

Aura validation meeting 21 September 2005

Water vapor observations
during Ticosonde-Aura/TCSP 2005:
Comparisons with AURA/MLS and RS92

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Balloon payload

- 24 Balloon launches during July 8 – July 25
- Water Vapor : CU Cryogenic Frostpoint Hygrometer (CFH)
- P T U: Vaisala RS80 and Vaisala RS92
- Ozone: ECC ozone sonde + GPS

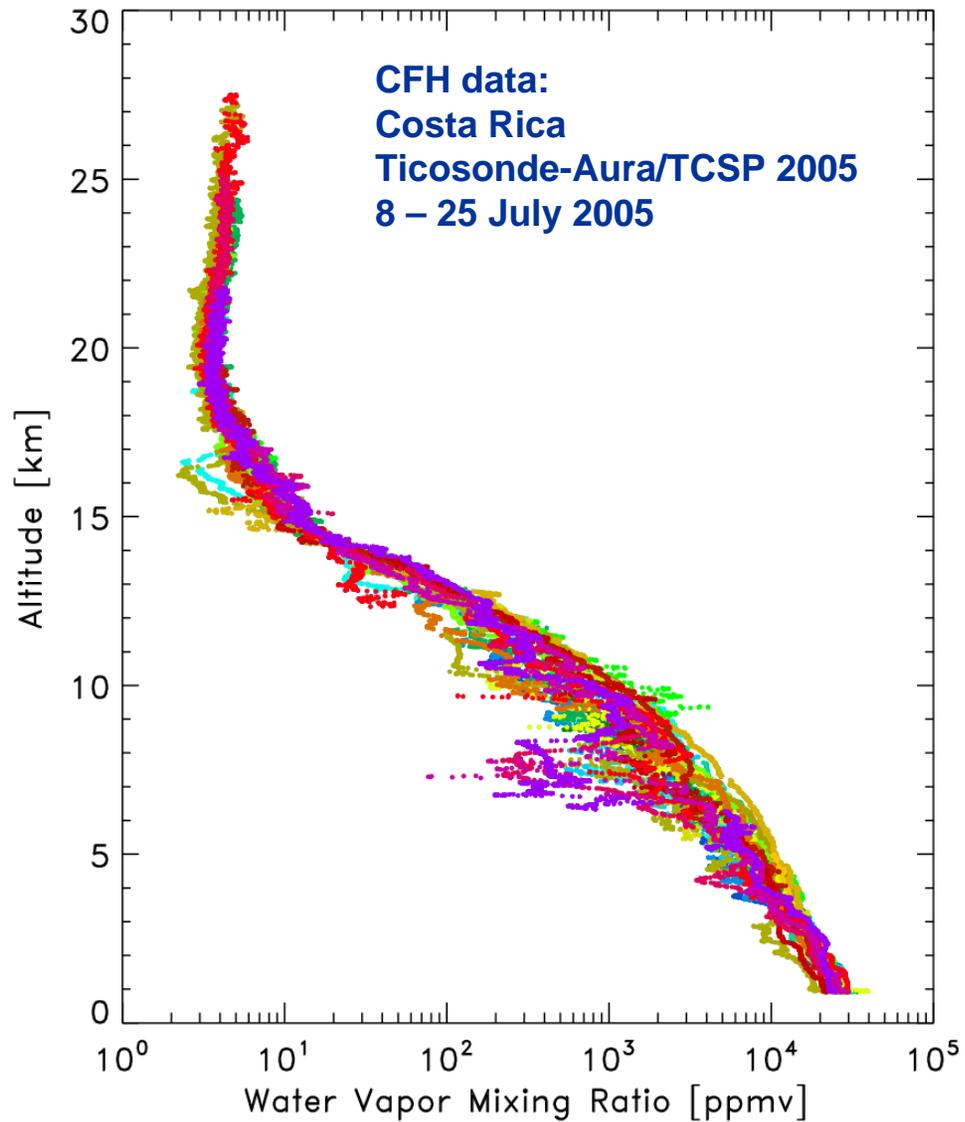
University of Colorado Cryogenic Frostpoint Hygrometer (CFH) sonde

- New instrument based on old NOAA/CMDL frost point hygrometer
- Microprocessor control
- Electronic sunlight filter
- Continuous PID update
- No liquid/ice ambiguity
- Vertical Range: surface to ≈ 28 km
- Uncertainty : troposphere: $< 5\%$
stratosphere: ~ 10
- Weight: ~ 400 gr



