

Issues in MWRP Retrievals of T, q and LWC product

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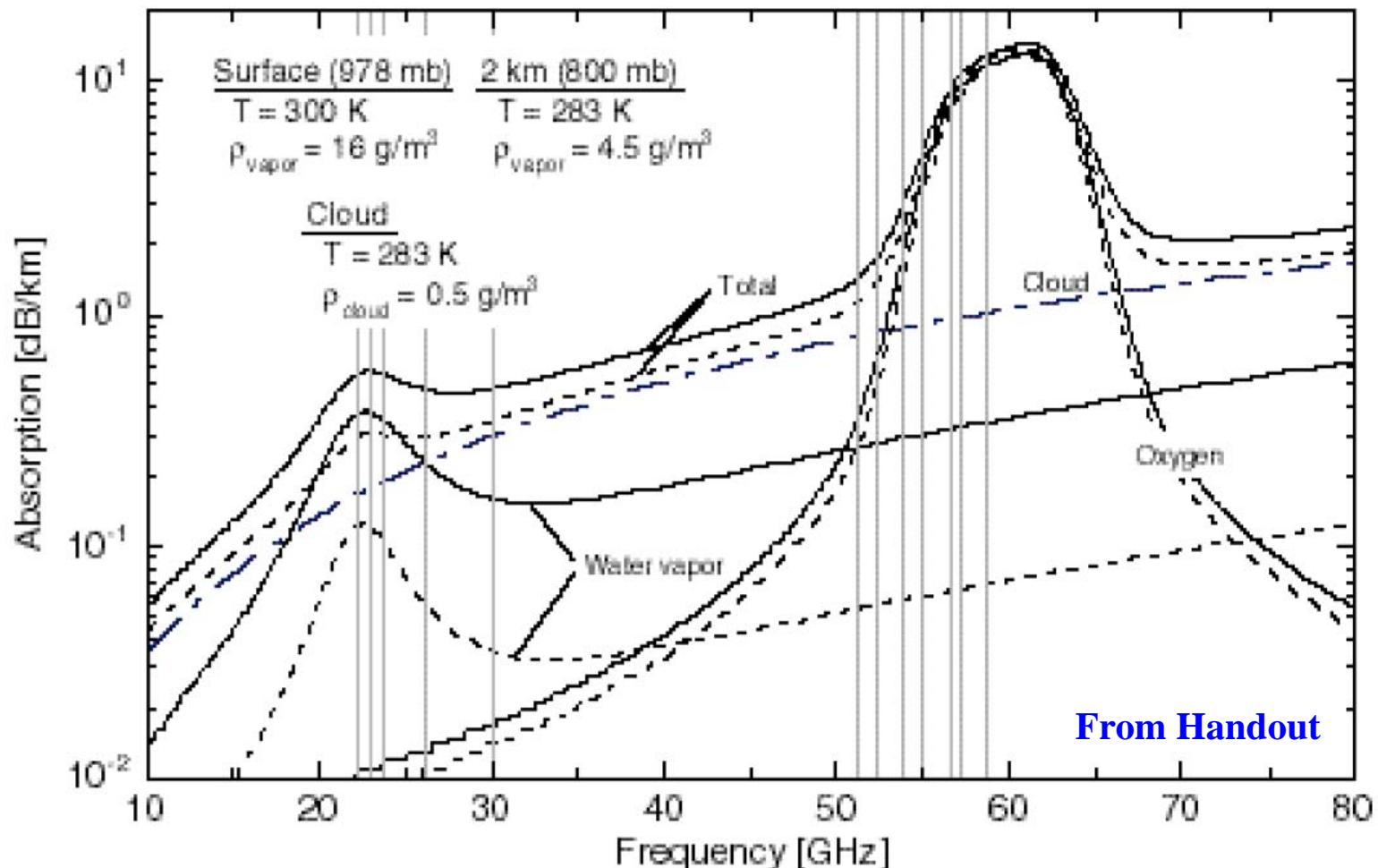
ESSIC, University of Maryland

College Park MD, 20740





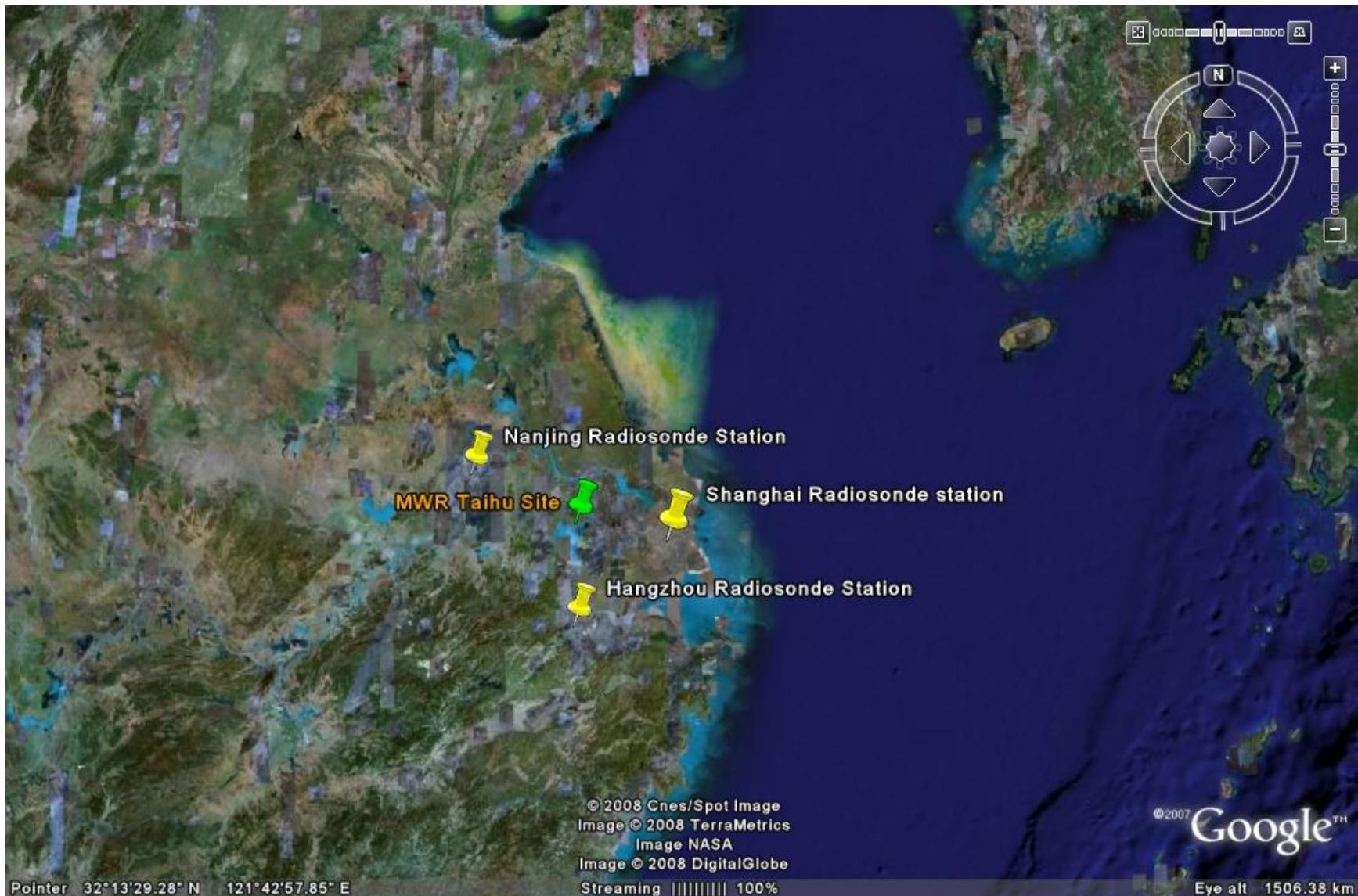
Microwave radiometer profiler specifications



