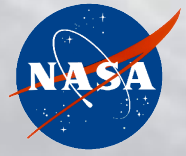

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AIRS Version 6 Validation Plans
and AIRS-AMSR-E TPW Results

Eric Fetzer

NASA Sounder Science Team Meeting

April 23, 2015

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A (Rough) Validation Plan

- **Three themes:**

  1. ***Long-term comparisons***
     - TPW: ground-based and AMSR-E (this talk and Qing Yue's).
     - Cloud properties with MODIS: (Brian Kahn talk and draft paper).
     - **Desirable**: operational sondes, GPS RO, total ozone from OMI, CloudSat/CALIPSO.

  2. ***Boundary layer properties, especially over land***
     - Surface T and q (Van Dang's talk).
     - Temperature inversions (Sun Wong's talk).

  3. ***Dedicated radiosondes***
     - MAGIC (Peter Kalmus's talk)
     - RICO?
     - Others...

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Summarizing *dedicated* sonde sites

Excluding MAGIC, we have 30 total sites, consisting of:

- **7: 'Supersites' with >20 sondes for multiple seasons.**
- **8: Good sites with >20 sondes for 1 season.**
- **3: Okay sites with ~10 sondes for 1 season.**
- **12: poor sites with too few sondes**
  - ***May be useful for global mean constraints.***

- **Some climate conditions are poorly sampled. For example:**
  - ***Only Table Mountain, CA is near a continental desert.***
  - ***Few sondes over extensive tropical forests like Amazon, Congo, Indonesia.***
  - ***Few sondes at middle and high latitude oceanic sites.***
    - Dedicated sondes over Pacific may help.

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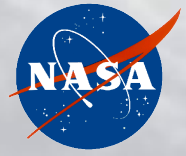
Other Validation Analyses

- **Vis / NIR radiances; Kahn**
  - ***Compare L1B Vis / NIR with MODIS***
- **Microwave L1B radiances; Lambrigtsen**
  - ***Compare with AMSU on other platforms***
- **Tropopause properties; Fishbein**
  - ***Compare tropopause structure with GPS RO retrievals***
- **Trends in upper troposphere from SW cal drift; Aumann**
  - ***Examine effects of shortwave drift on retrieved products***
- **Other efforts supported by ROSES.**
  - ***Especially trace gases.***



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Other Priorities

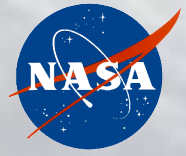
- **A GLOBAL metric for distinguishing AIRS T & q from reanalyses.**
  - ***Example: Brian Kahn's scale studies.***

- **Sampling issues**
  - ***We now have several papers.***

- **Transition to applications**
  - ***Usually requires careful validation.***

- **A combined AIRS-SNPP strategy.**

- **A summary of V5 papers.**



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Summary: The Validation Plan

- **Our challenge is prioritizing the analyses mentioned in the previous slides.**
- **Please let me know if you are planning a comparison between AIRS and in situ or satellite data.**

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AIRS – AMSR-E Total Water Comparison

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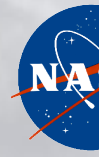
Approach

- **Examine nine days: 6 September 2002,…,2010.**
- **Nearest neighbor matching.**
- ***One-to-one comparison*: apply identical QC to each footprint. Reject both if:**
  - ***AMSR-E = 255***
  - ***AIRS totH2O_QC > threshold***
- **Apply simple statistics for QC = 0 and QC = 1.**