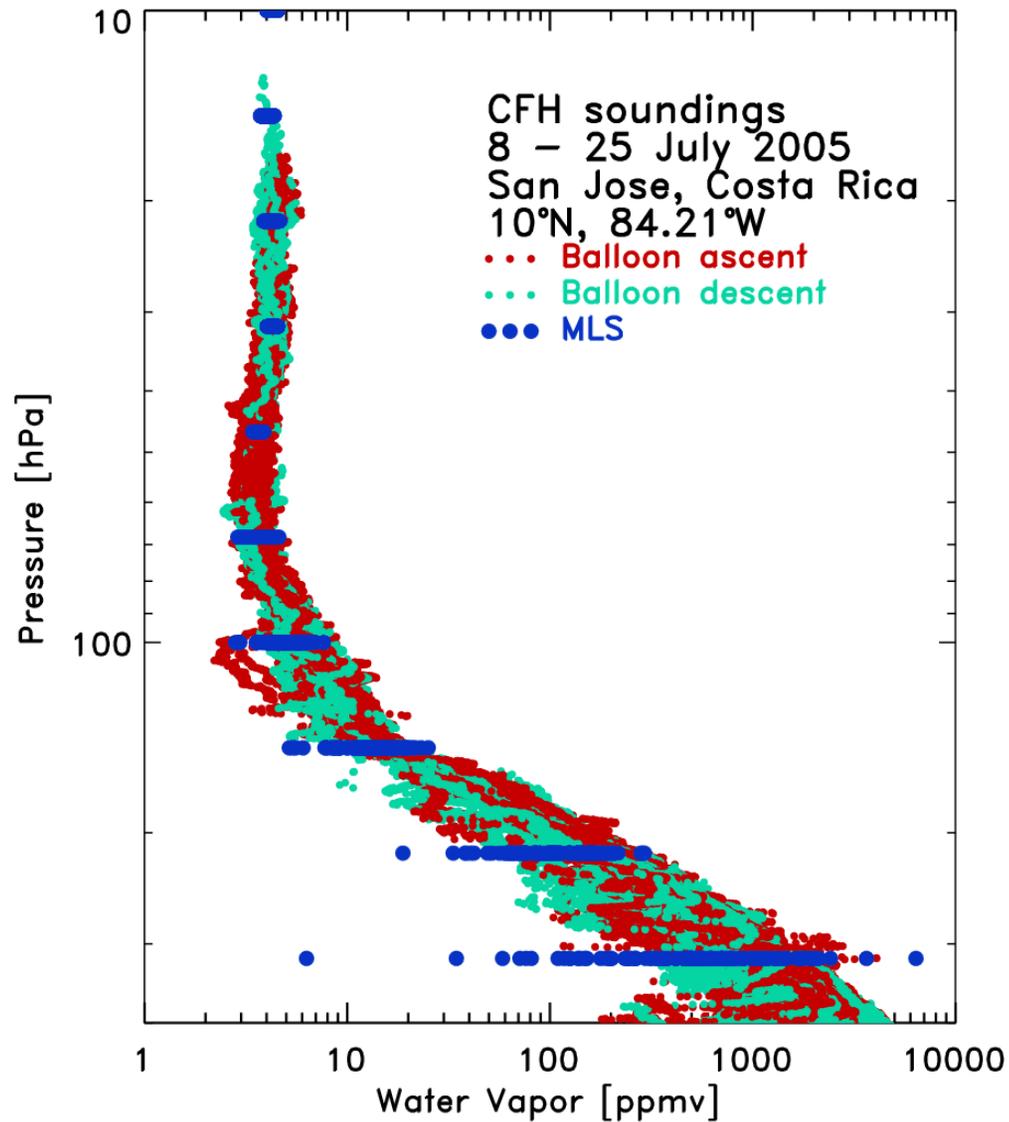


Water vapor mixing ratio

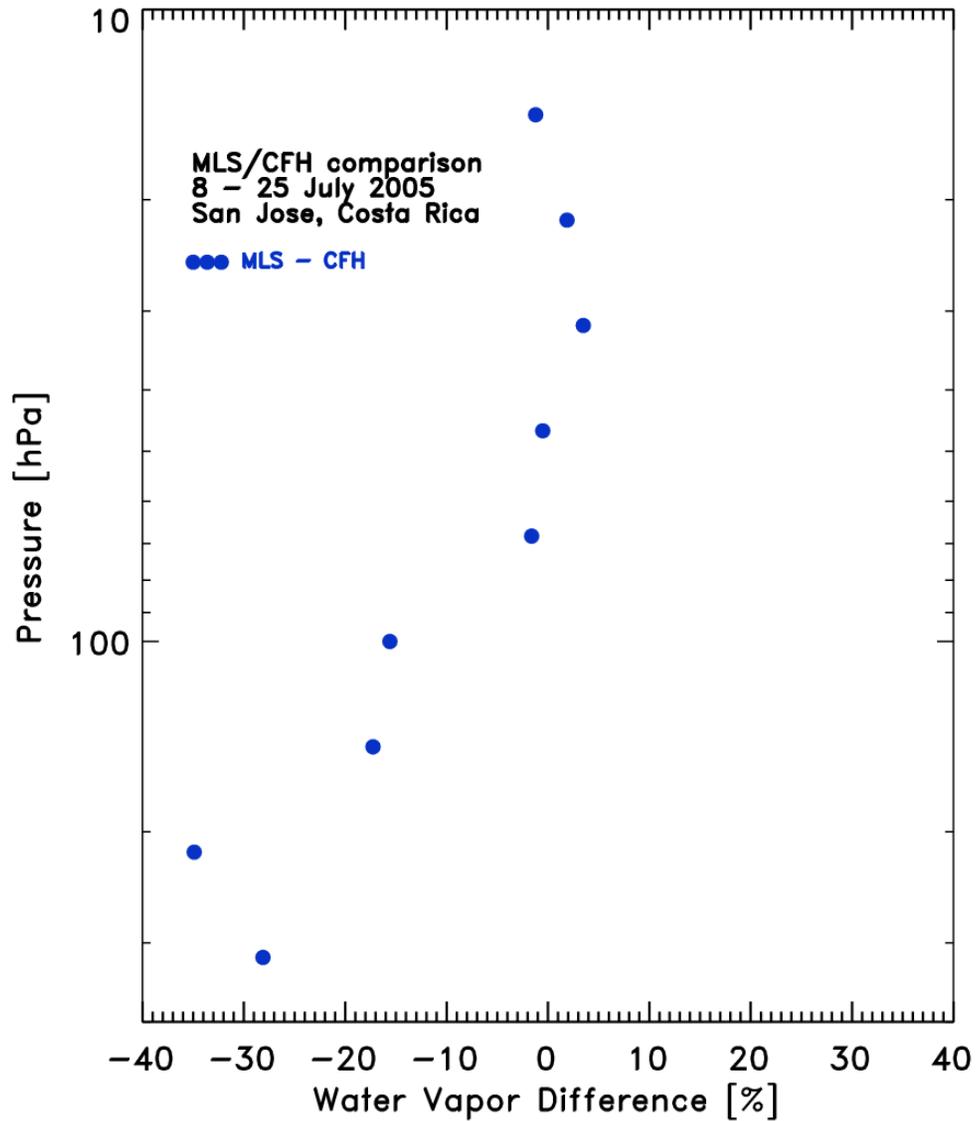


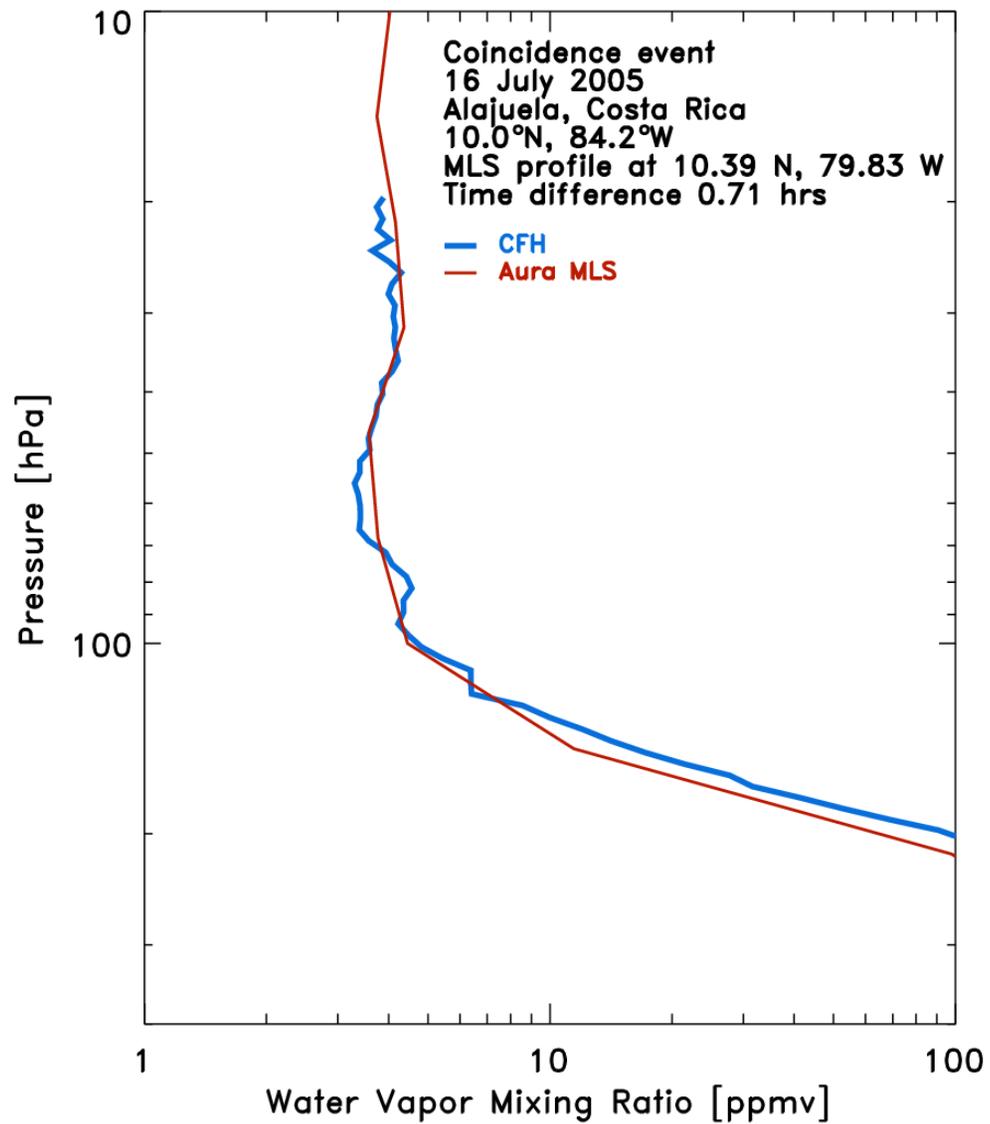
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- Aura/MLS comparisons with CU-CFH