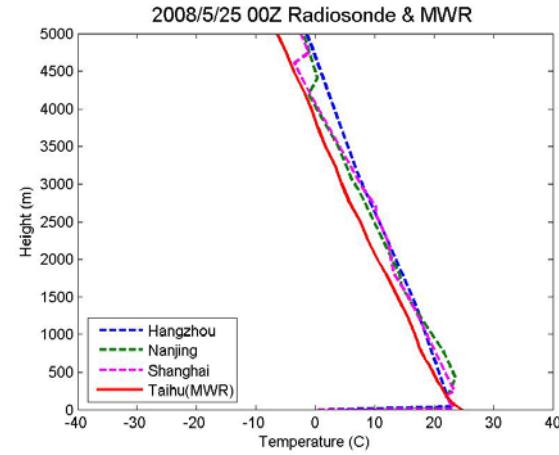
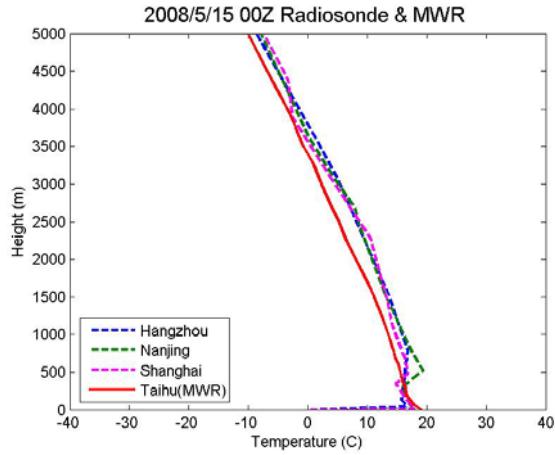
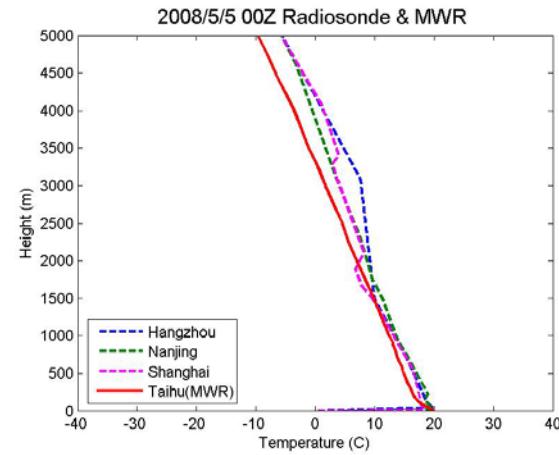
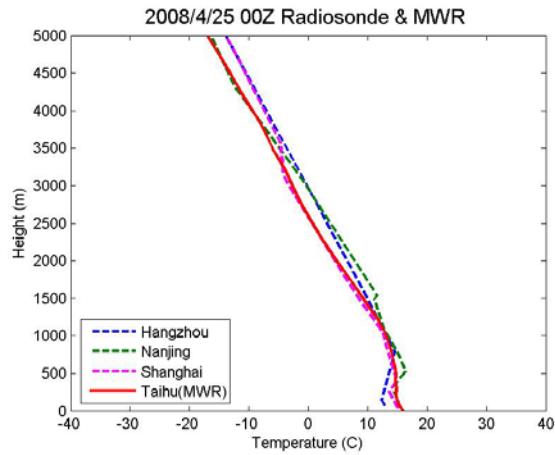


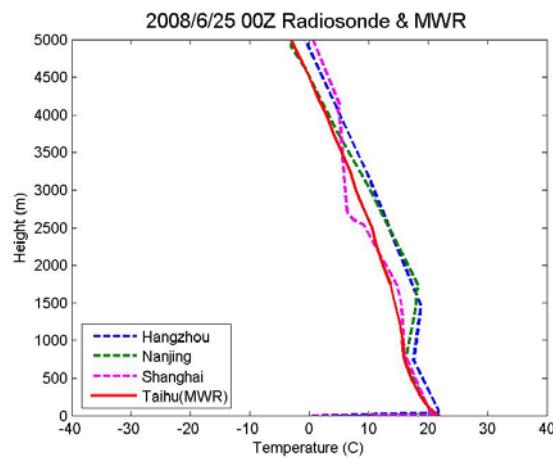
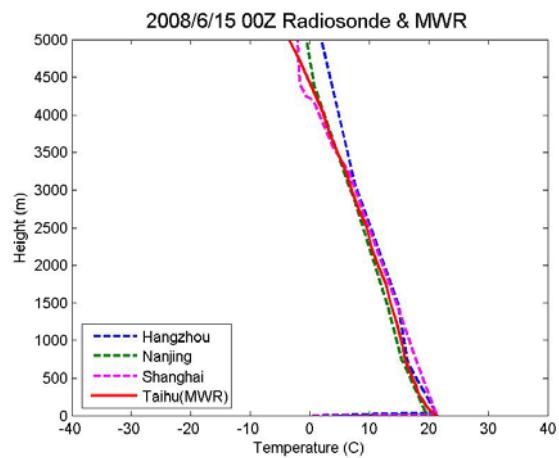
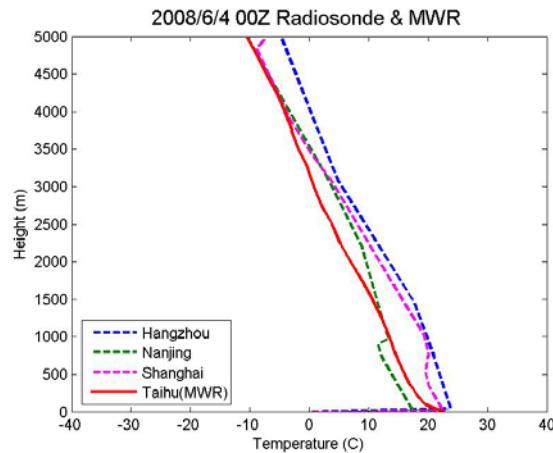
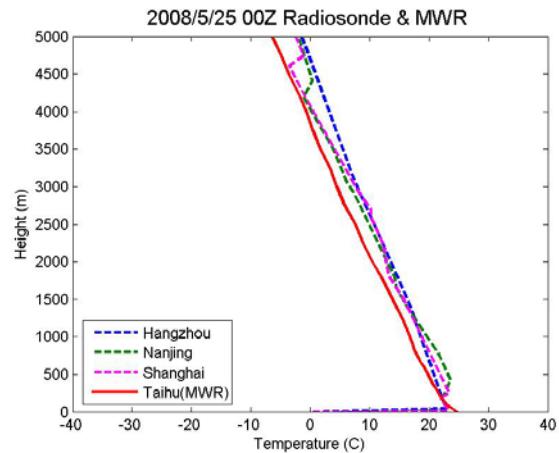
Basic questions concerning the quality of the retrieval quality

