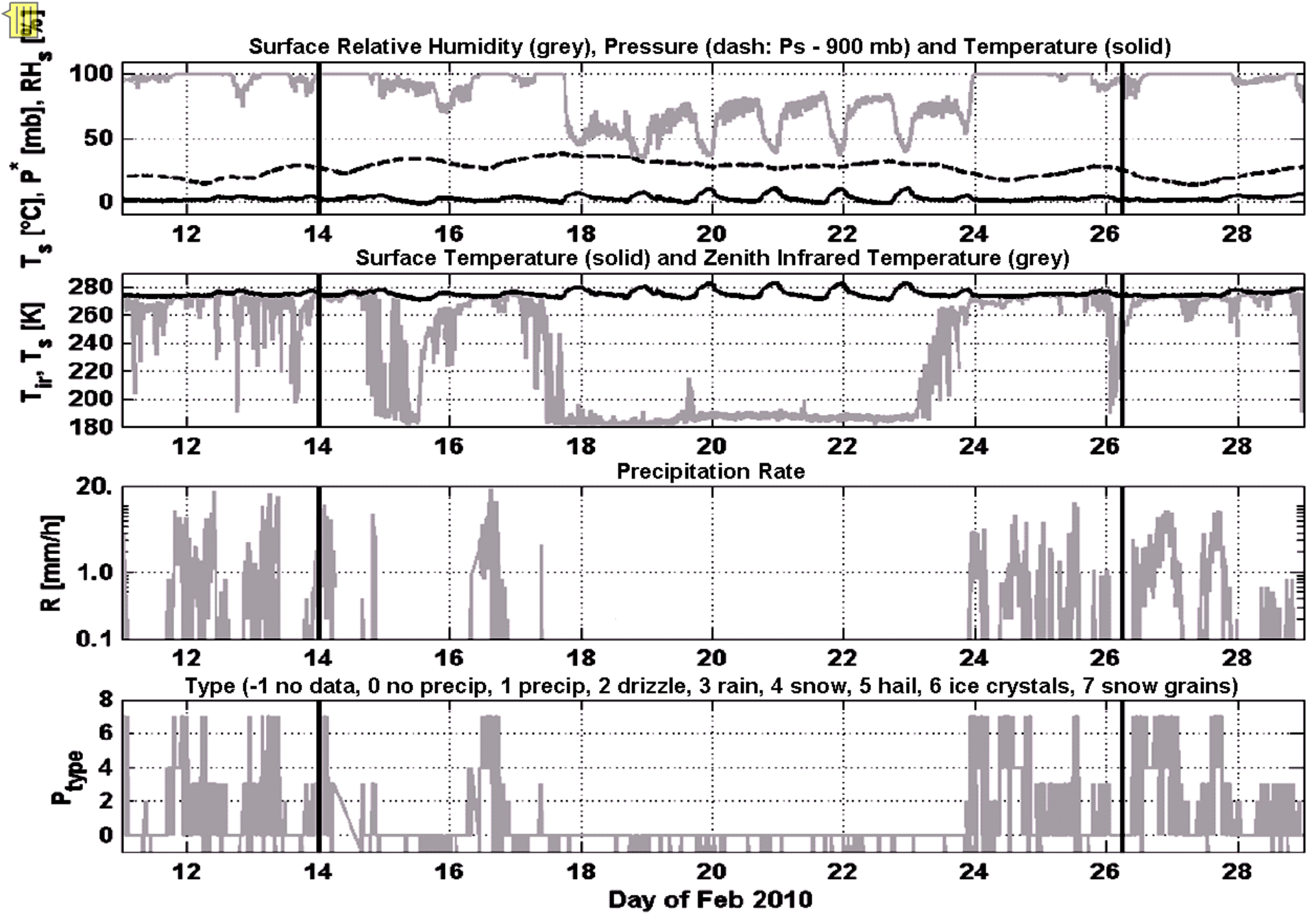
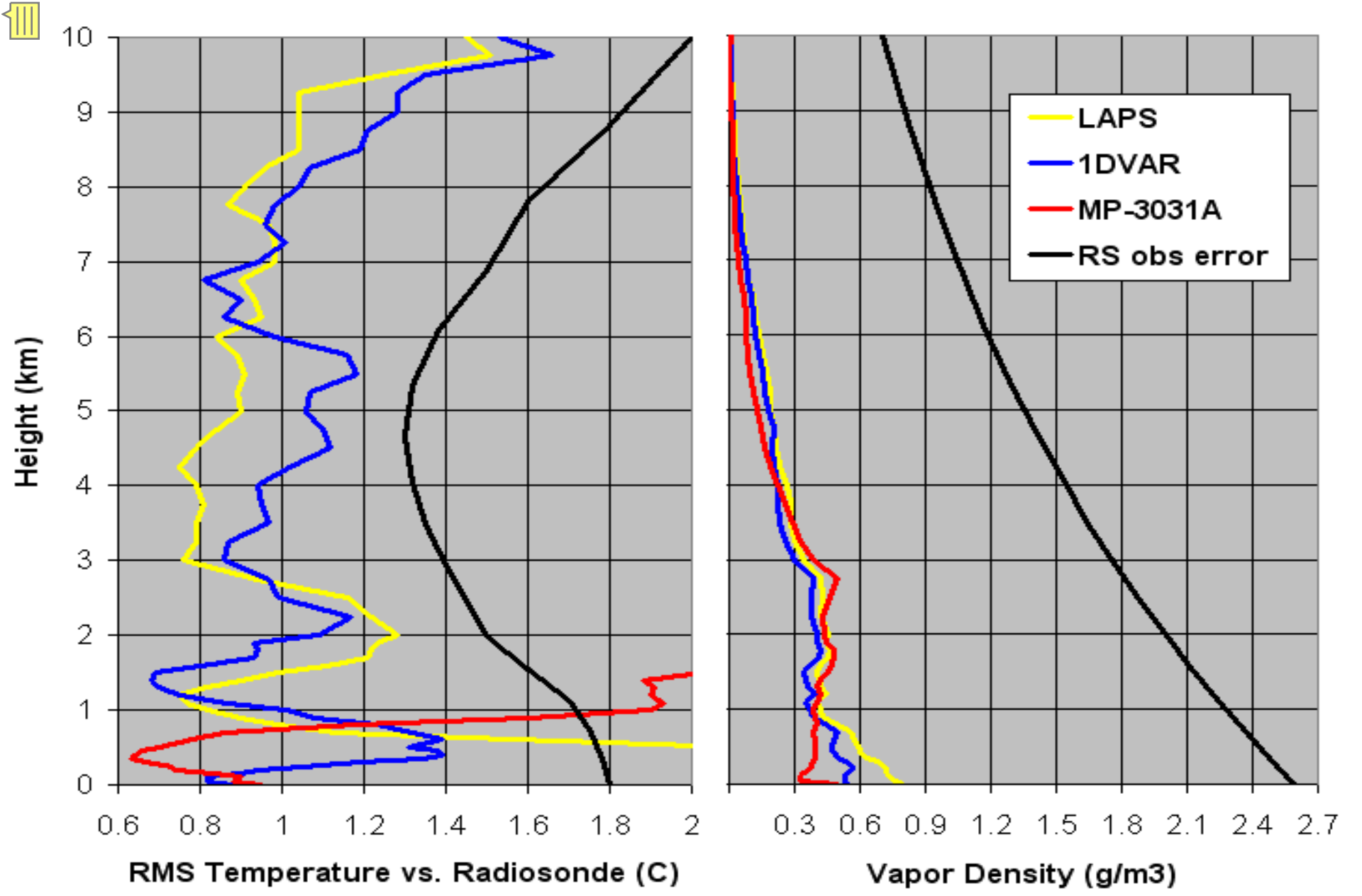