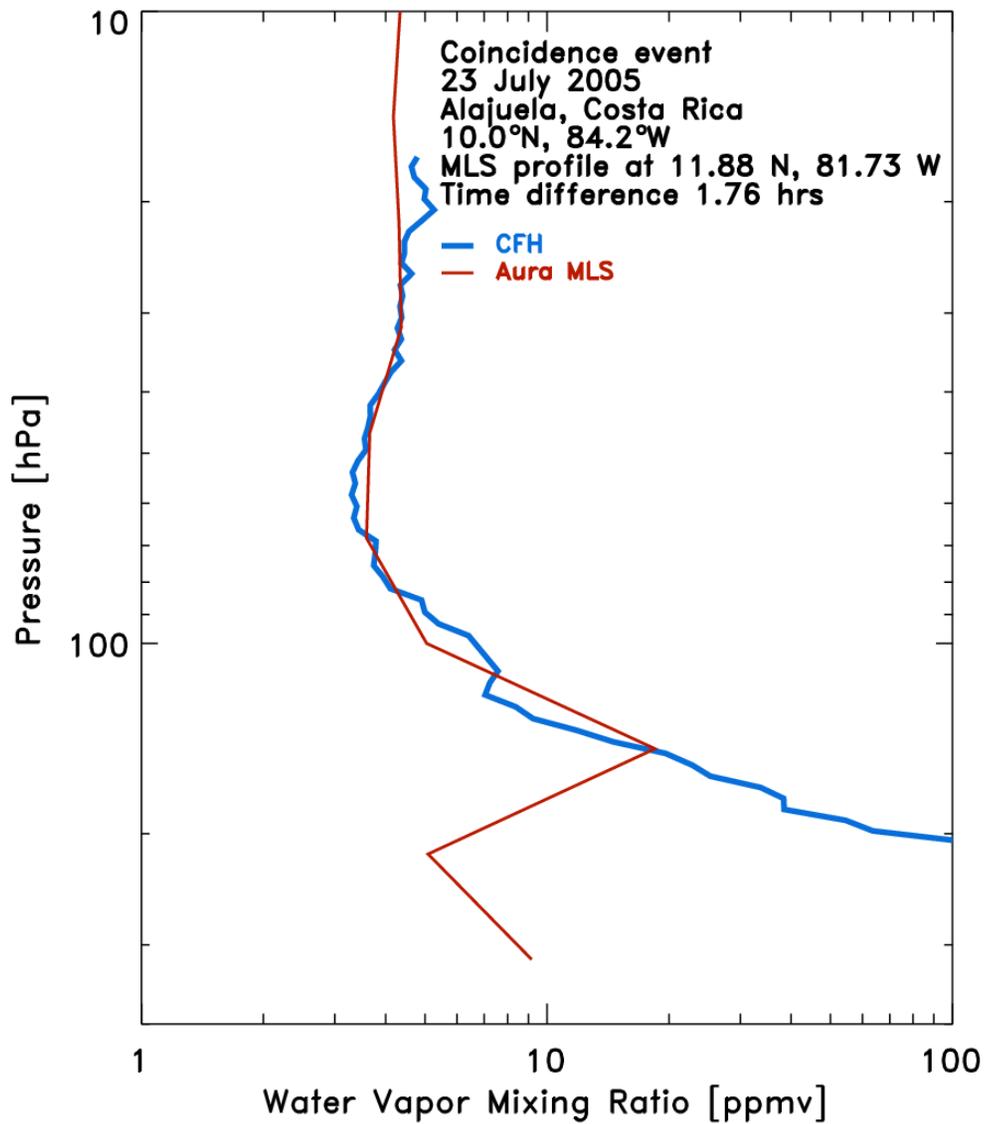
Satellite comparison

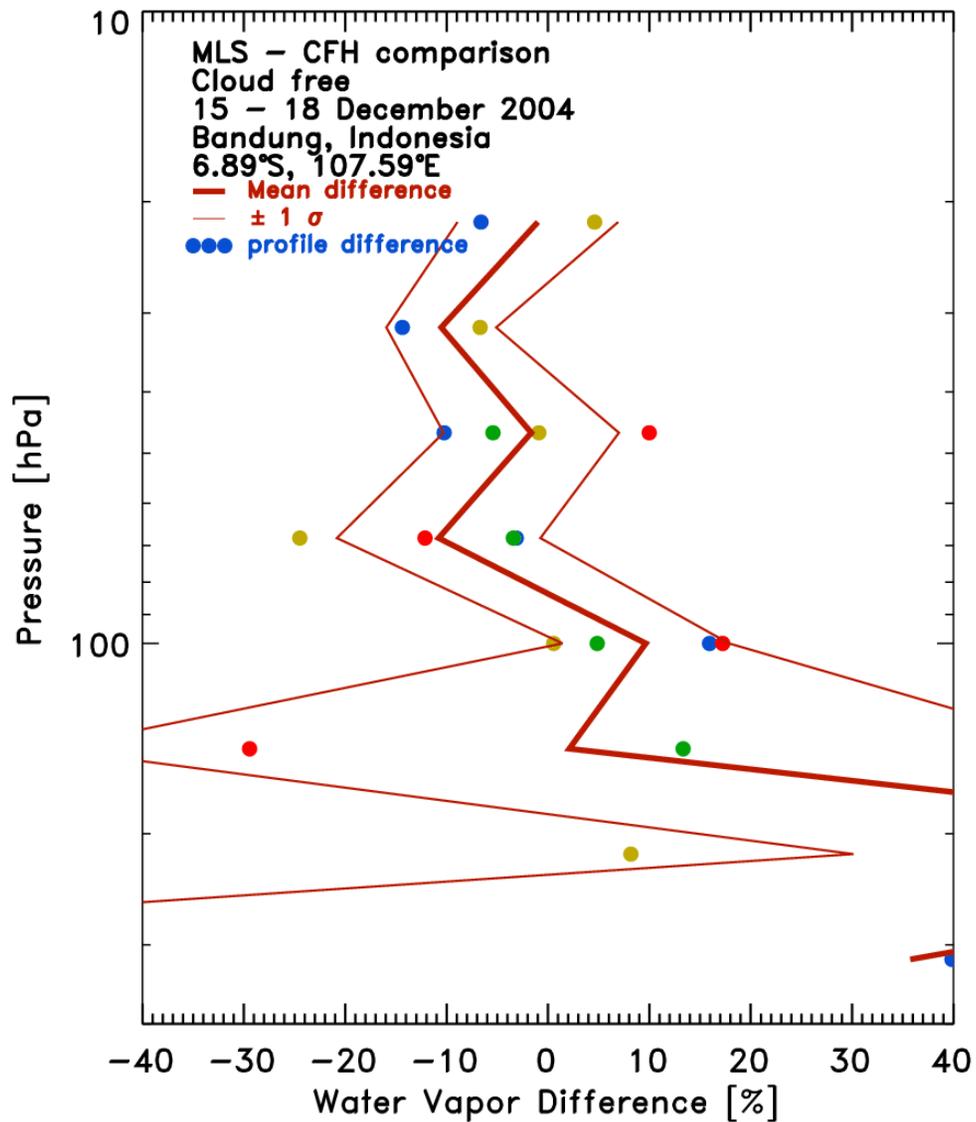


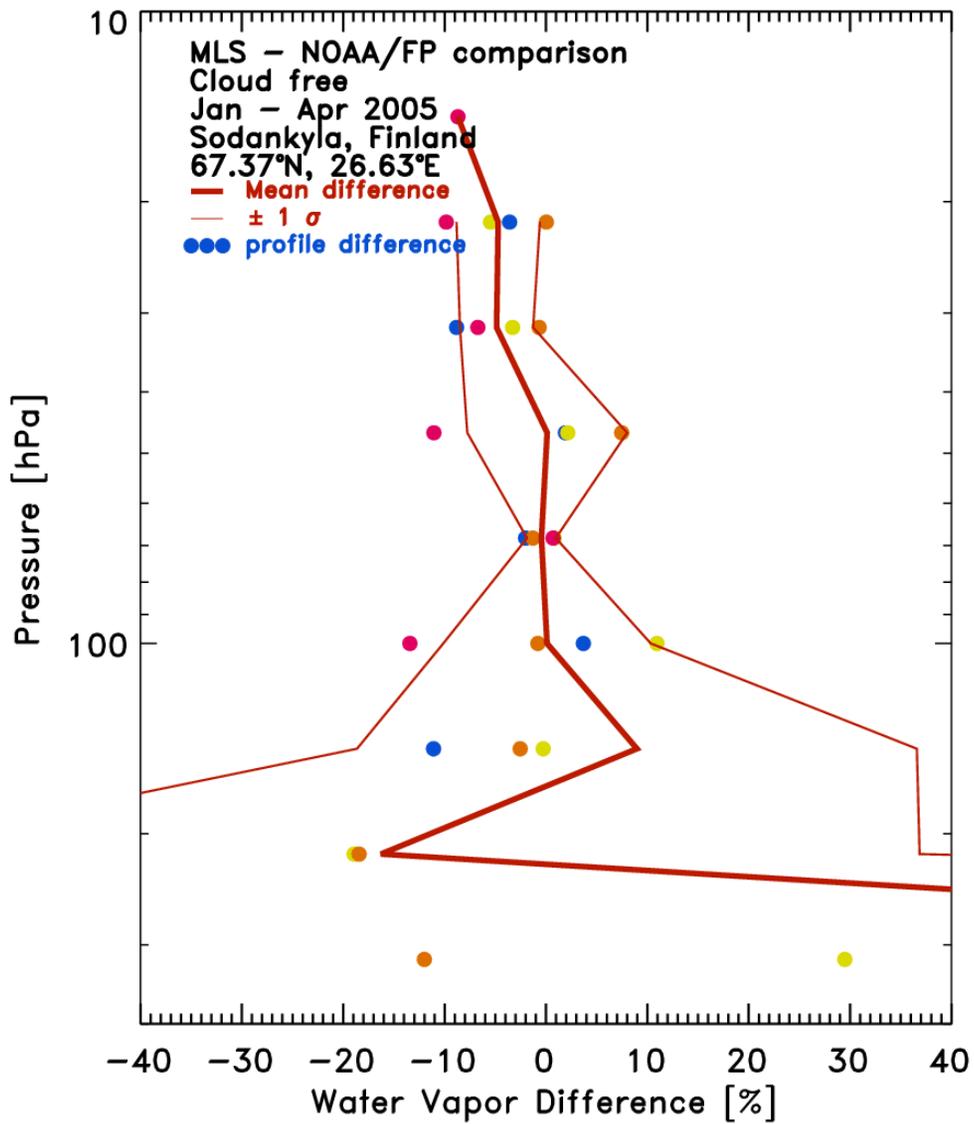
Satellite comparison

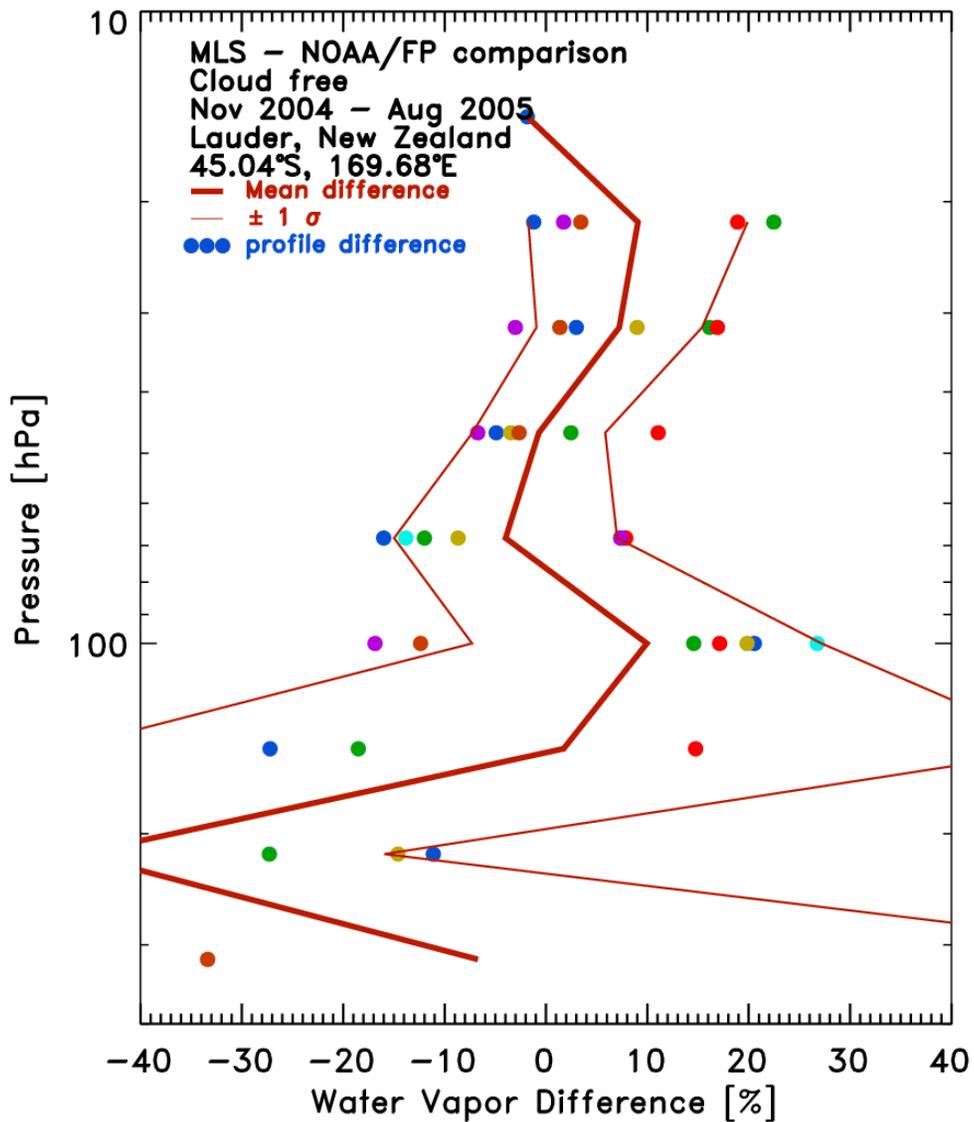