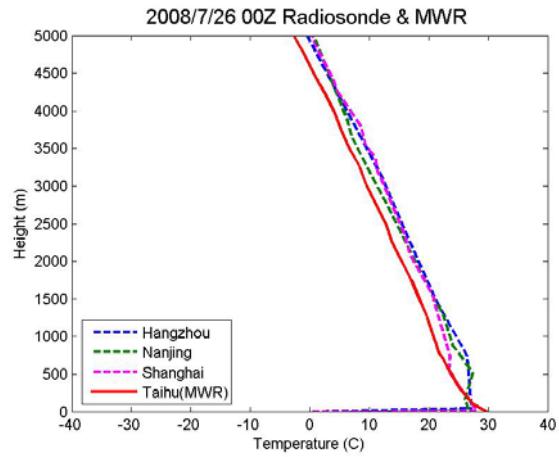
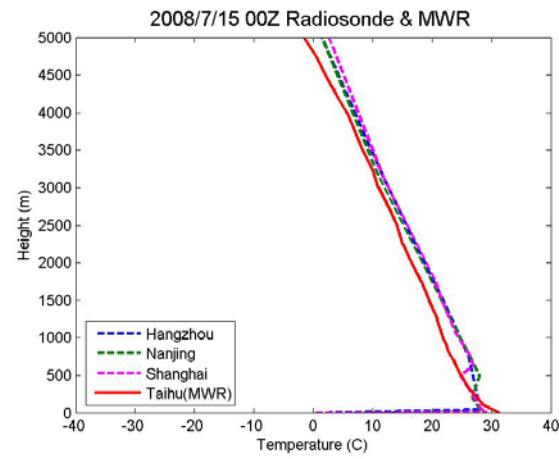
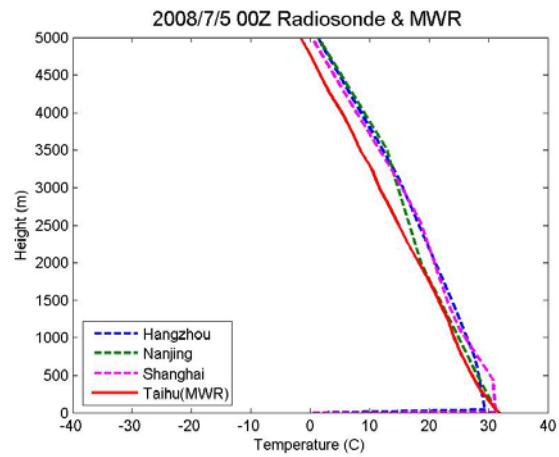
- Using 12-channel measurements in the combined 22 to 30 GHz and 51 to 59 GHz, it was claimed to be able to retrieve the profiles of temperature, humidity, and liquid water content, in addition to liquid water path using the algorithms based on the Stuttgart Neural Network Simulator and a historical records of radiosonde profiles.
- Clearly, the number of independent measurements (eigenvalues) is less than the 47 retrieved layers output. A data set with an insufficient number of inputs may not produce sound-quality retrievals.
- The key questions are how good and useful are these retrievals? For T and q retrievals, are they better than the interpolated values from surrounding radio-sonde data ?
- For LWC, are they even more reliable than adiabatic estimation constrained by the CCL and relative humidity determined from reanalysis data ?

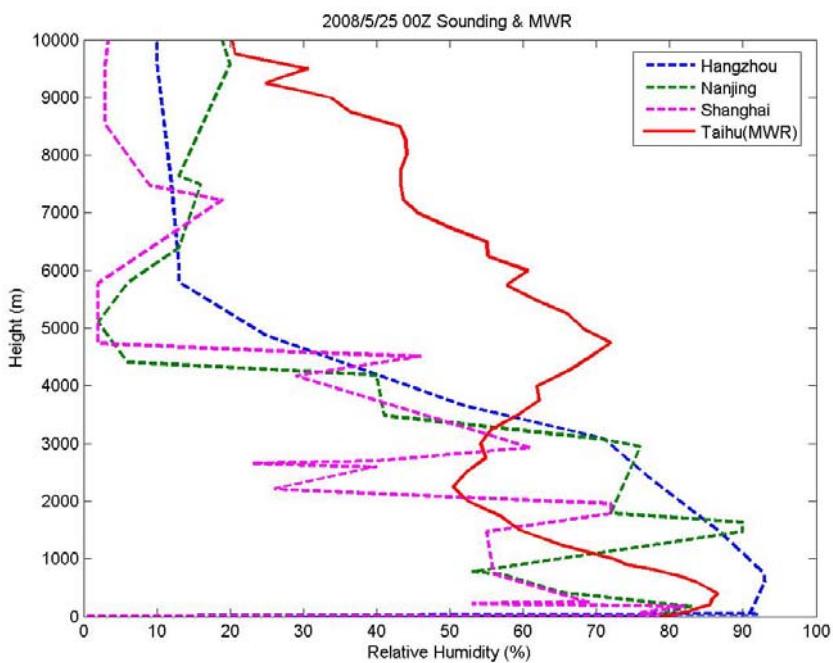
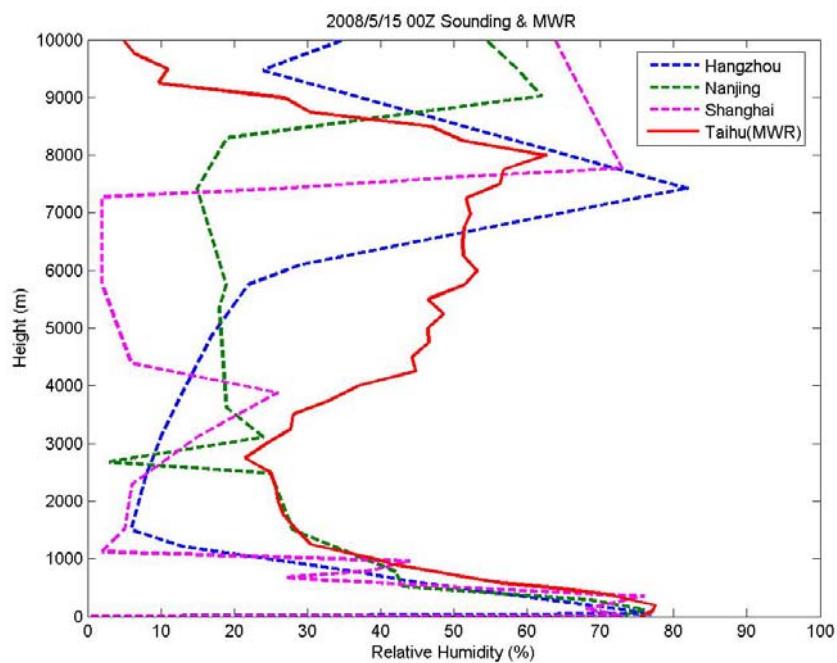
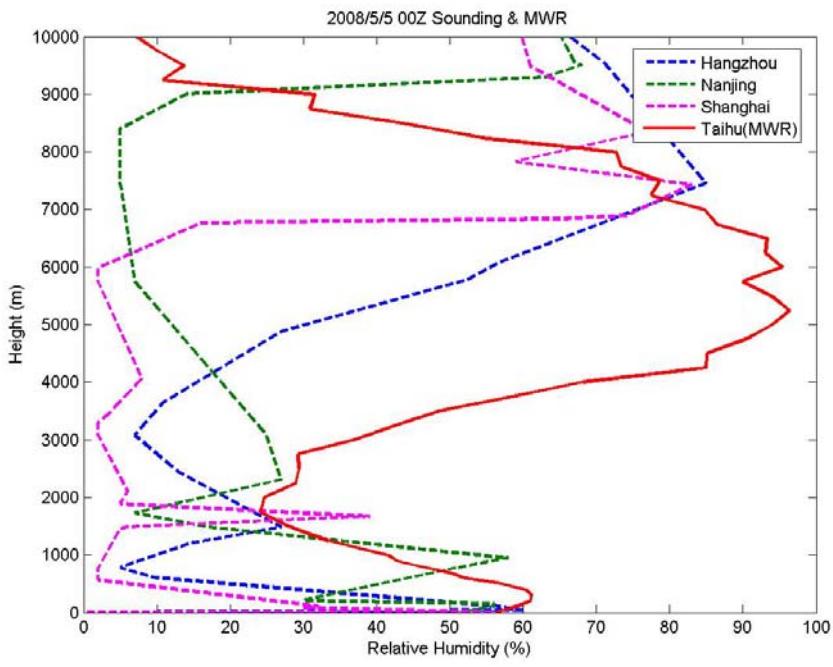
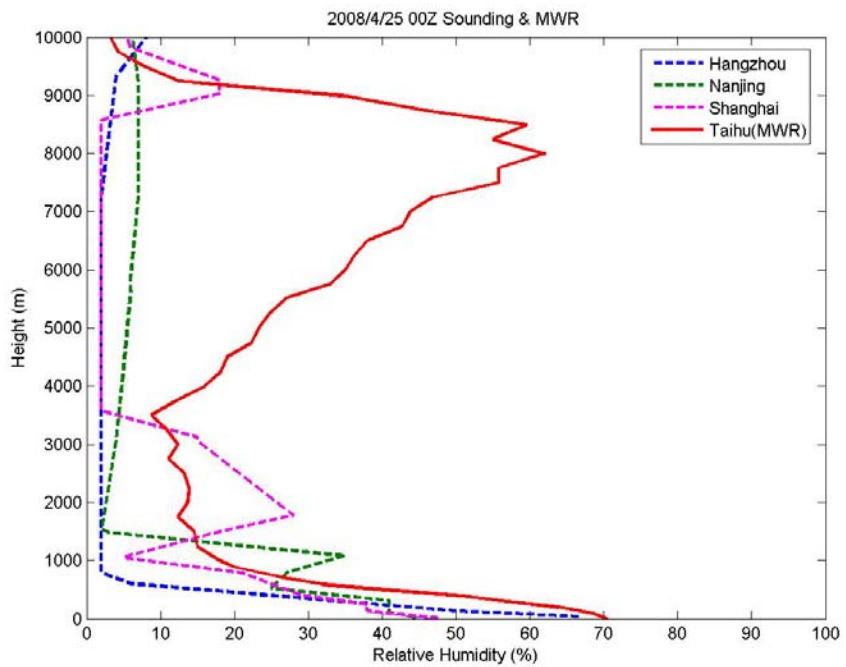