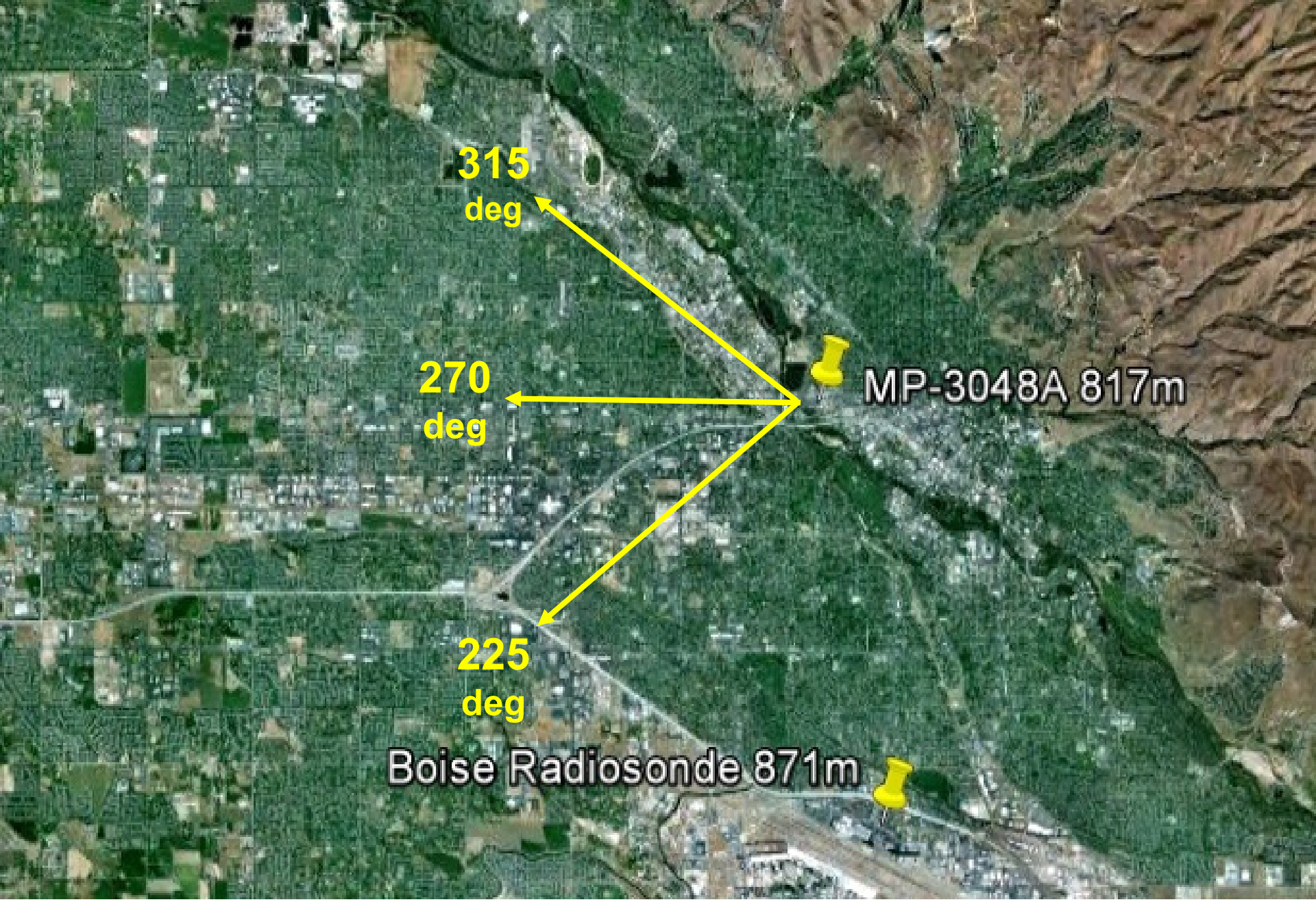
Surface met and precipitation (>20 mm/hr) at the radiometer site



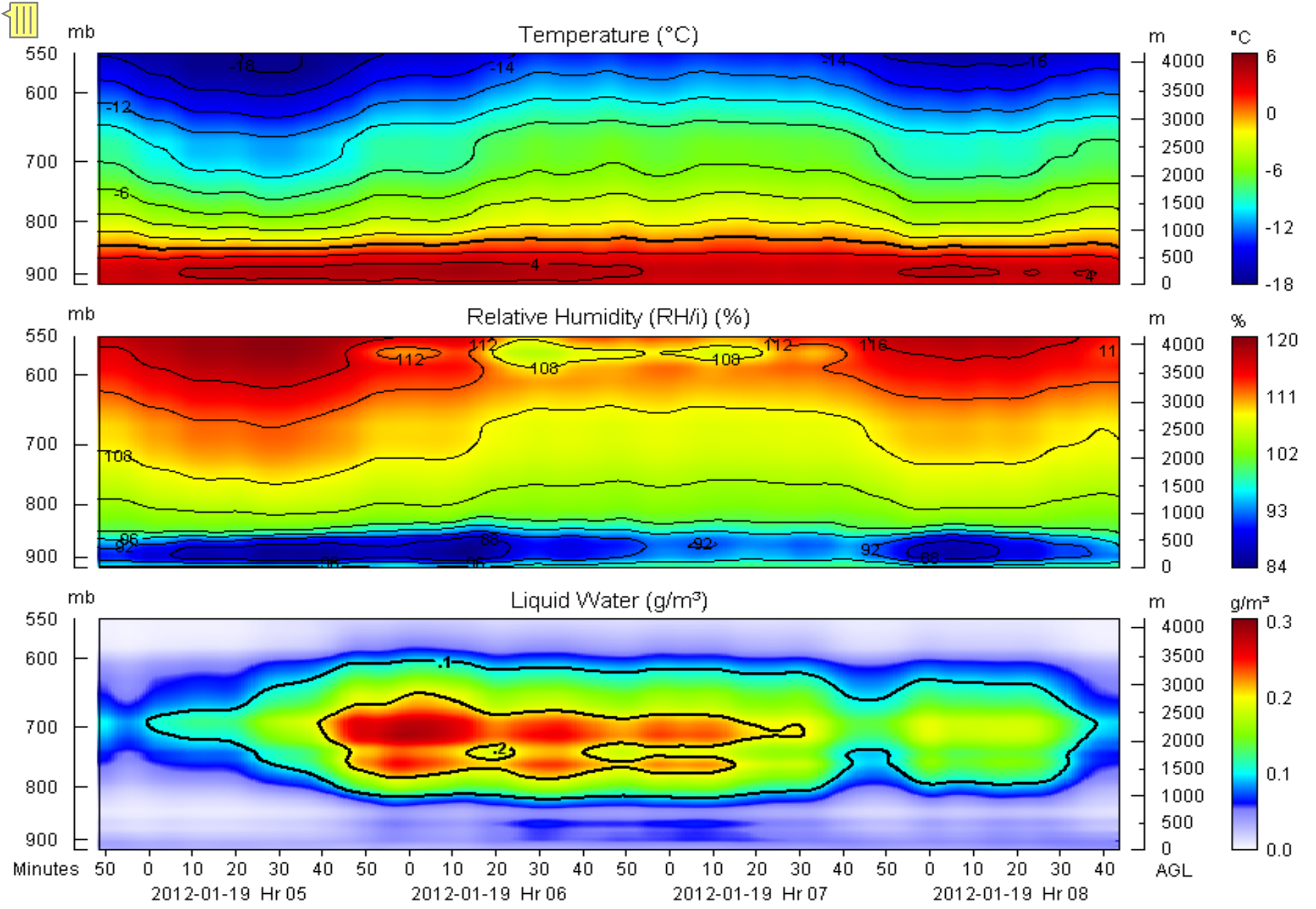
Radiosonde equivalent observation accuracy for 1DVAR retrievals during 2010 Winter Olympics (Cimini et al, **TGRS**, 2011)