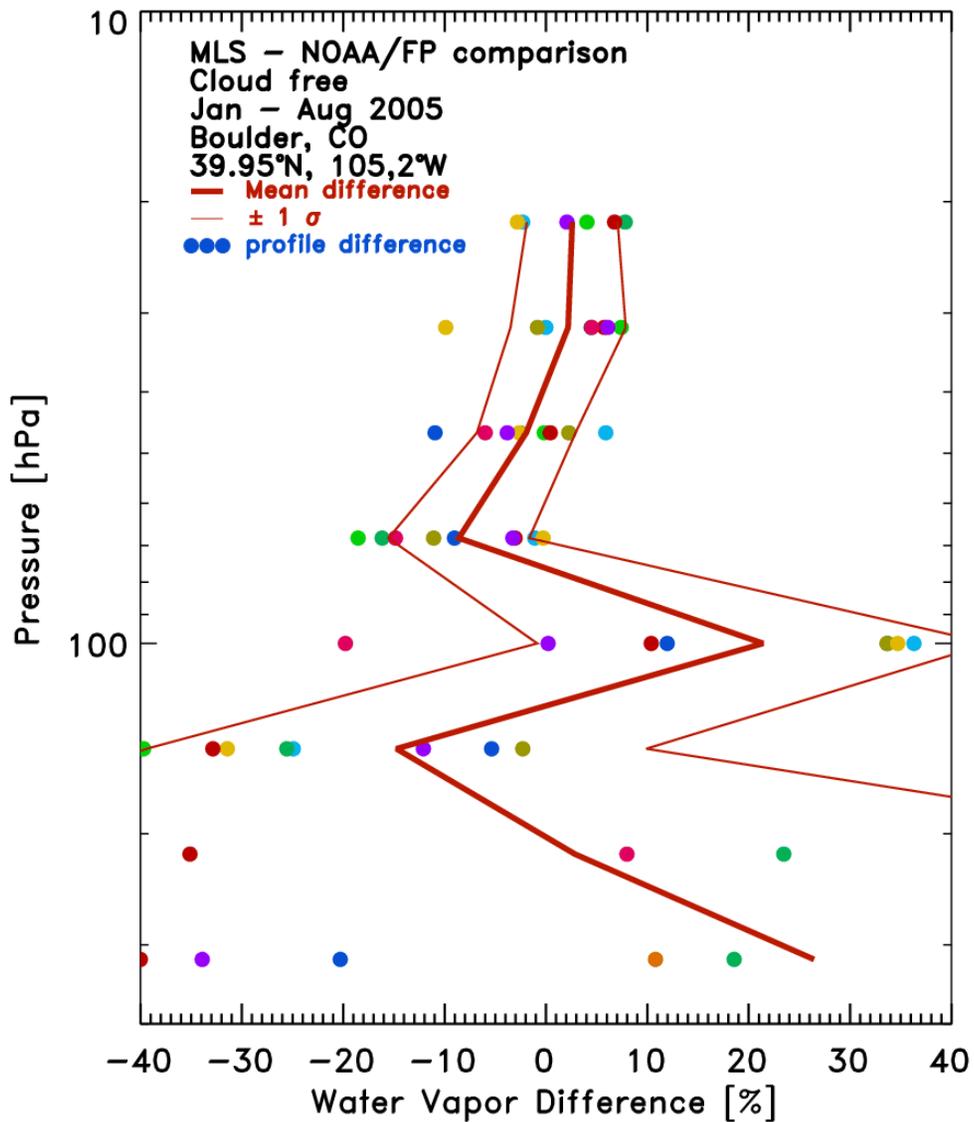






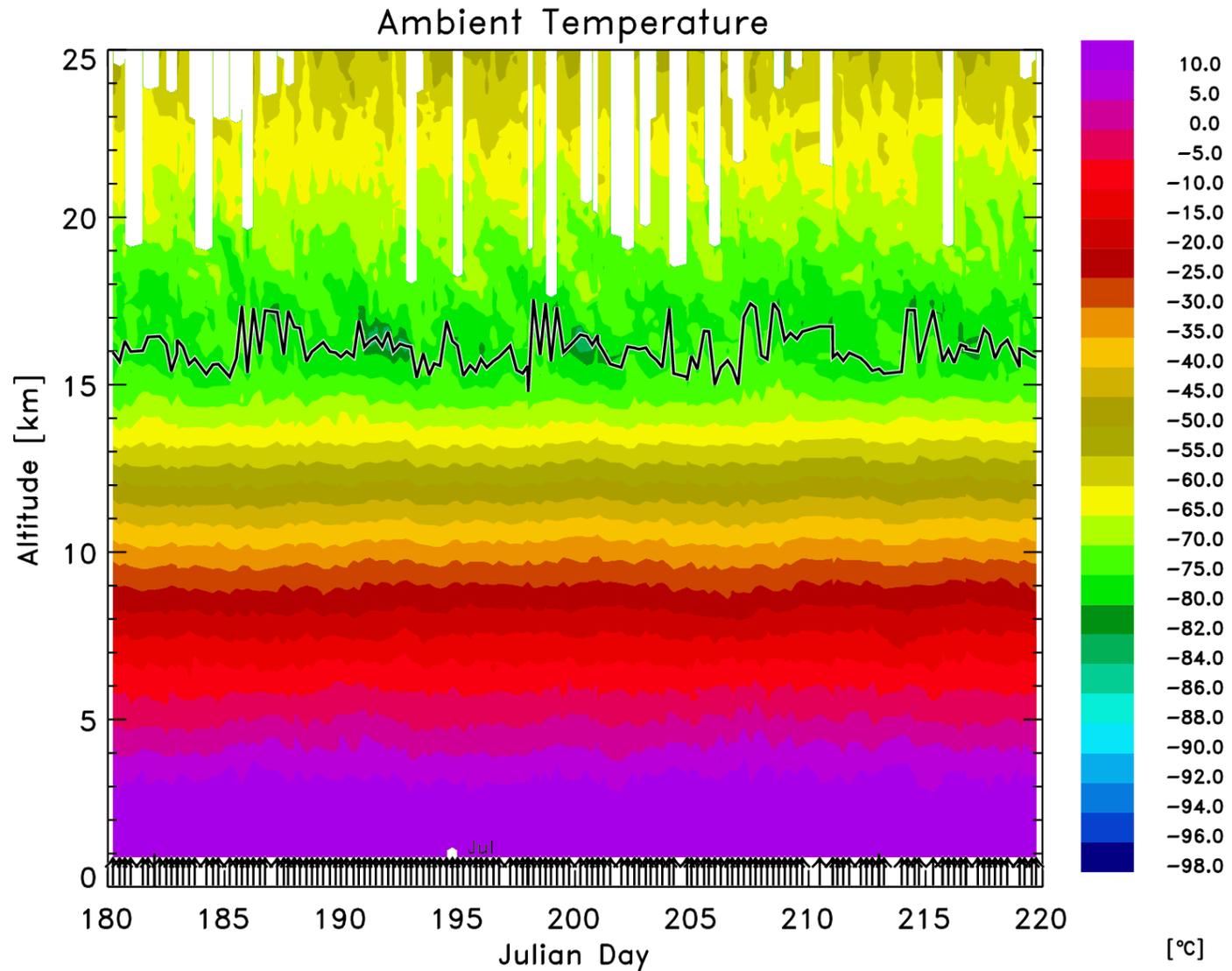




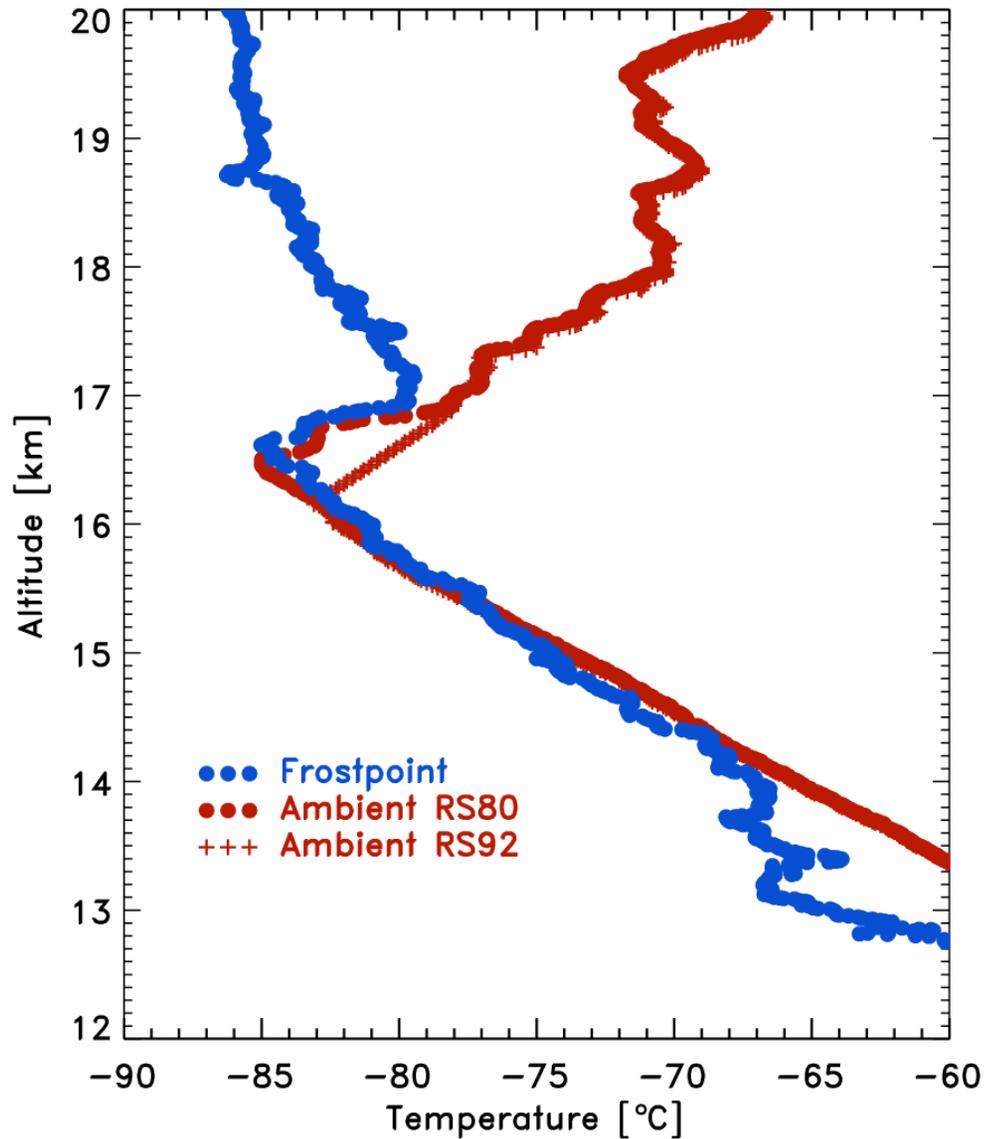


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- Tropopause dehydration event