Radiosonde and MWR Temperature profile

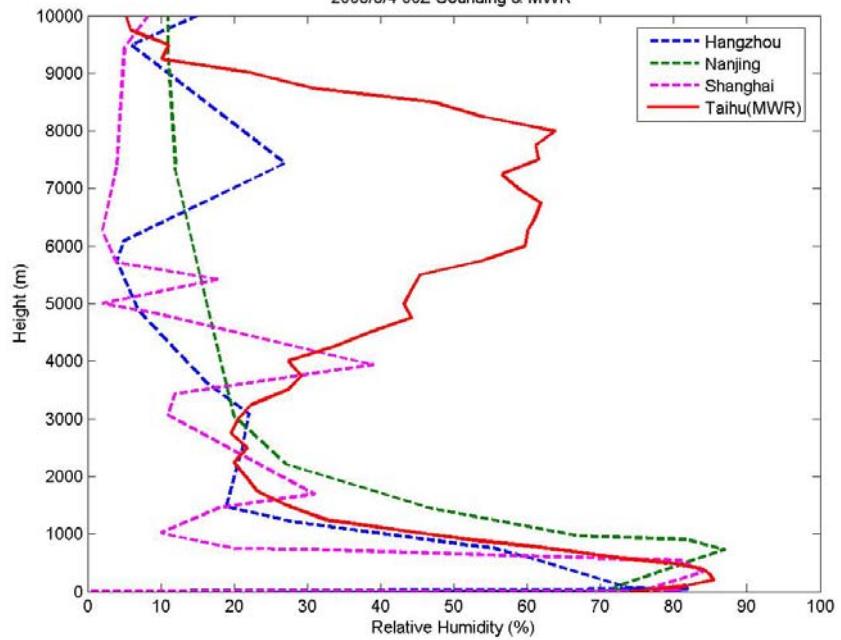




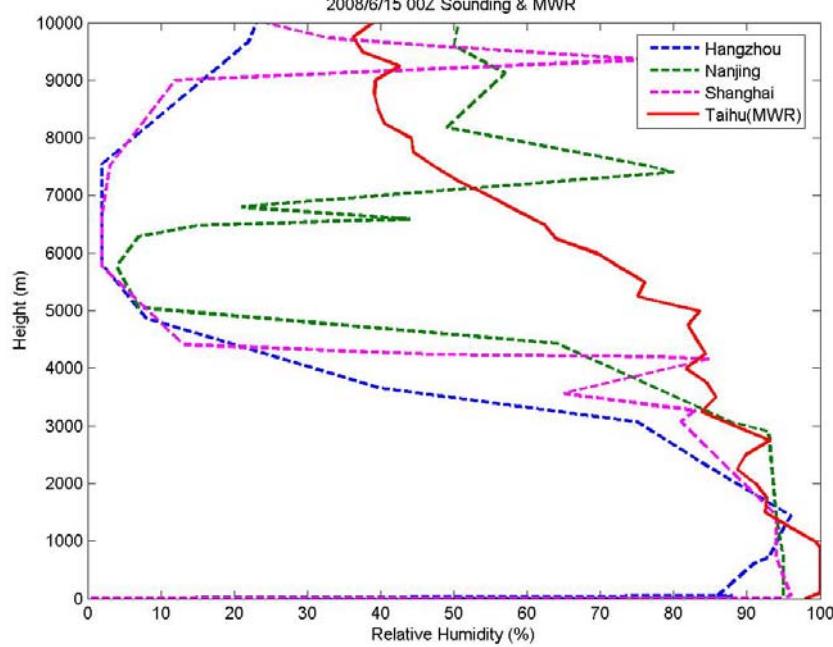




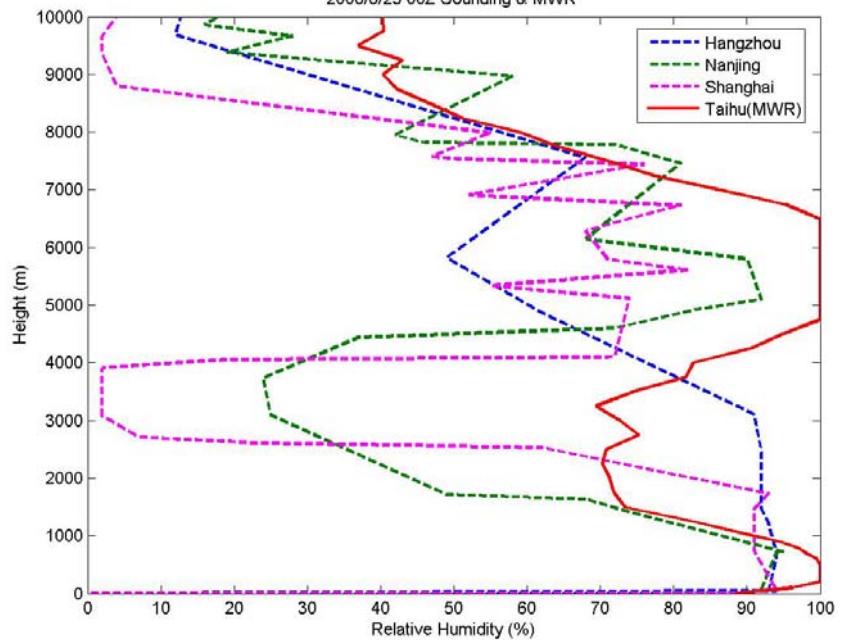
2008/6/4 00Z Sounding & MWR



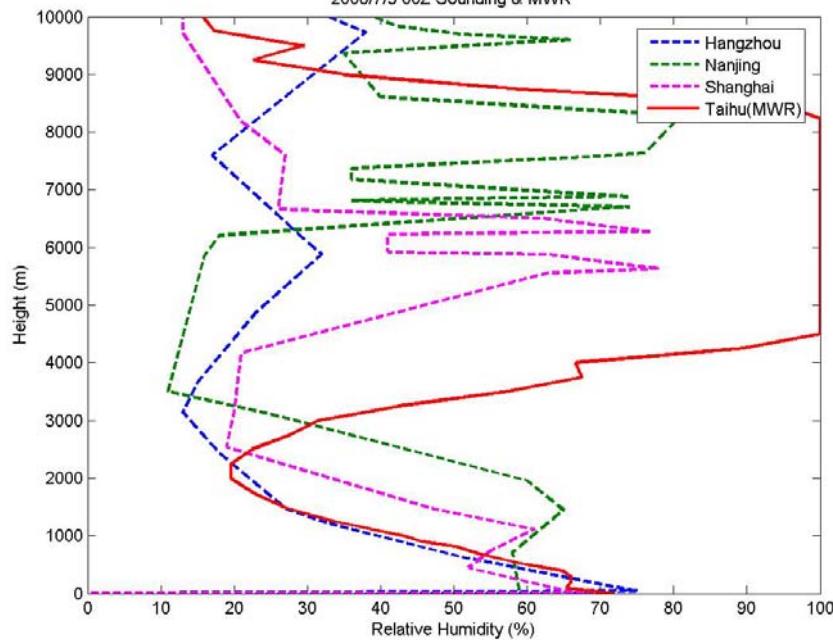
2008/6/15 00Z Sounding & MWR



2008/6/25 00Z Sounding & MWR



2008/7/5 00Z Sounding & MWR



Ensuing Questions