radiometrics

- Radiometer and radiosonde liquid profile comparisons



Idaho Power radiometer (site and observation directions) and radiosonde site



Temperature, humidity and liquid profiles at 270° azimuth, 15° elevation

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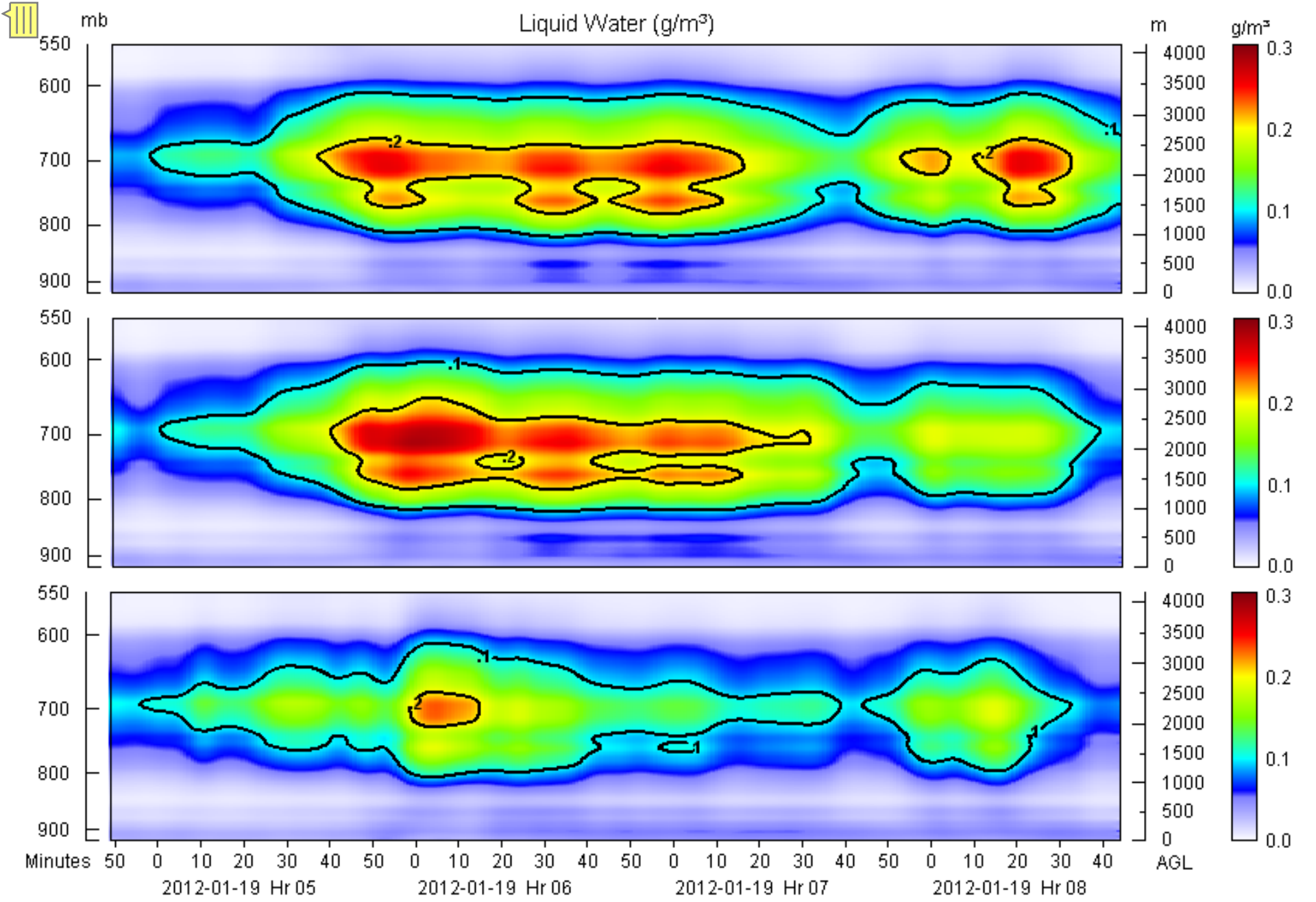