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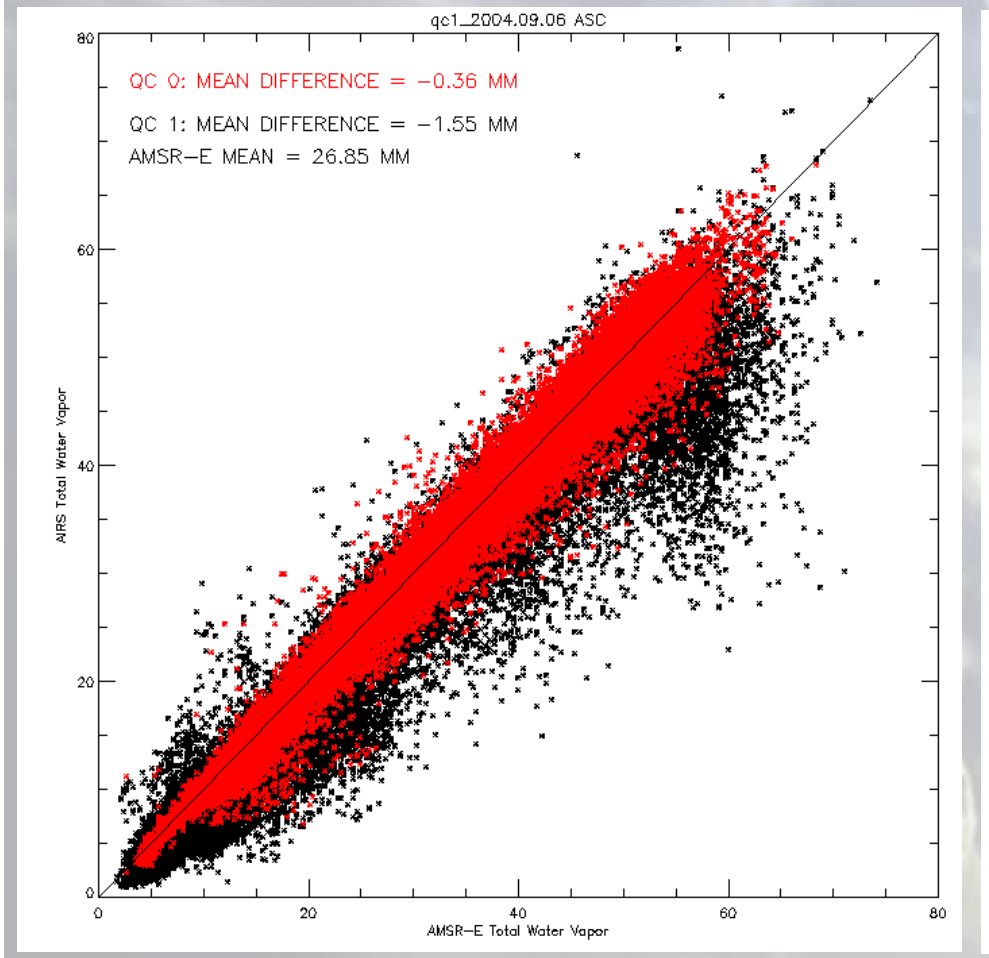
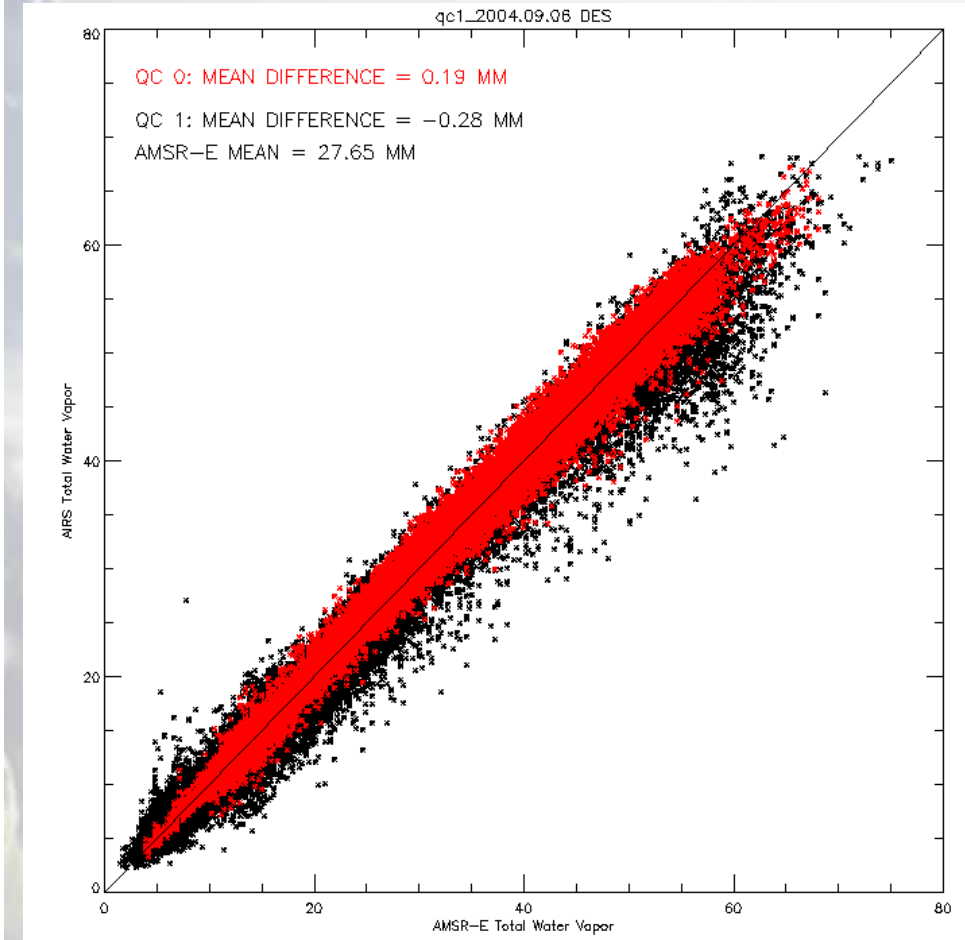
AIRS-AMSR-E >|1| mm during day when totH2O_QC = 1
Much smaller at night and with QC = 0

2004.09.06 Day



2004.09.06 Night



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AIRS-AMSR-E Conclusion

- **The Version 6 daytime dry bias over ocean is caught by QC.**
  - ***The correction is obvious: use totH2O_QC = 0***
  - ***See Qing Yue's talk about conditions over land.***