- Will the large errors in T and q retrieval propagate to the retrieval of LWC?
- If so, shall we retrieve LWC using T and q from alternative sources ?
- If we have to have LWC, shall we trust a rough adiabatic estimation than the MWRP product?



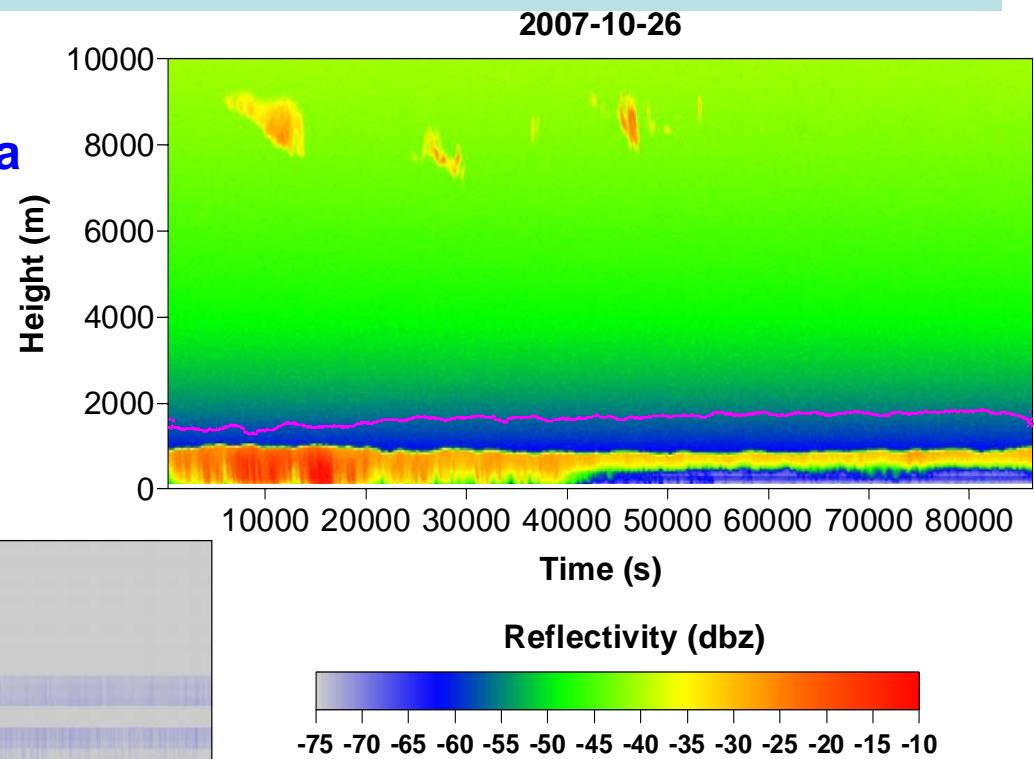
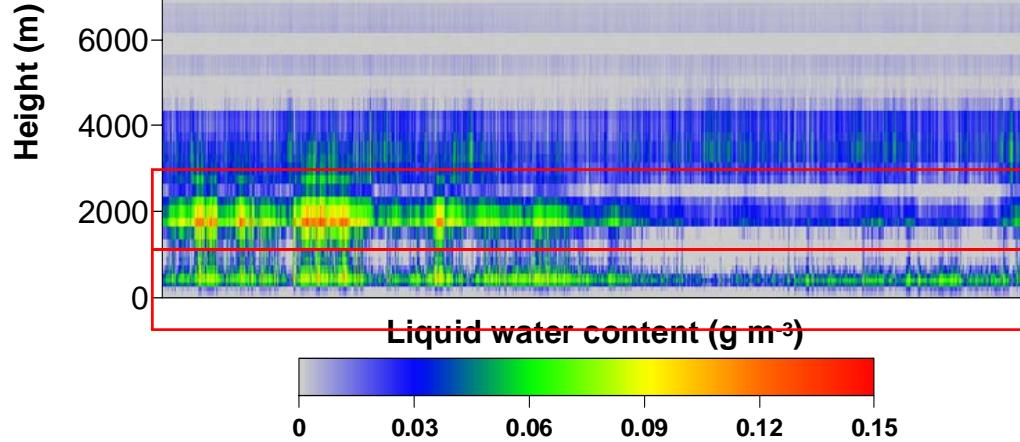
DATA SET