Liquid profiles at 315°, 270°, 225° azimuth, 15° elevation

RAOB software
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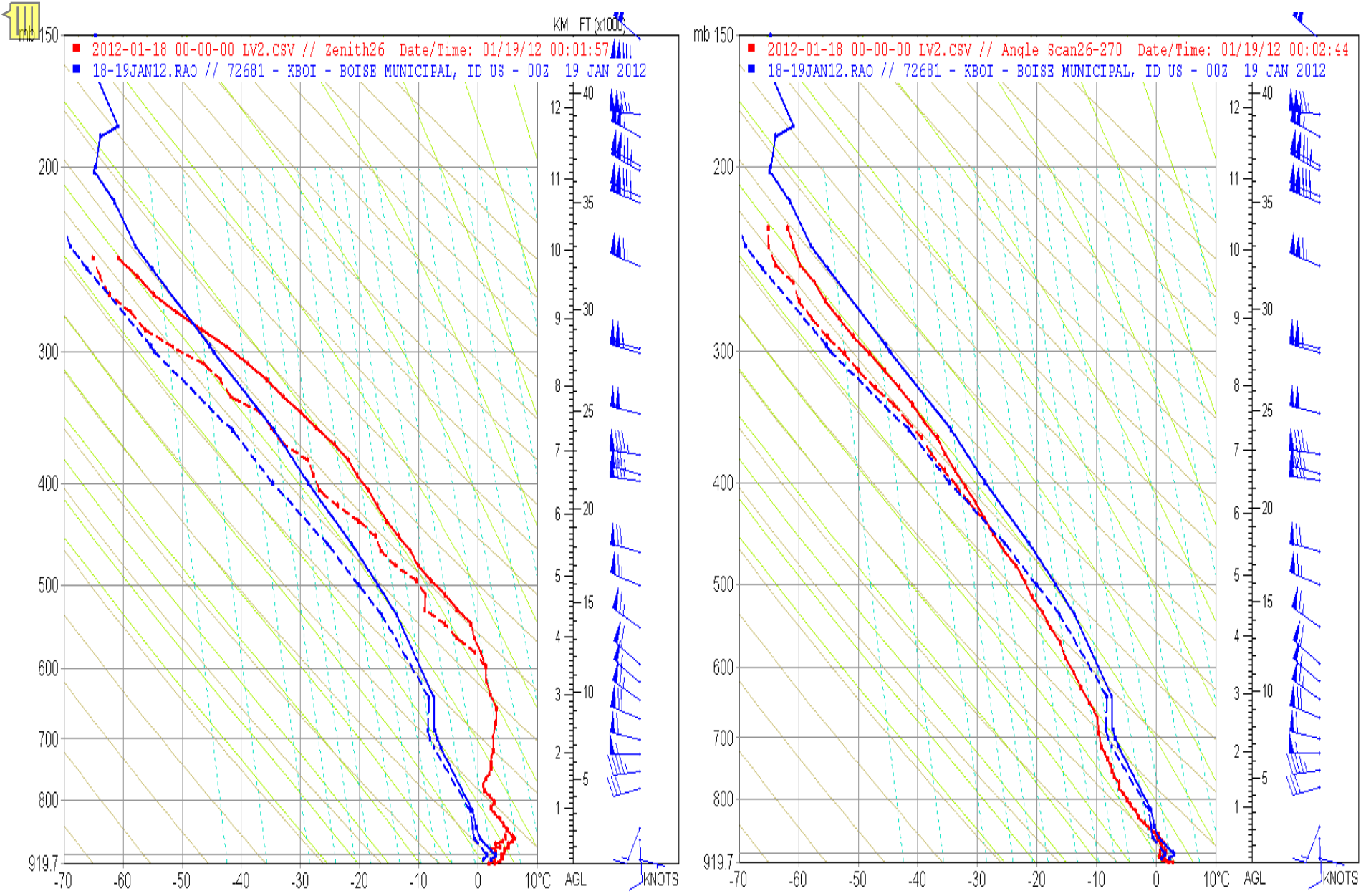
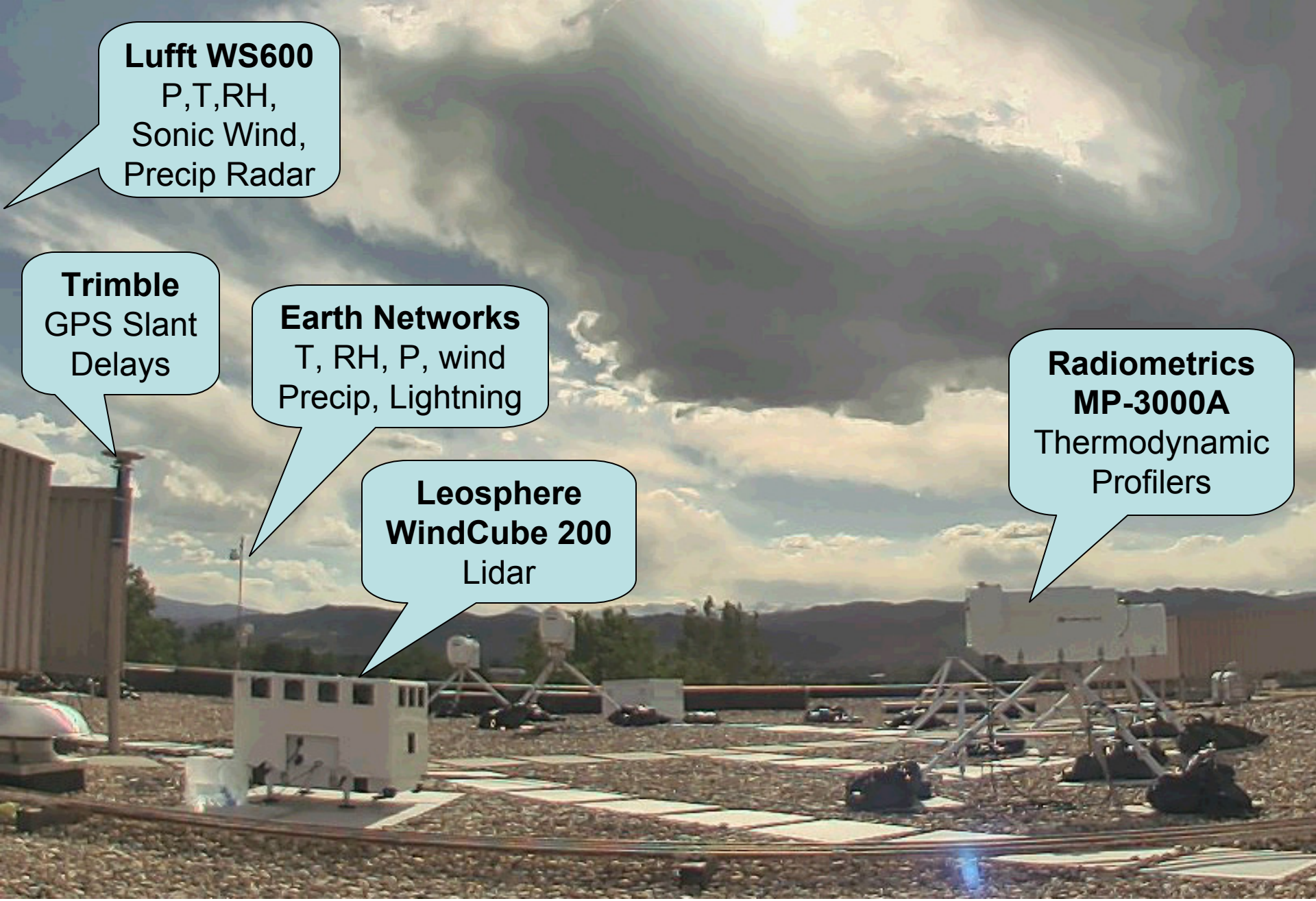


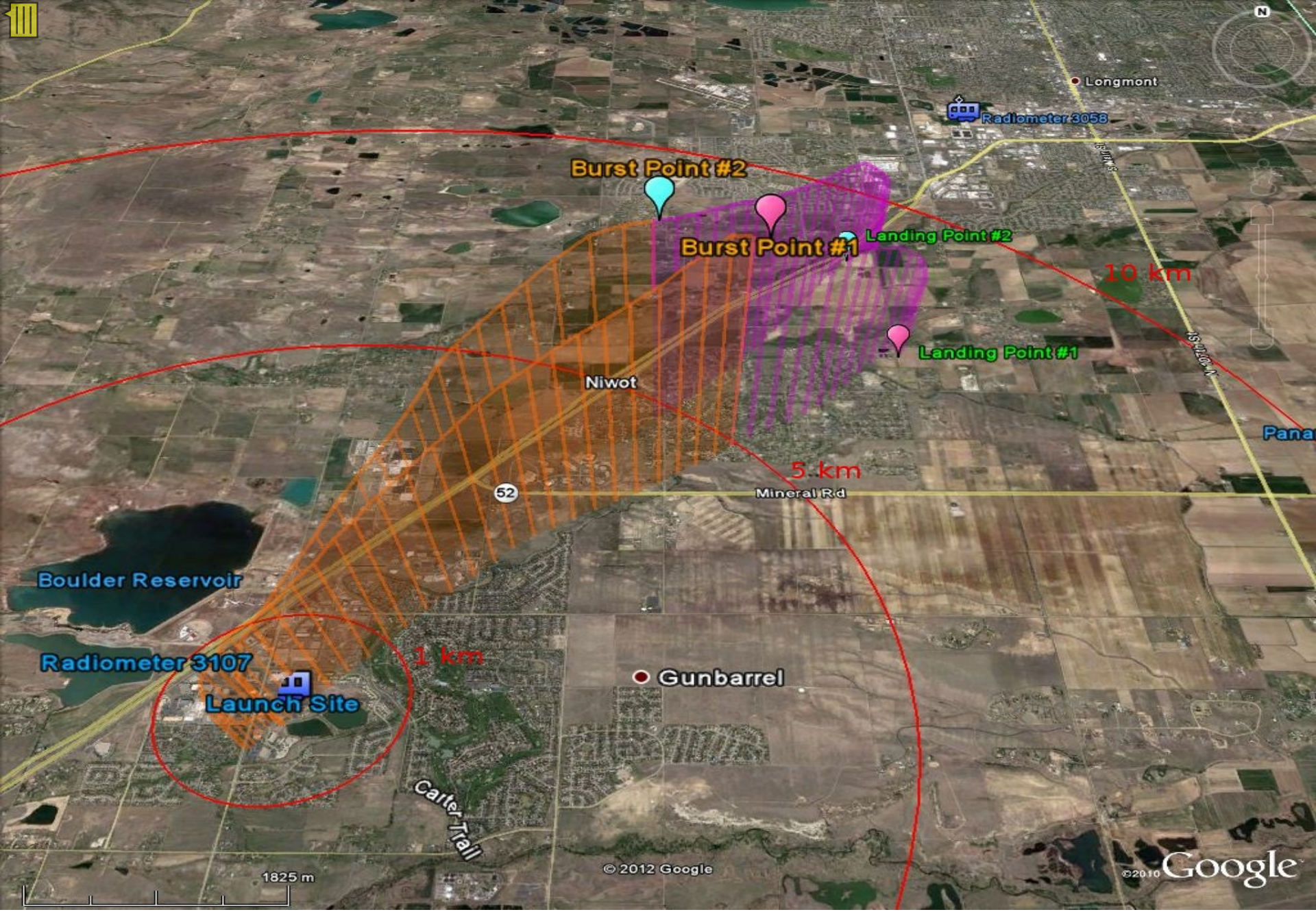
Radiometer (red) and radiosonde (blue) profiles; off-zenith retrieval (right) is accurate during heavy precipitation, off-zenith (left) is degraded.