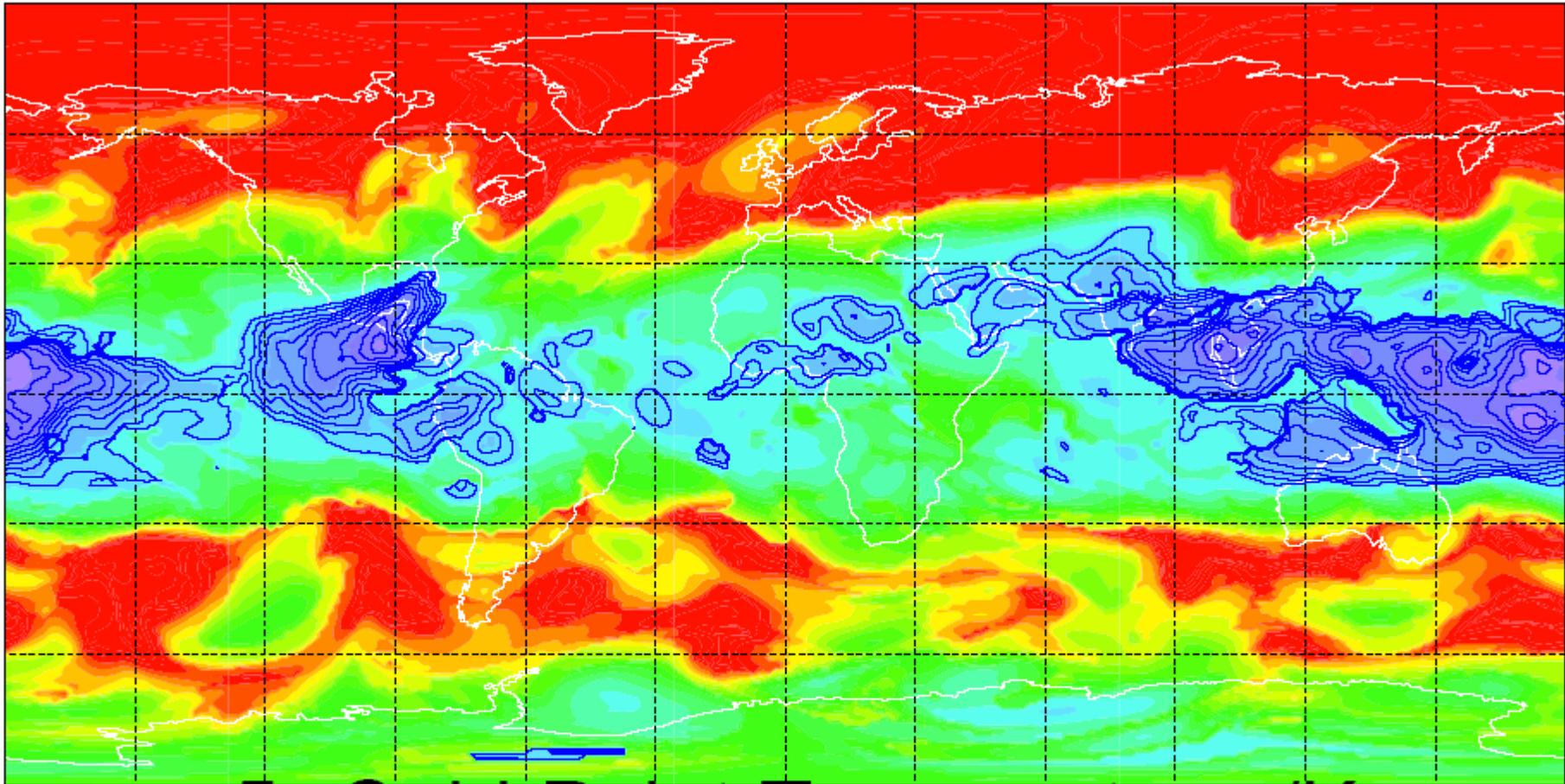
Temperature, Costa Rica July 2005



Dehydration event 11 July 2005



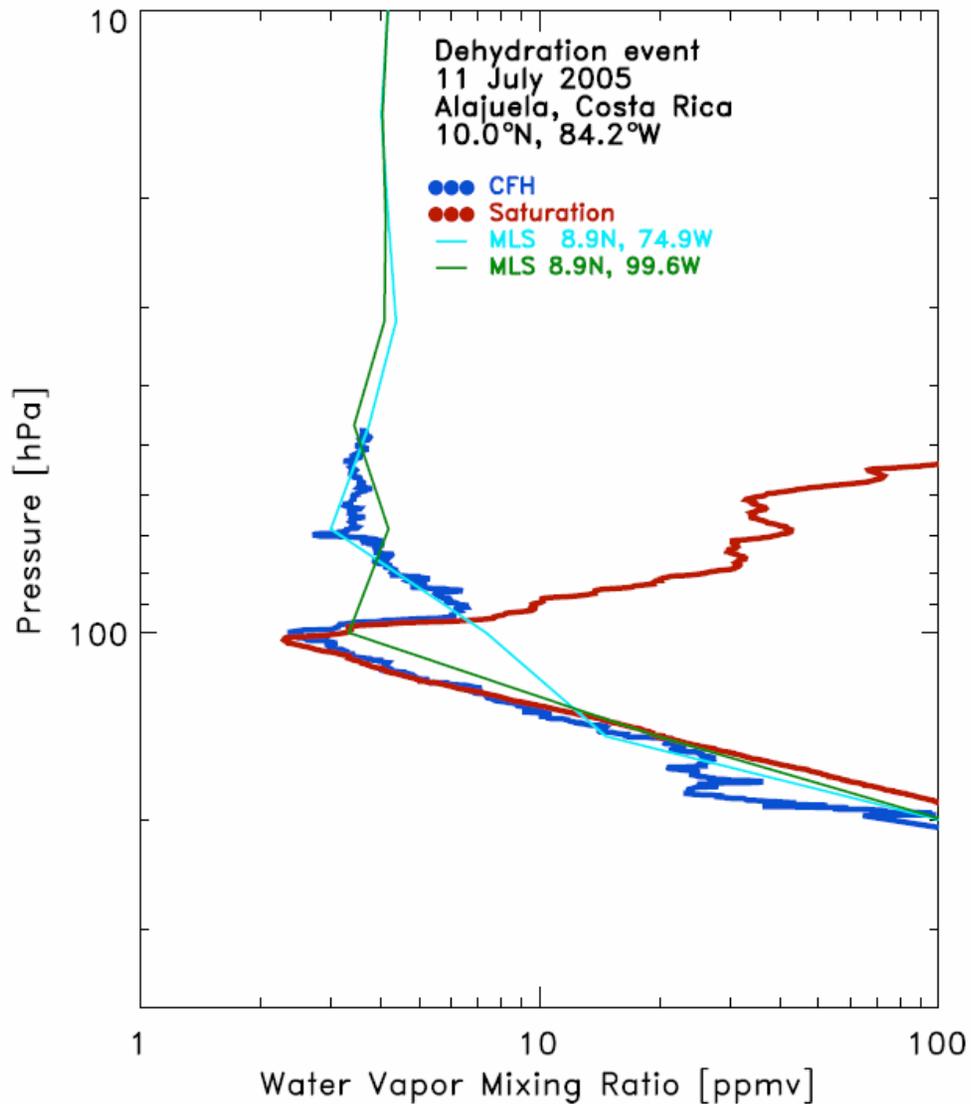
11 July 2005



5. Cold Point Temperature /K

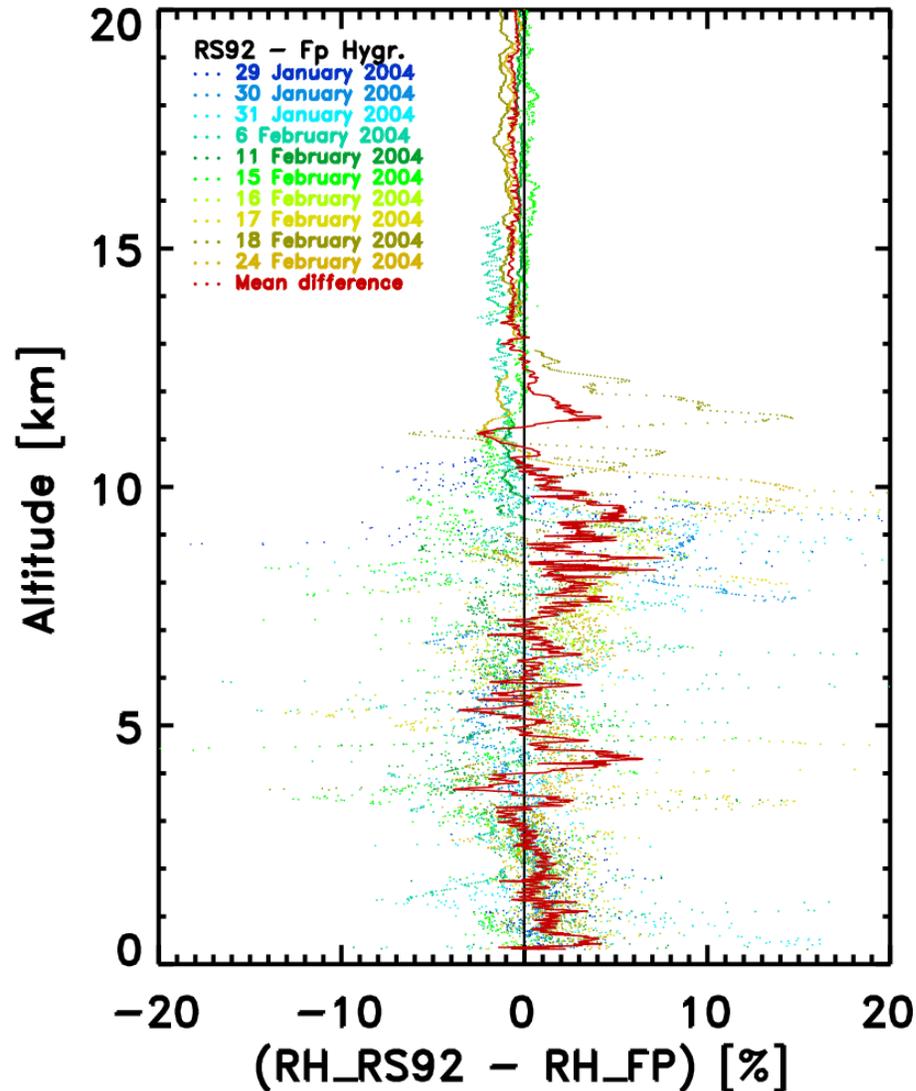


Dehydration event 11 July 2005