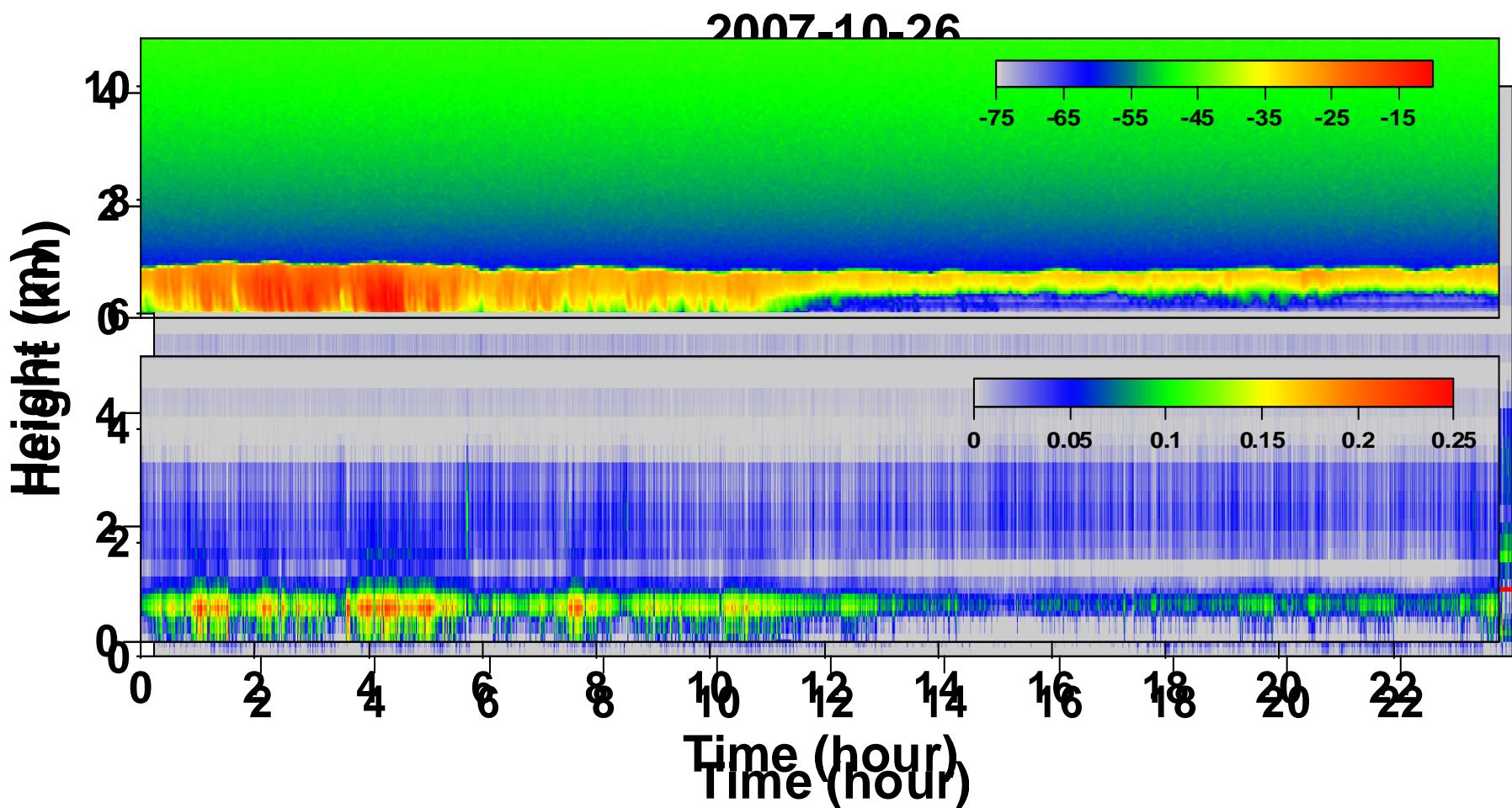
Problems

- 1) LWCs appear in cloud-free area
- 2) Cloud pattern upside-down
- 3) Wrong cloud base height



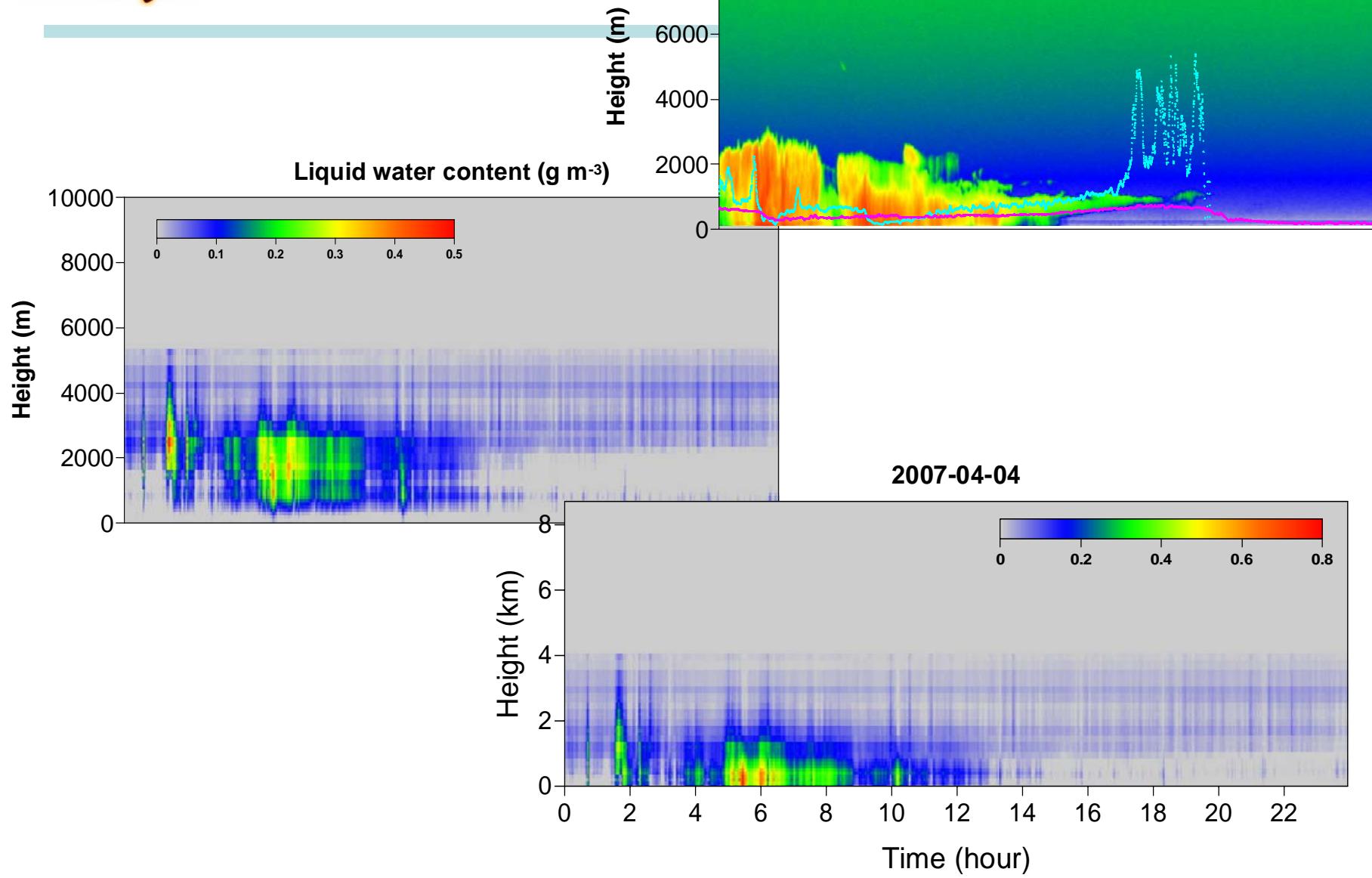


More reasonable?