RAOB software
www.raob.com

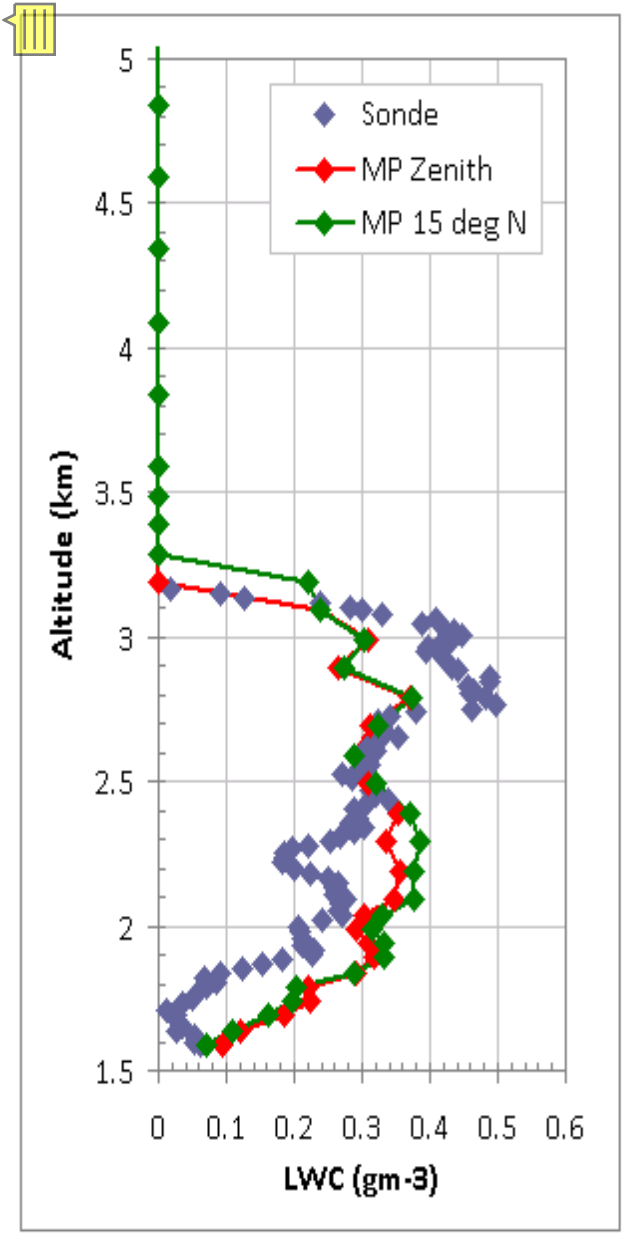
NCAR and NOAA staff launch radiosonde including supercooled liquid sensor

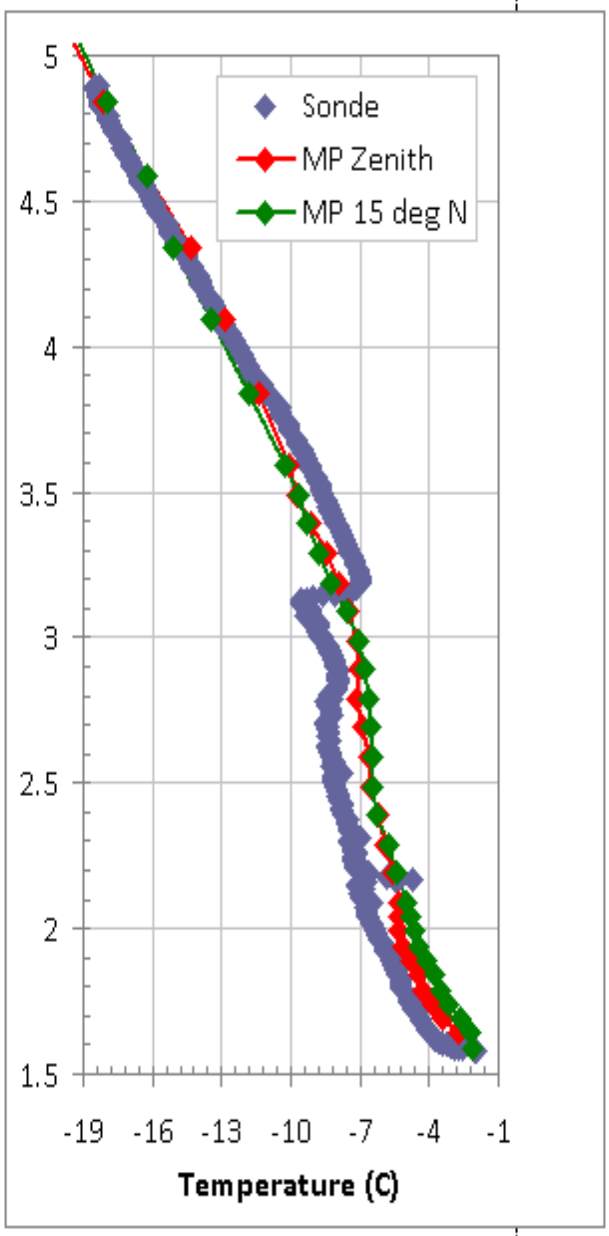


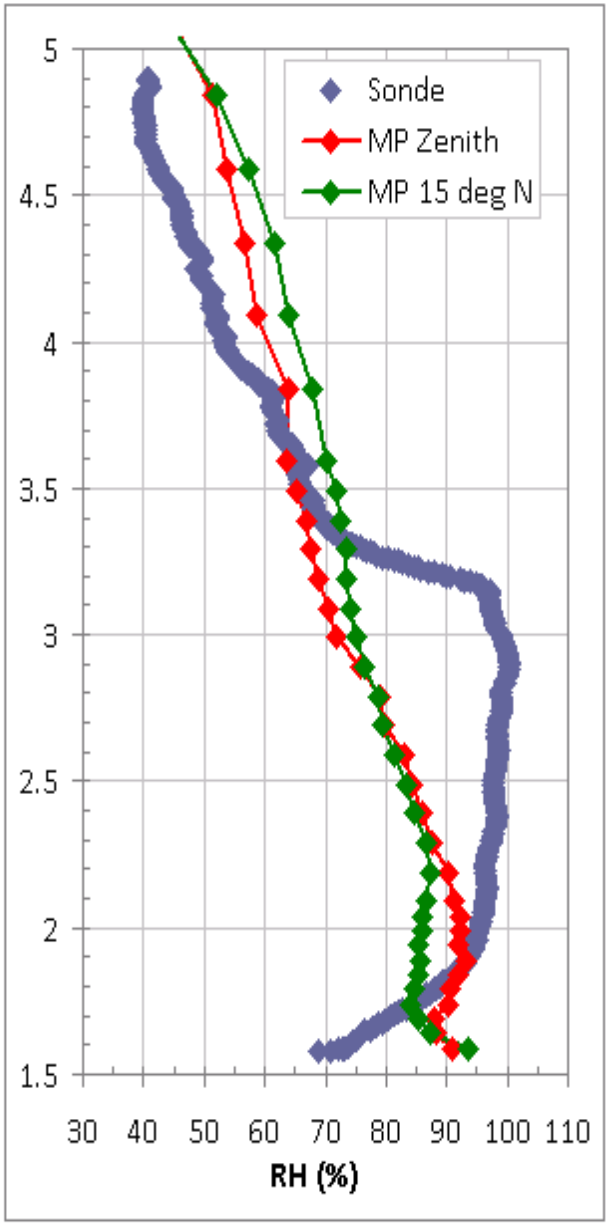
Atmospheric Observatory at Radiometrics (Boulder, CO)