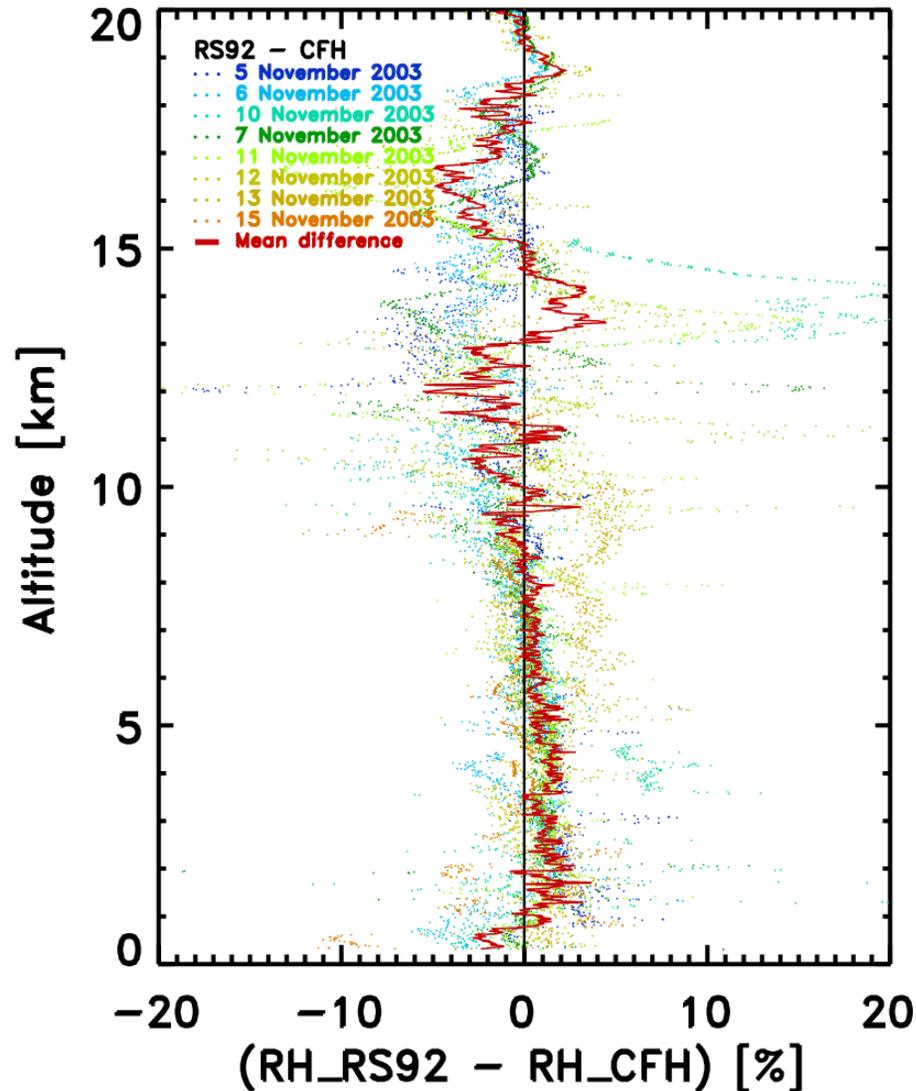


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- RS92/RS90 comparisons with CU-CFH

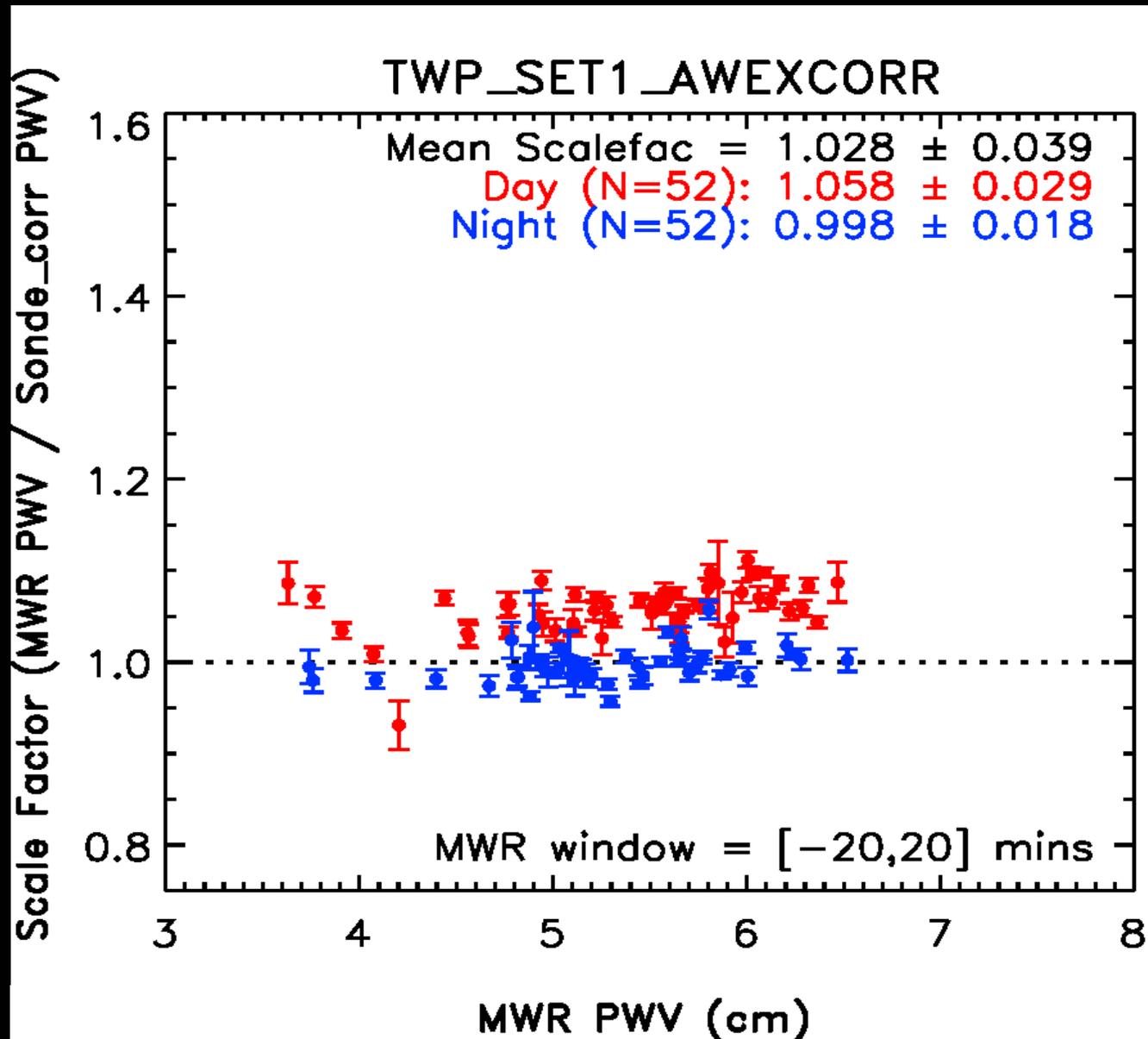
RS92 comparison LAUTLOS, Sodankylä, Jan/Feb 2004



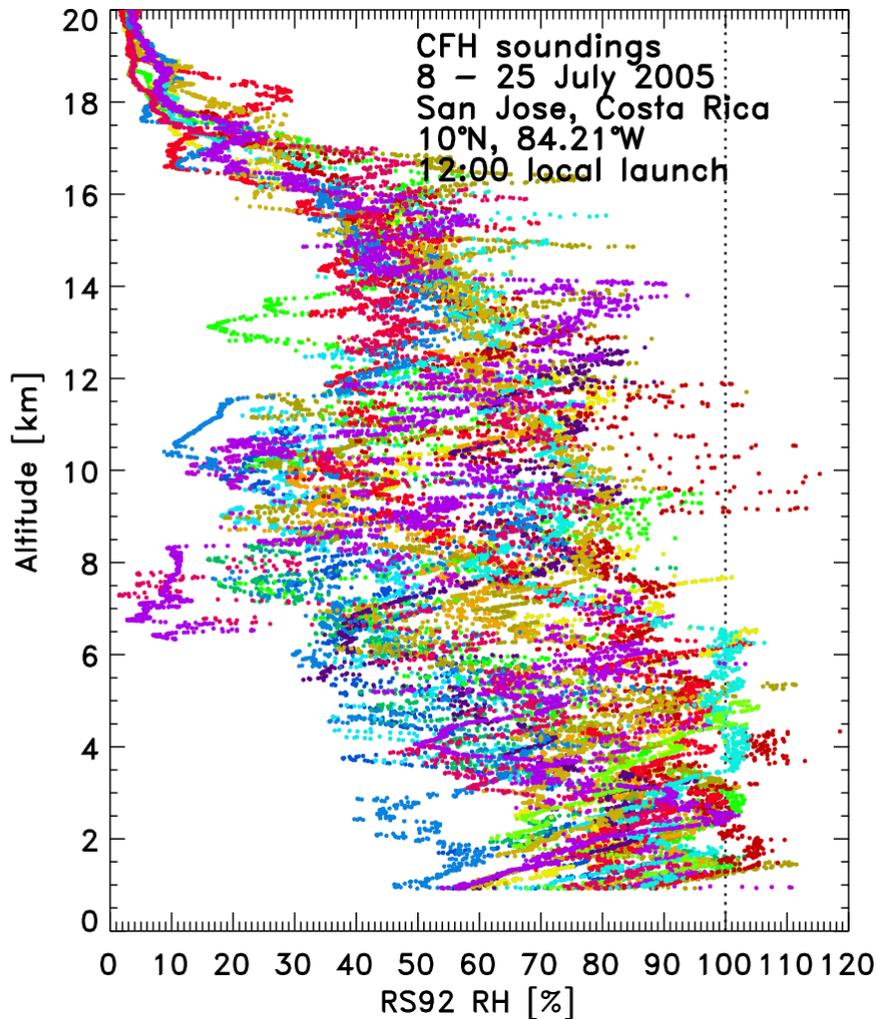
RS92 comparisons AWEX, Oklahoma, Nov 2003