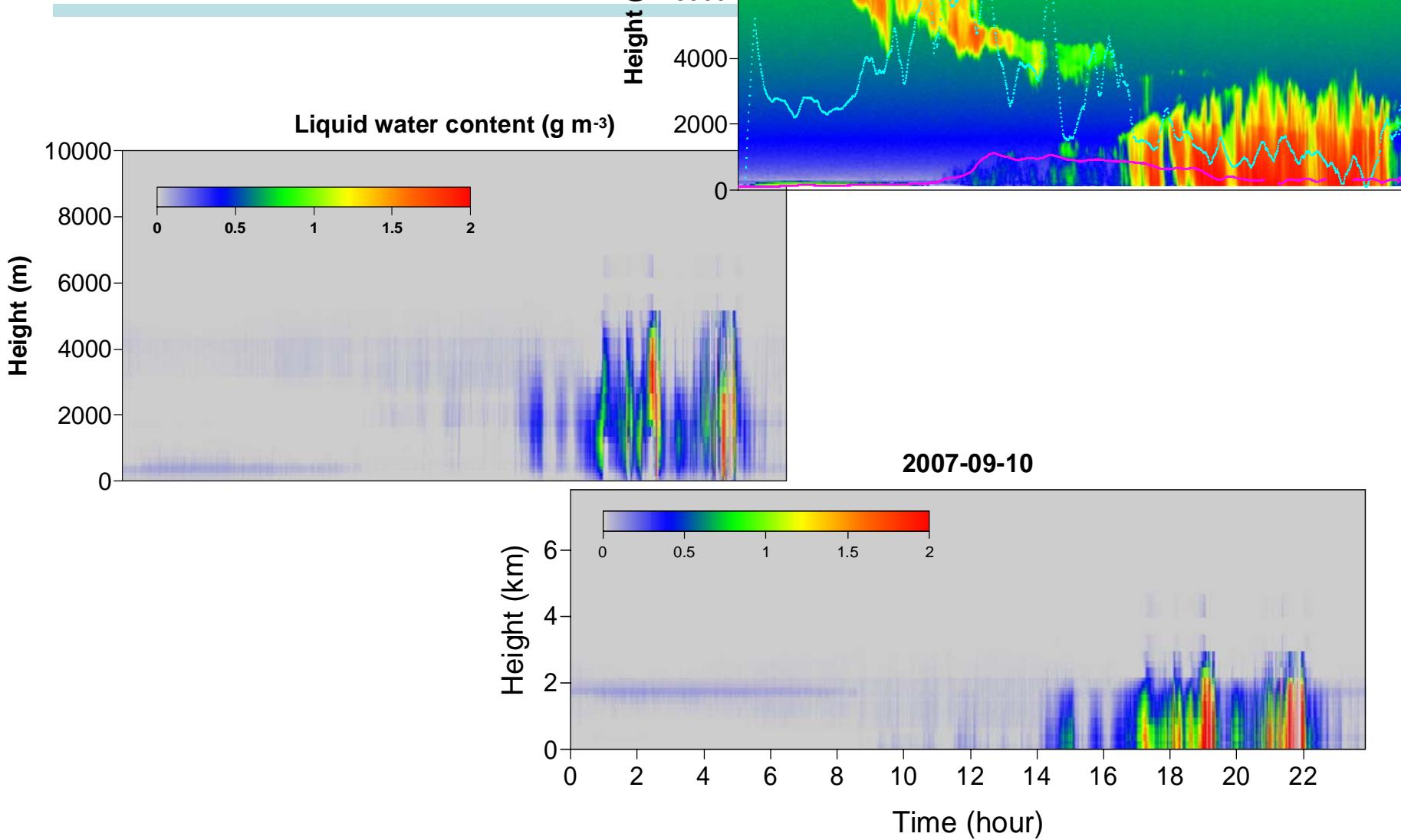


Other Case



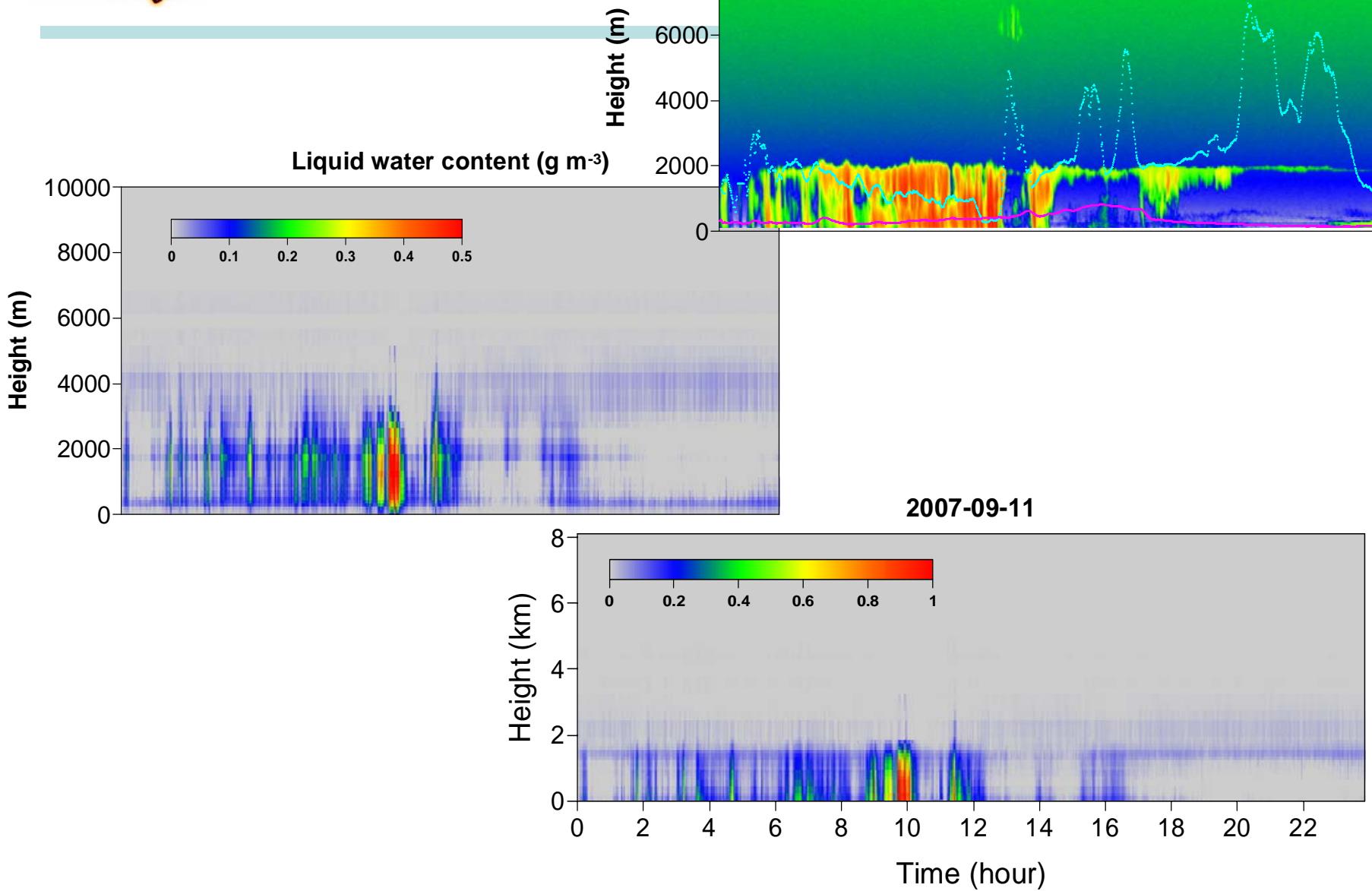


Other Case



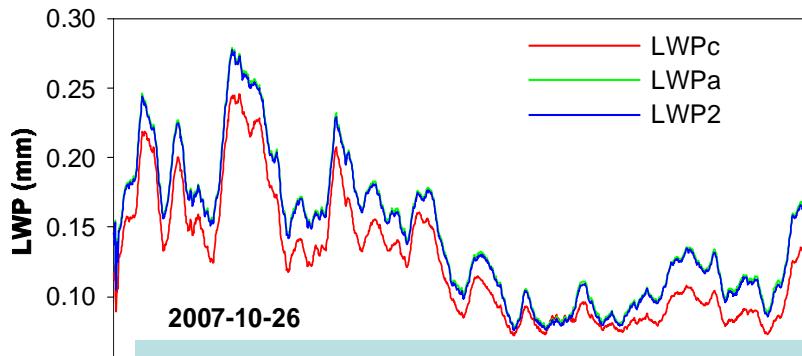


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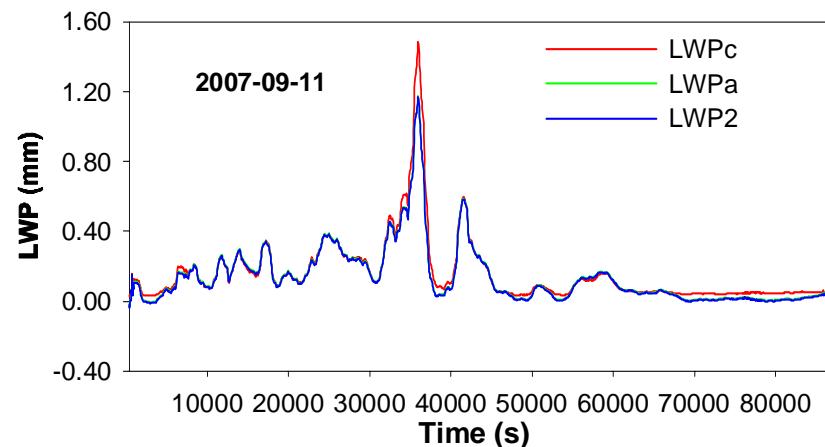
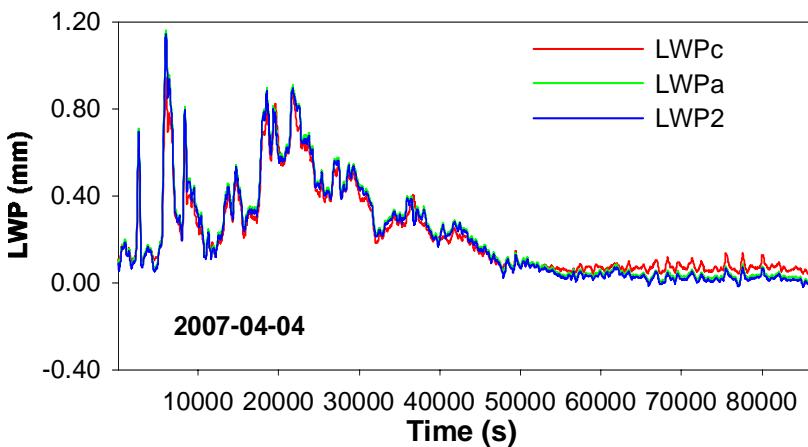
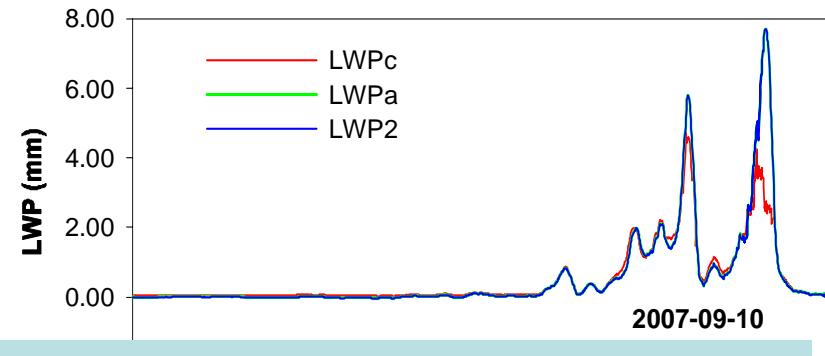




Compare LWP

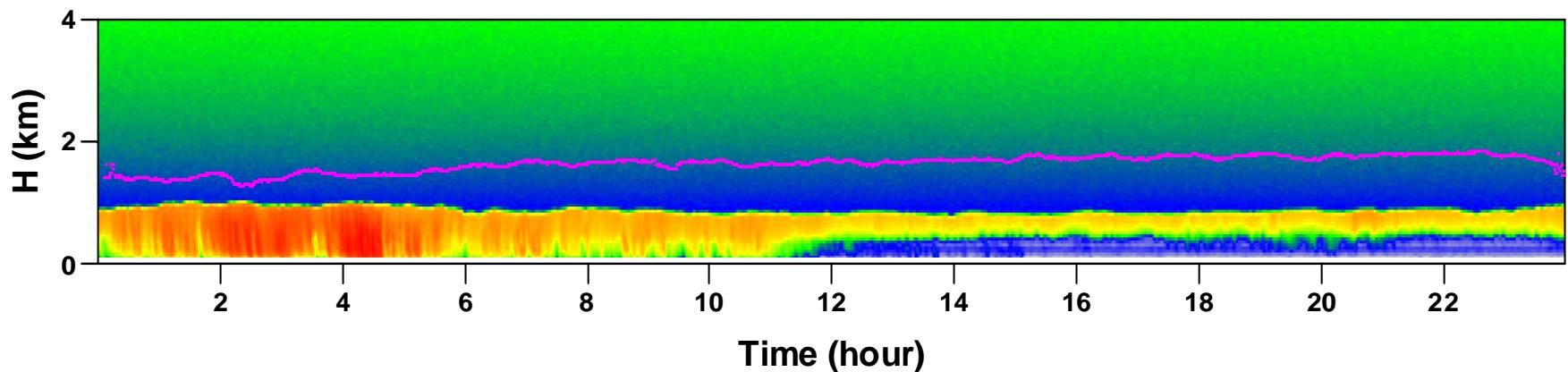
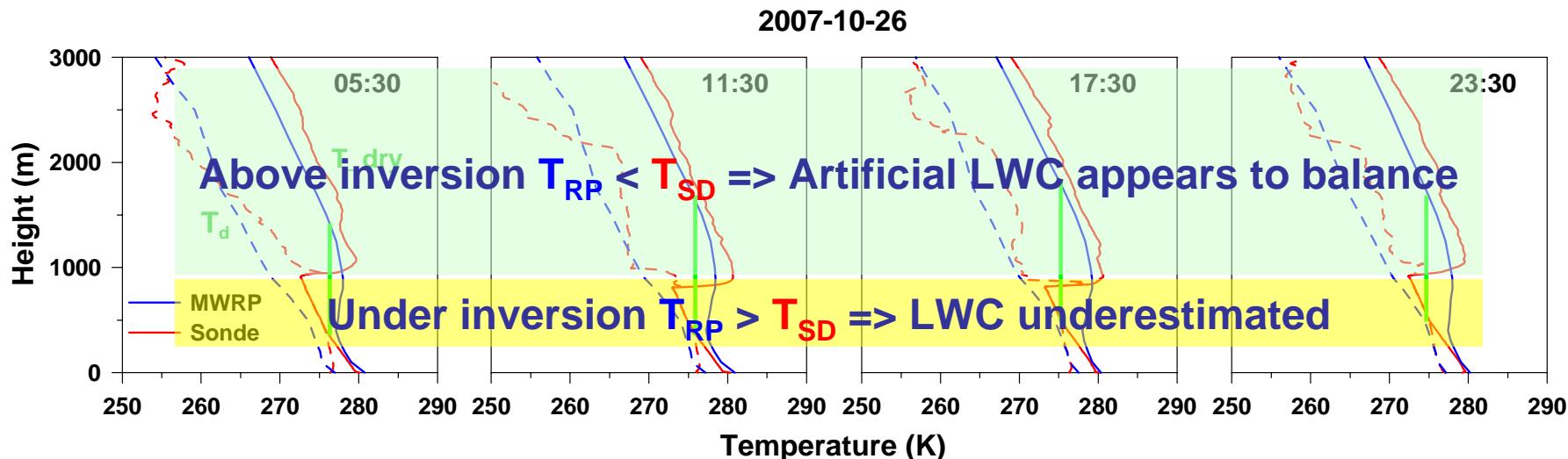


The artificial LWC is not an extra error but the cloud water
be distributed in wrong layers





The role of strong inversion



Ensuing Questions

- Given the large errors in T and q retrieval, shall we retrieve LWC using T and q from alternative sources ?
- If we have to have LWC, shall we trust a rough adiabatic estimation than the MWRP product?
- Of course, these questions are valid only at the stations where no cloud radar or lidar are available, which is the case in many MWRP stations.
- The bottom line question, do we really need to acquire MWRP, for what ?