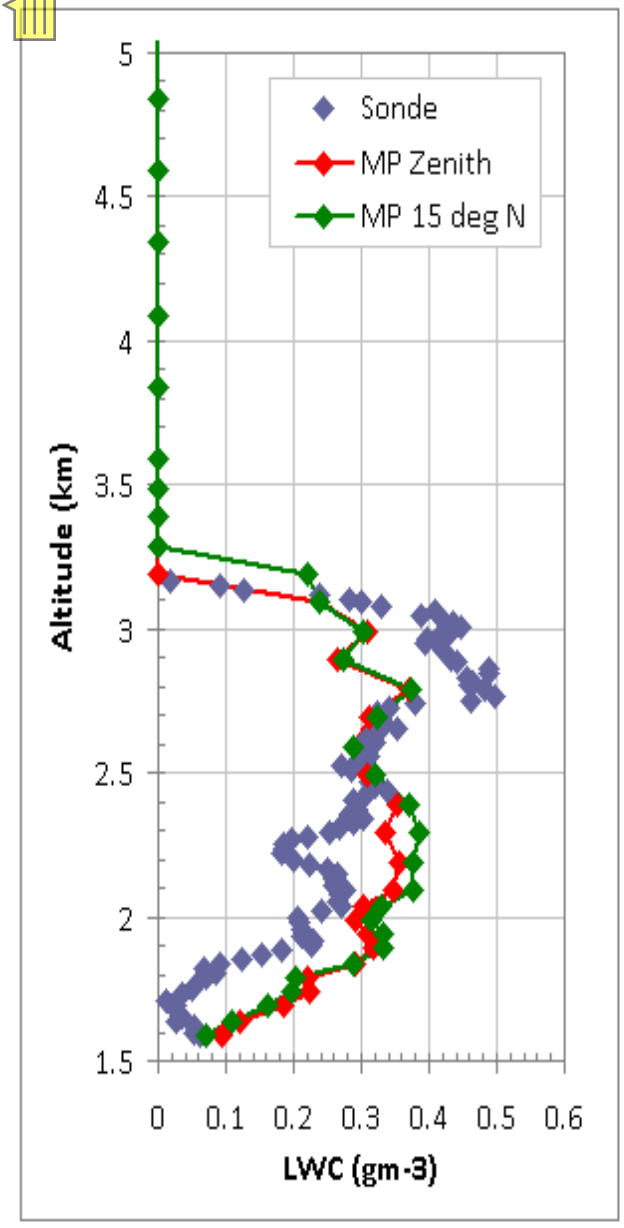
Radiosonde trajectories (launch #1 and #2)

