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

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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).

     - **<u>Desirable</u>**: 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...

Summarizing *dedicated* sonde sites

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

- **7:** ʻSupersitesʼ **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.

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.*

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.**

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.**

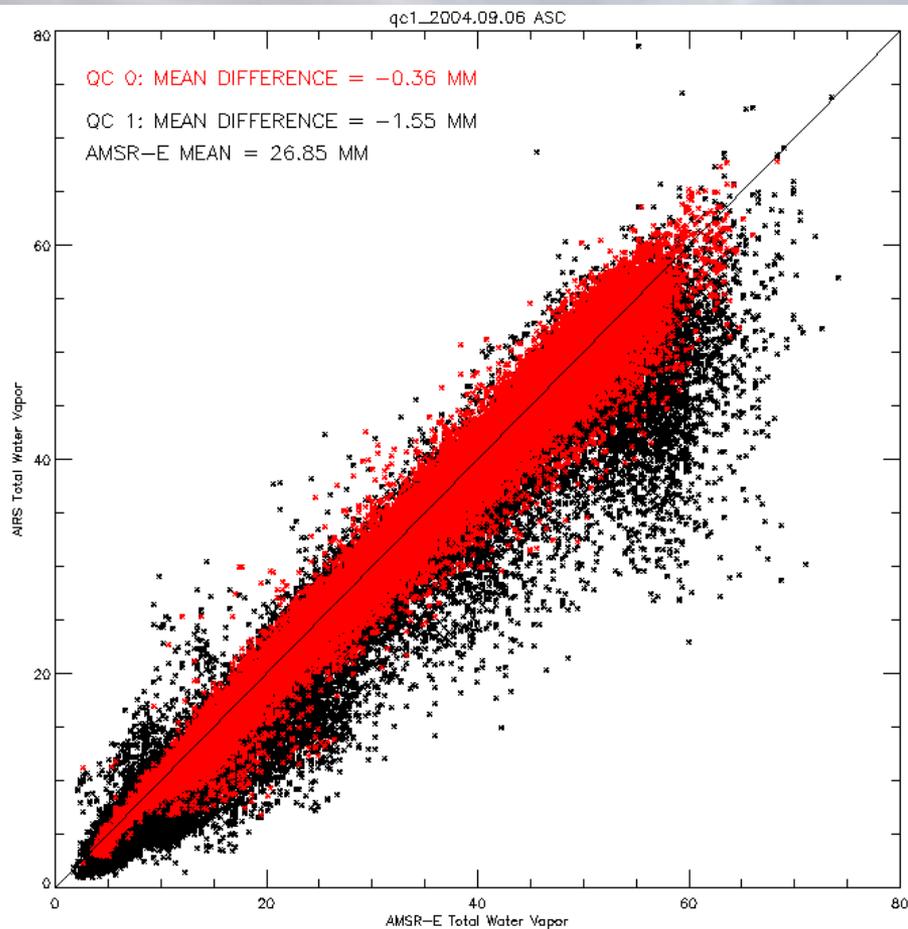# AIRS – AMSR-E Total Water Comparison

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*
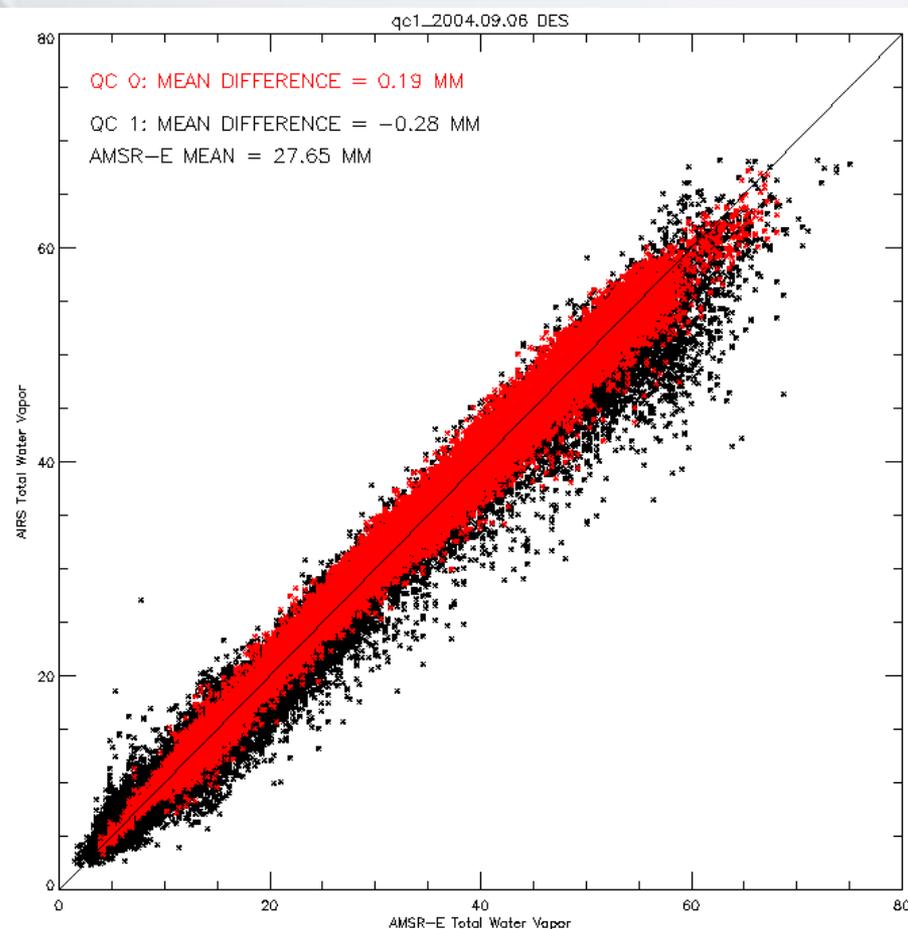
- **Apply simple statistics for QC = 0 and QC = 1.**

AIRS-AMSR-E >I1I mm during day when totH2O_QC = 1
Much smaller at night and with QC = 0

2004.09.06 Day

2004.09.06 Night

qc1_2004.09.06 ASC

QC 0: MEAN DIFFERENCE = −0.36 MM

QC 1: MEAN DIFFERENCE = −1.55 MM

AMSR−E MEAN = 26.85 MM

qc1_2004.09.06 DES

QC 0: MEAN DIFFERENCE = 0.19 MM

QC 1: MEAN DIFFERENCE = −0.28 MM

AMSR−E MEAN = 27.65 MM

AIRS-AMSR-E Conclusion

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