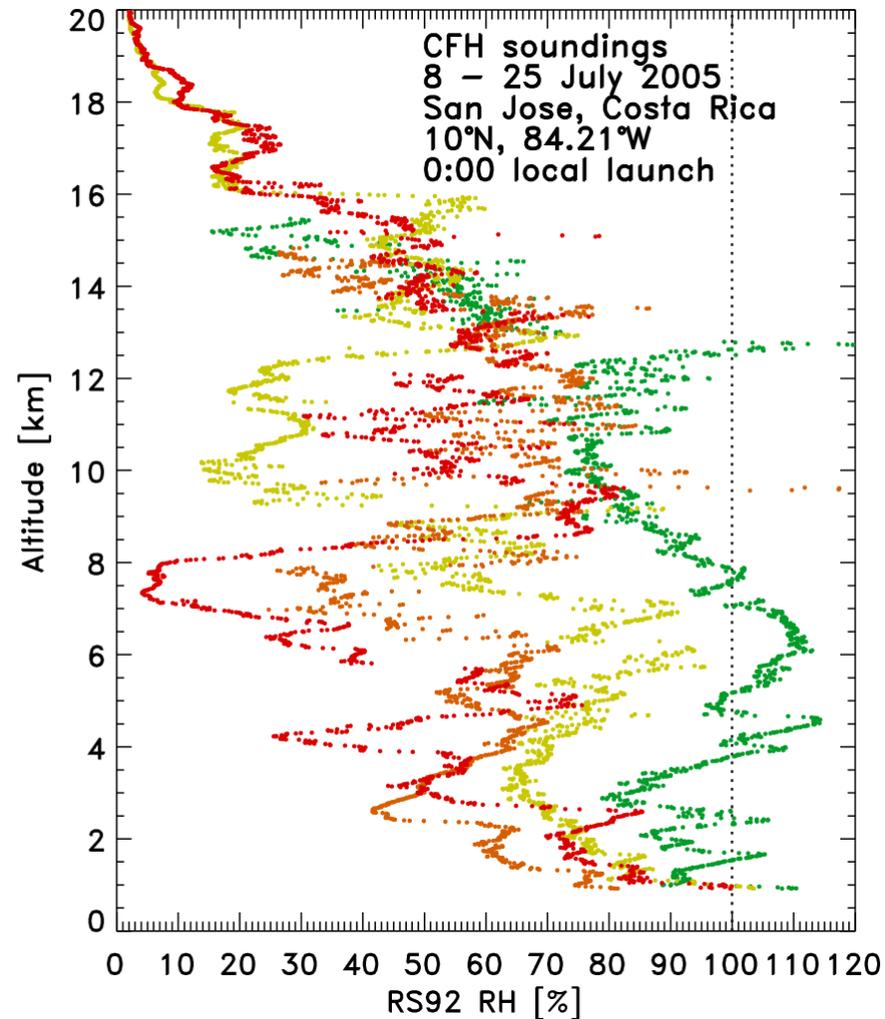
ARM Microwave scaling



RS92 comparison

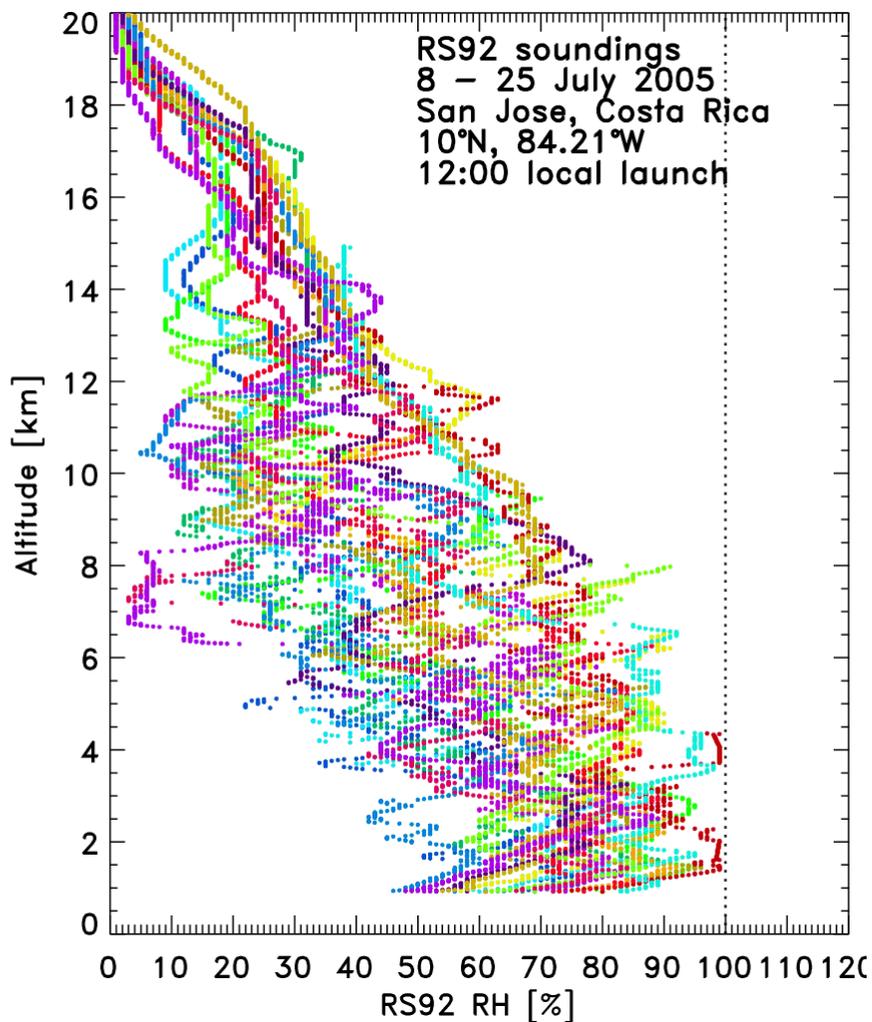


Daytime

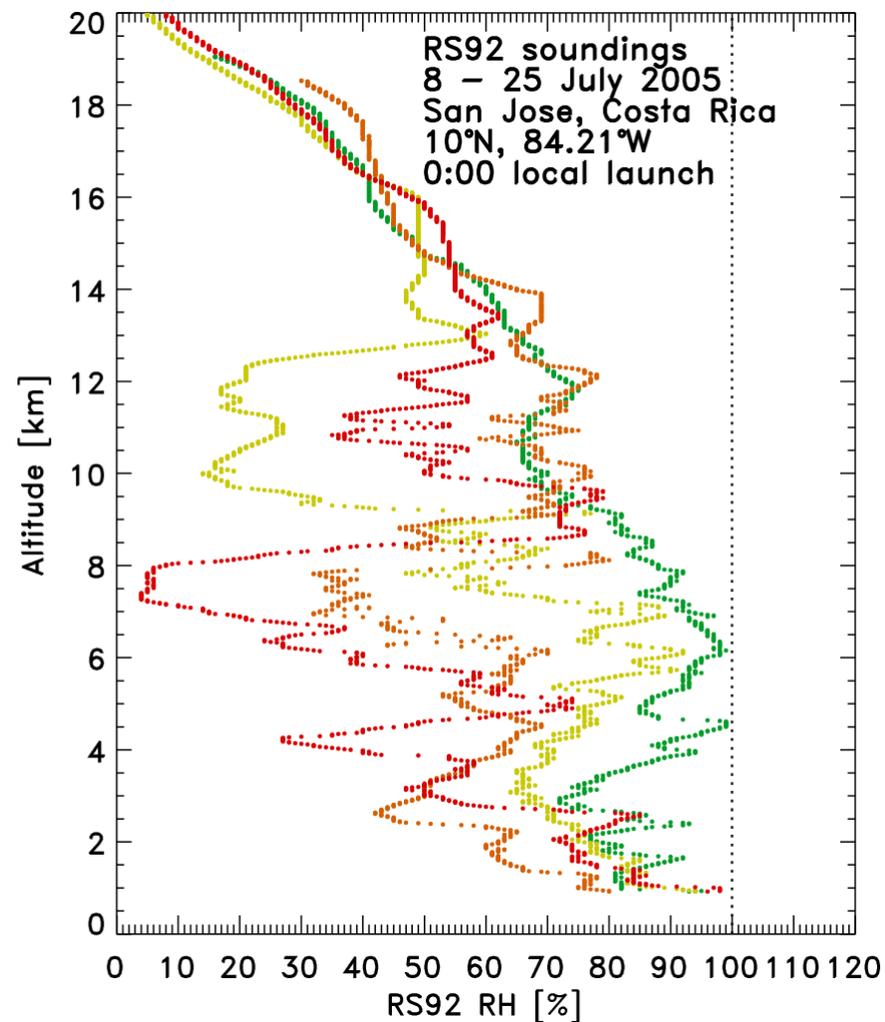


Nighttime

RS92 comparison

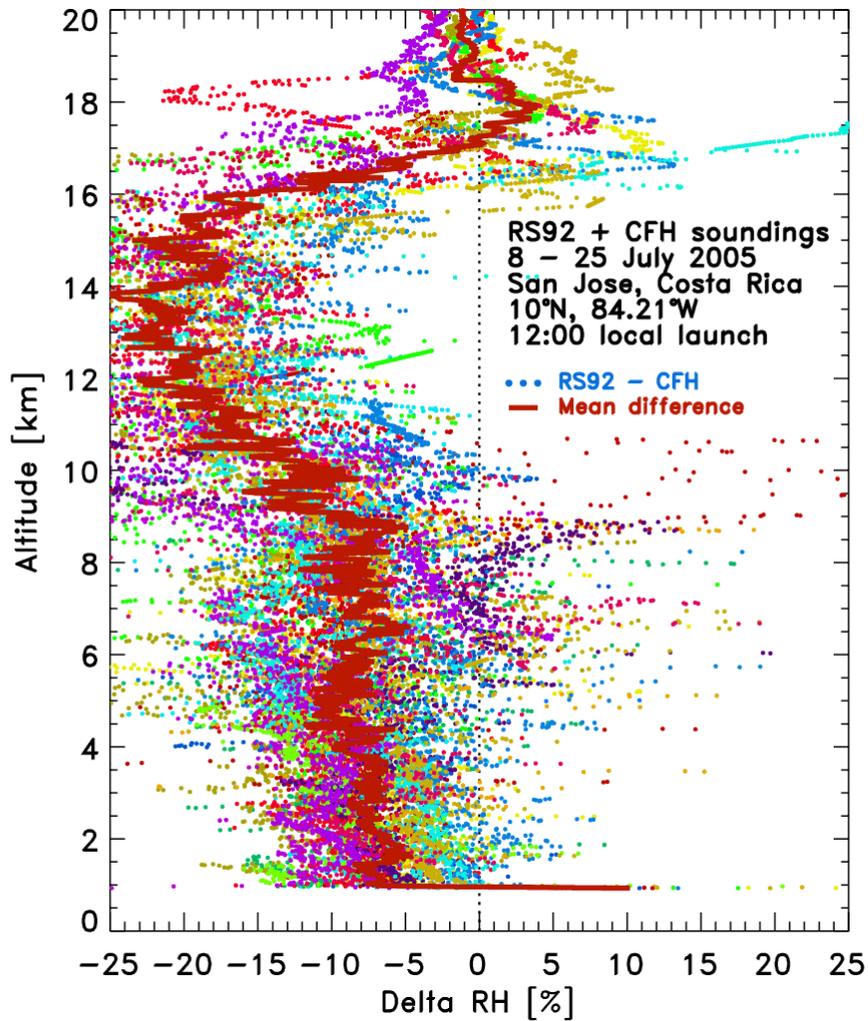


Daytime

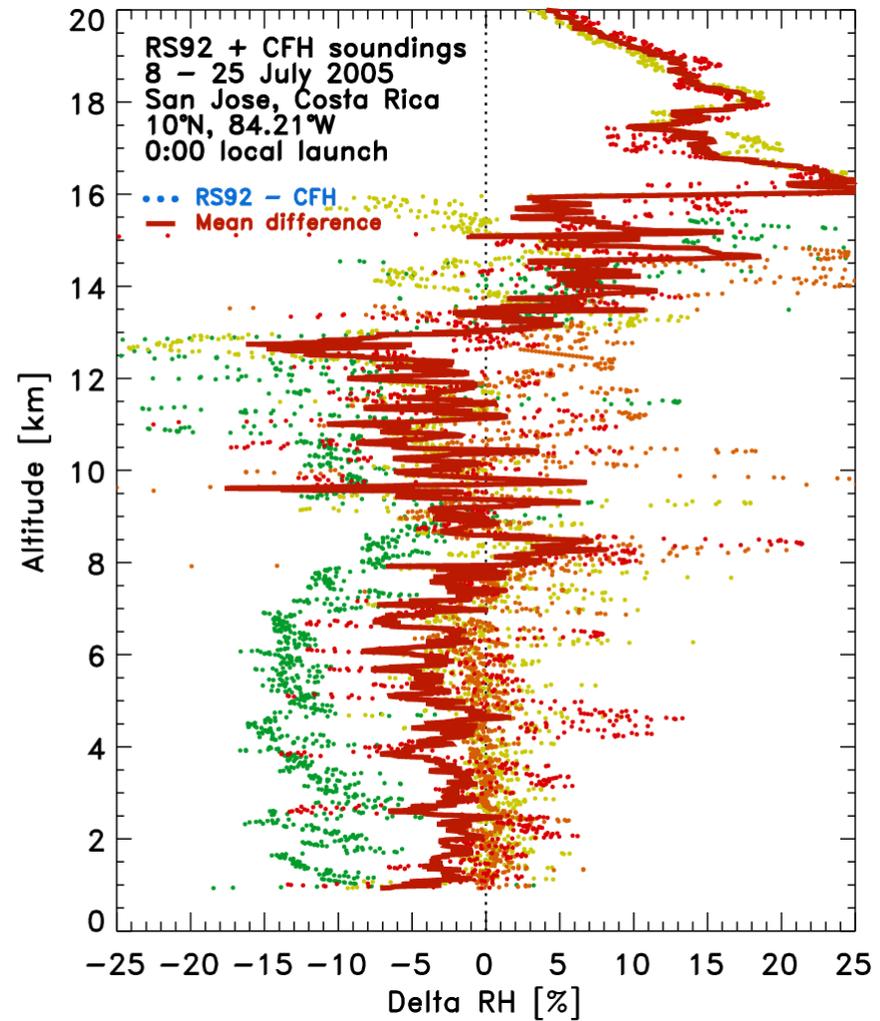


Nighttime

RS92 comparison

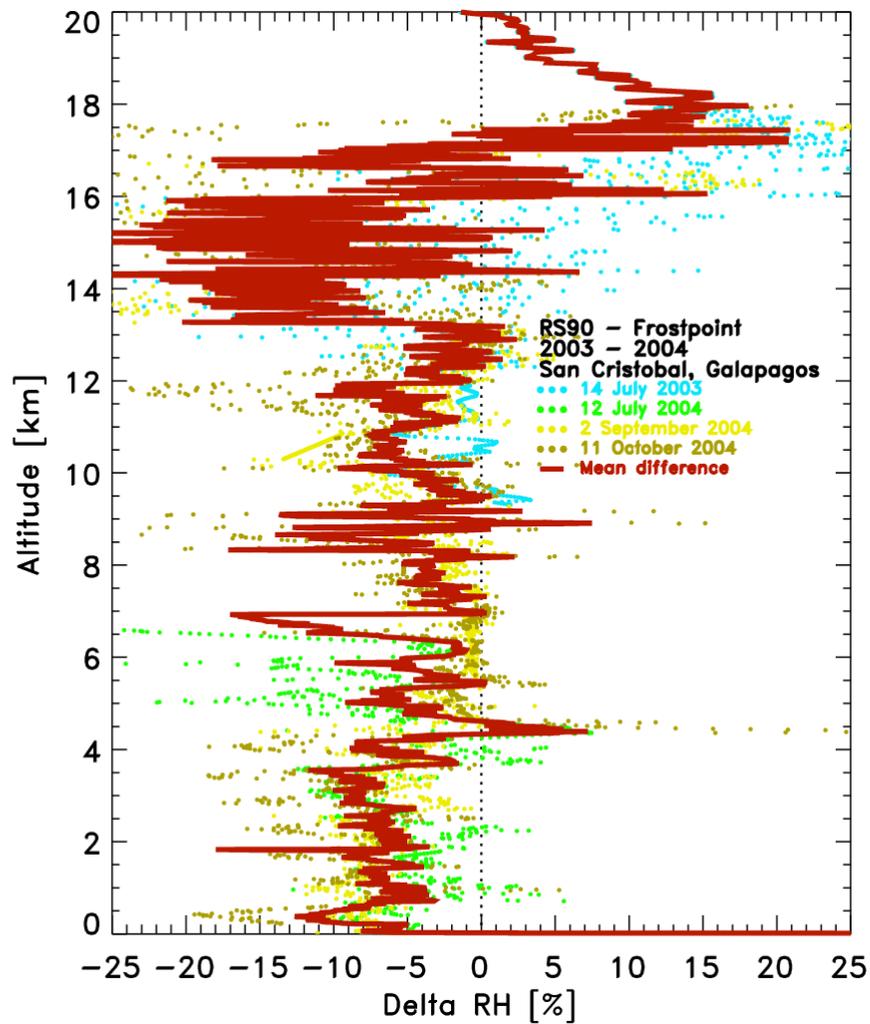


Daytime

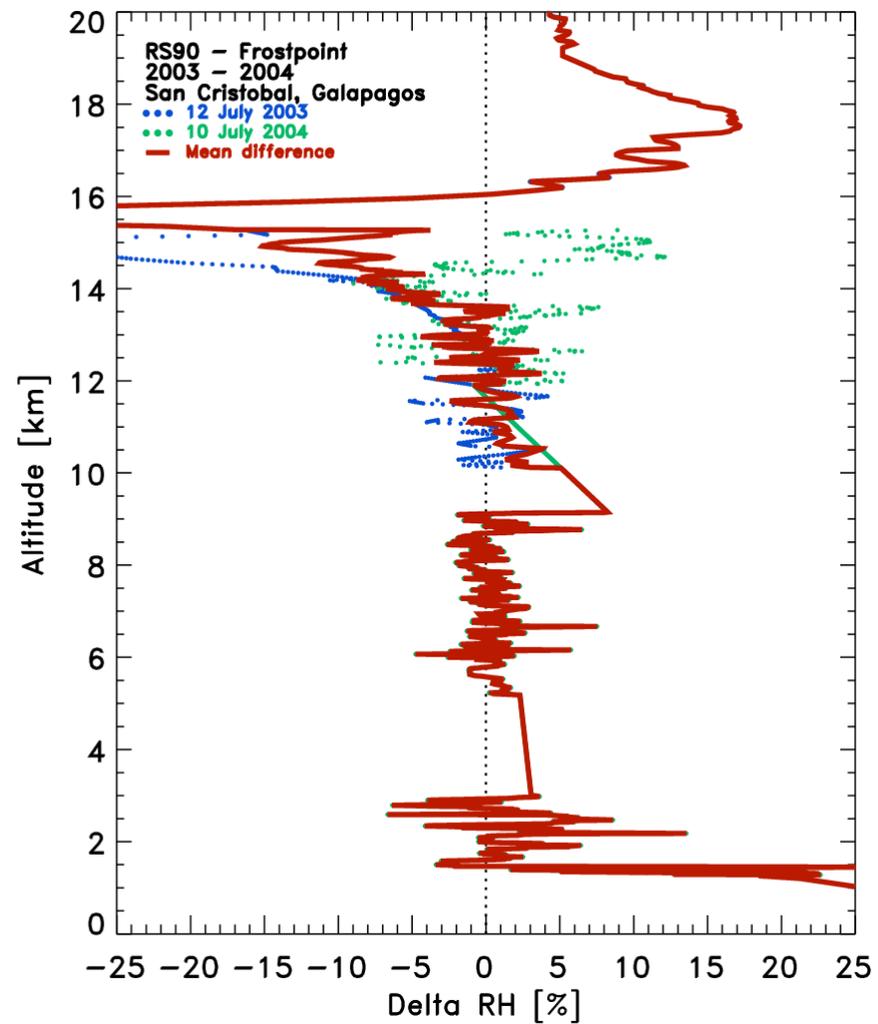


Nighttime

RS90 comparison



Daytime



Nighttime

Summary

- **MLS:**

- At all sites good agreement in stratosphere ($P \leq 68$ hPa)
- At Costa Rica clear dry bias in troposphere ($P \geq 100$ hPa)
- At Sodankylä reasonable agreement in lower stratosphere ($P \leq 147$ hPa)
- At the other sites either wet or dry bias ($P \geq 100$ hPa)
- Large variability in the tropospheric comparison
- Excellent data set for tropical tropopause water vapor

- **RS92:**

- Good agreement in night time up to 13 km (< tropopause, no corrections)
- Strong dry bias in day time (~7%RH in column, 20%RH at 12 km)
- RS90 seems to have similar features