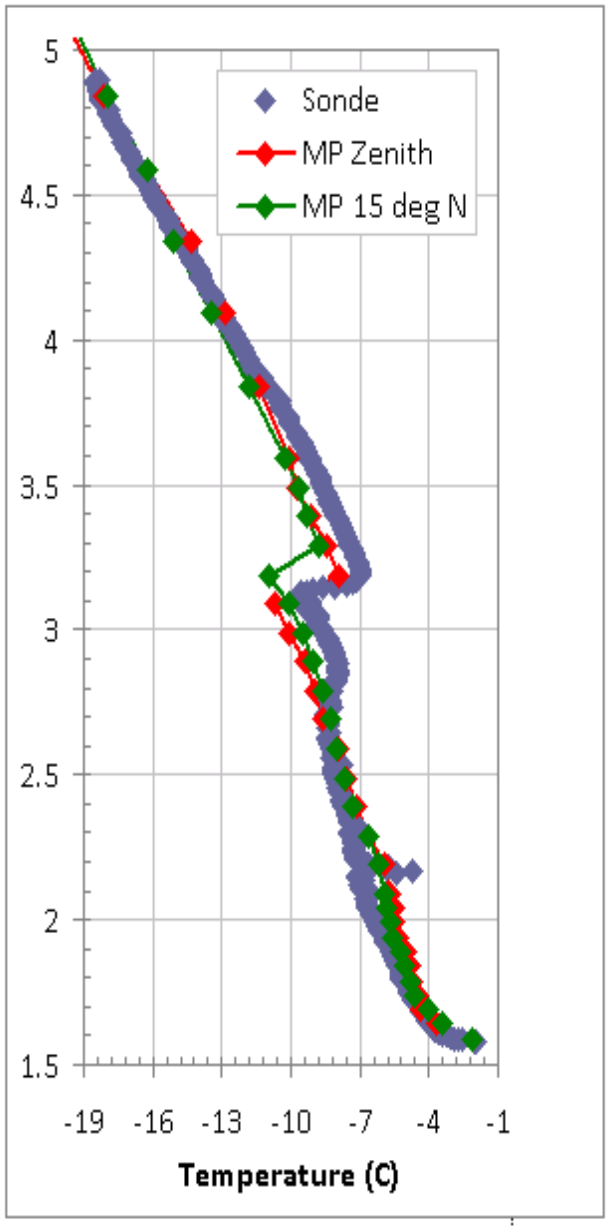


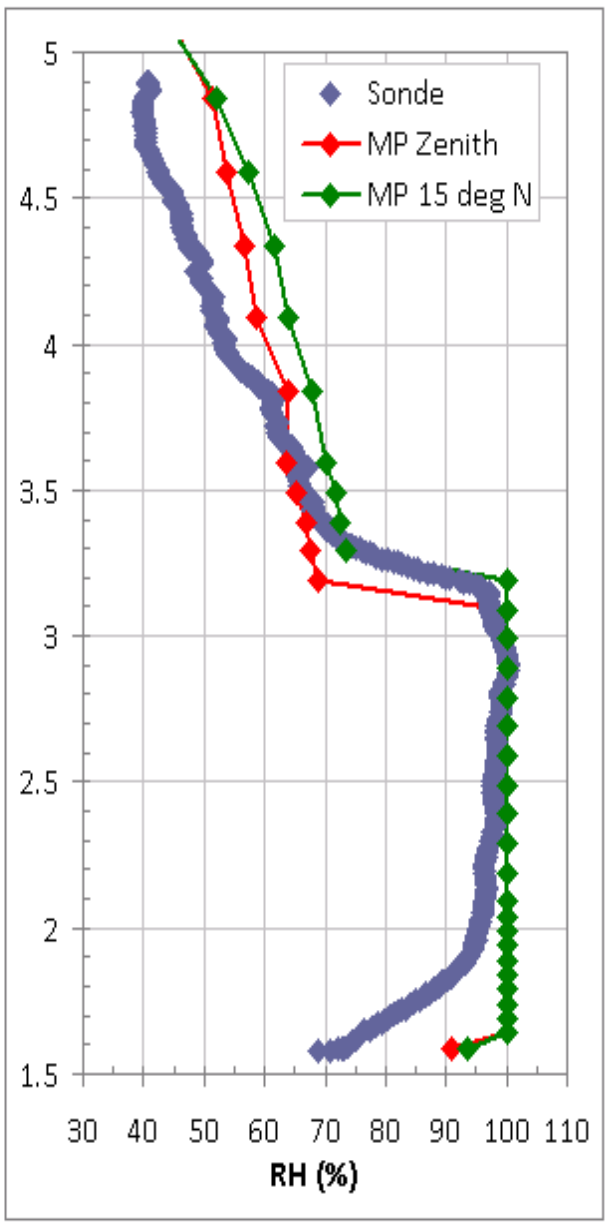




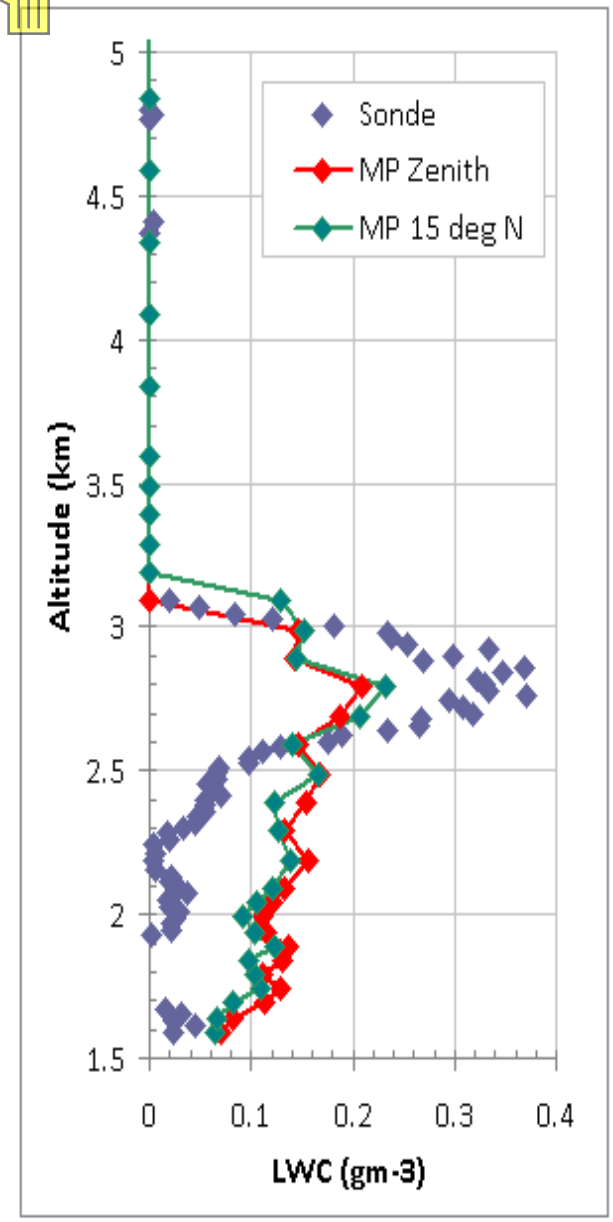
Launch #1 (blue) and radiometer (red, green) soundings including liquid cutoff <-11 C (arbitrary constraint) and raw radiometer T and RH retrievals

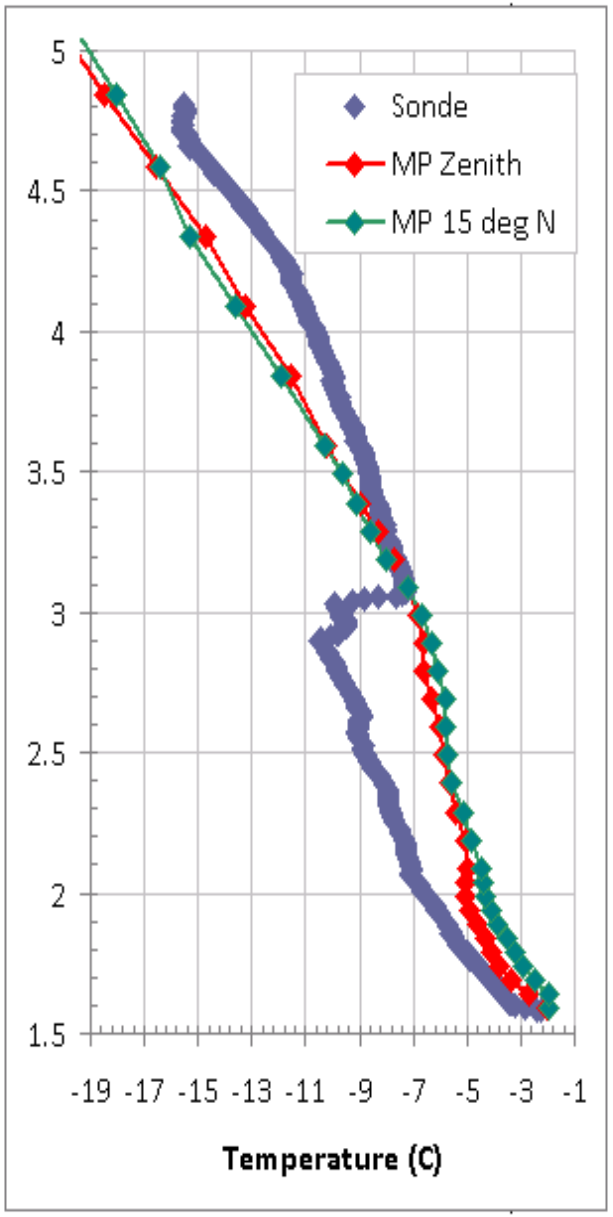


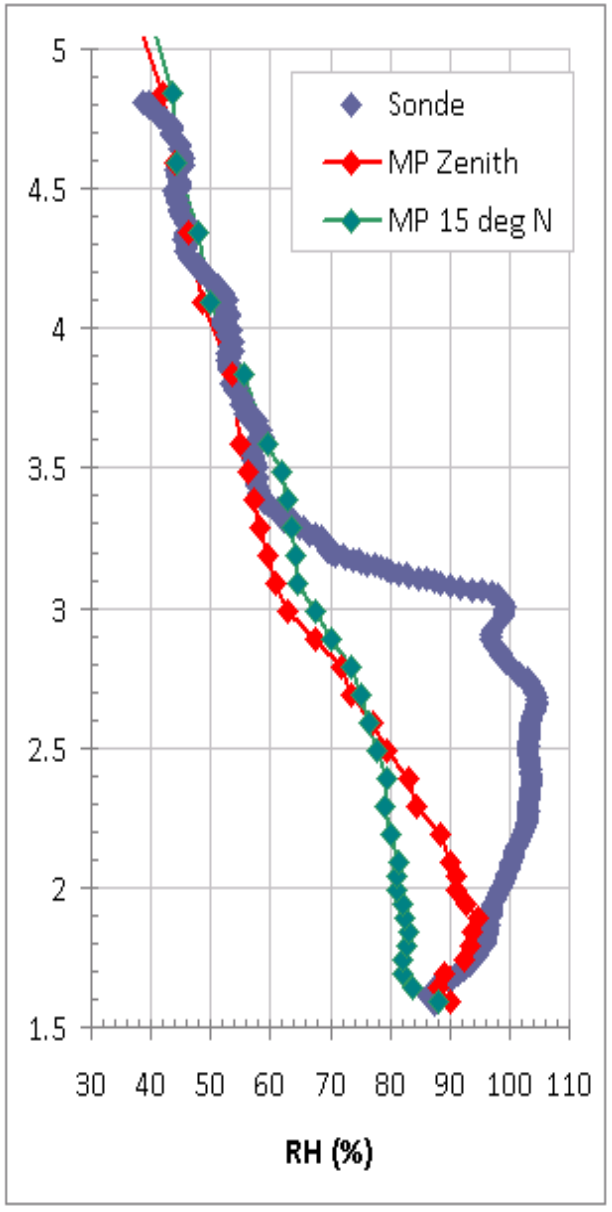




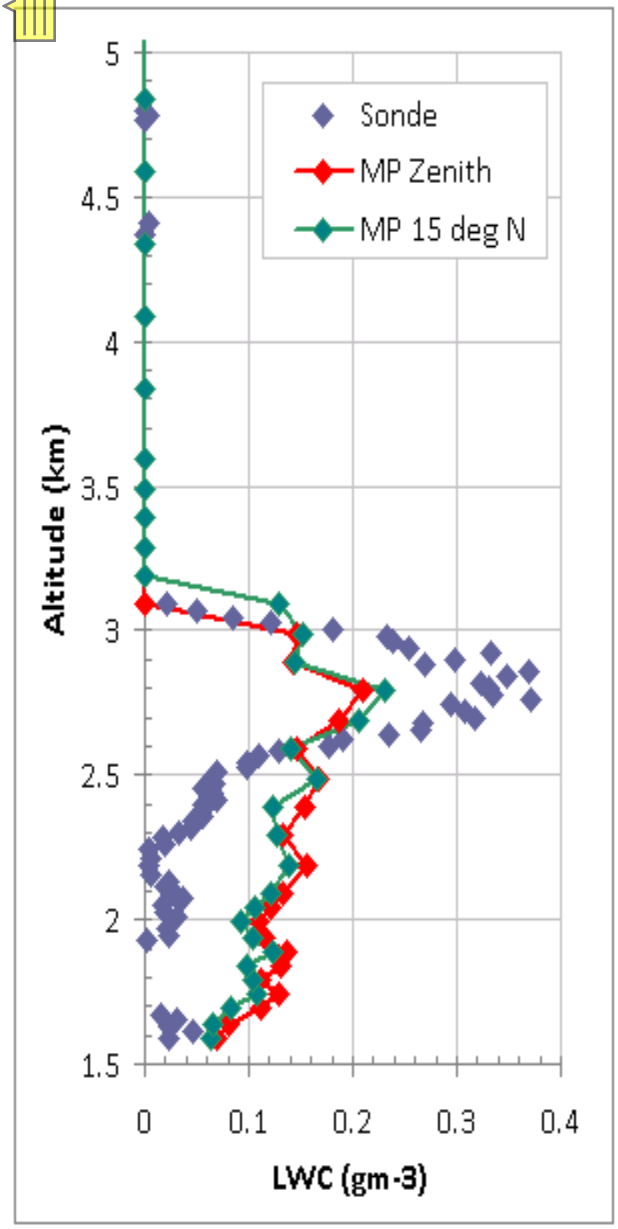
Launch #1 (blue) and radiometer (red, green) soundings including liquid cutoff <-11 C (arbitrary constraint) and T adjusted to saturate RH

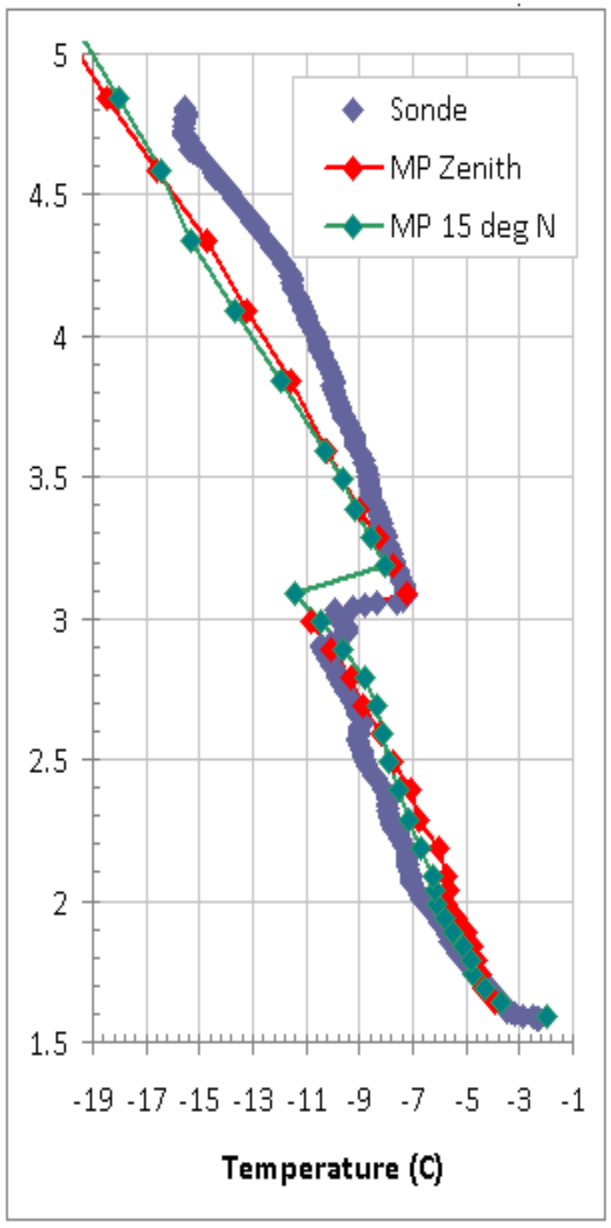


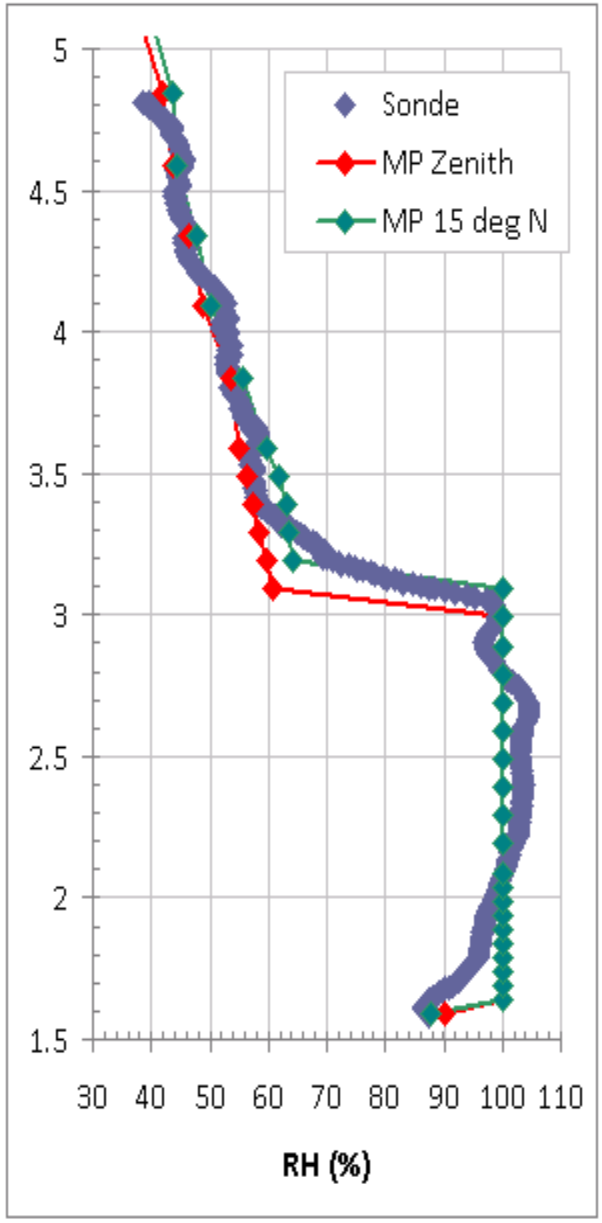




Launch #2 (blue) and radiometer (red, green) soundings including liquid cutoff <-11 C (arbitrary constraint) and raw radiometer T and RH retrievals







Launch #2 (blue) and radiometer (red, green) soundings including liquid cutoff <-11 C (arbitrary constraint) and T adjusted to saturate RH

radiometrics

- Thermodynamic profiling network roll out

Introducing the Boundary Layer Network

Real-time Profiles of the Atmosphere's Most Turbulent Layer

Real-time & Continuous Observations

Temperature, humidity and liquid profiles of the boundary layer and above are updated every six minutes. The BLN's increased update frequency over existing radisonde networks, which typically release balloons just twice a day, improves model accuracy and operational decision-making.

- Data for Improved Local Forecasts & Decision-Making
- Initial Deployment in California, Spring 2012
- 100 Radiometers Across the U.S. in the Next 3 Years


Utilities


Wind


Solar


Aviation


Air Quality


Water Management

Earth Networks℠ | radiometrics

www.earthnetworks.com/Products/BoundaryLayerNetwork.aspx

Earlier Warning of High-Impact, Local Weather

Improved information about the instability of the atmosphere enables advanced notification of convective initiation that leads to severe thunderstorms and tornadoes. The BLN is a critical tool in the battle to increase the speed and accuracy of severe weather warnings.

Better Forecasts, Better Decisions

Continuous observations of the boundary layer from fixed locations feed mesocale models hungry for real-time ,localized data. The result is improved forecasts and better decision-making across numerous industries including utilities, wind, solar, aviation, air quality and water management.

Utilities | Wind | Solar | Aviation | Air Quality | Water Management

Earth Networks℠ | radiometrics

www.earthnetworks.com/Products/BoundaryLayerNetwork.aspx