

Comparing clear and cloudy radiances in the same scene

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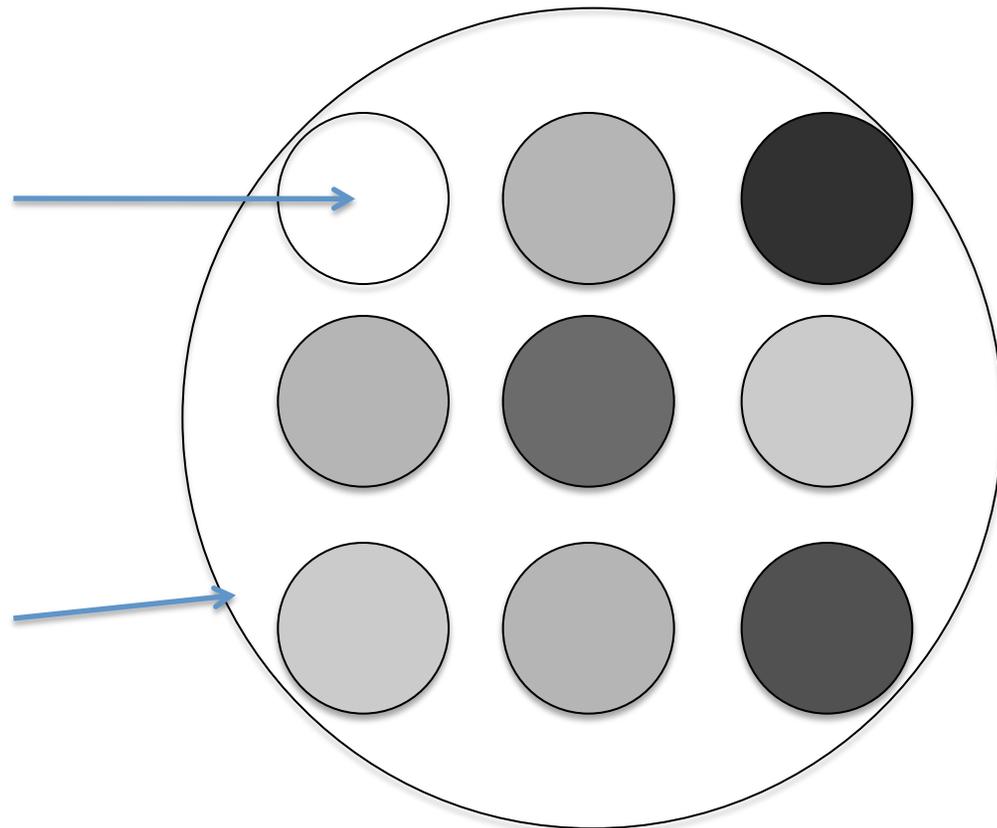
Jet Propulsion Laboratory
California Institute of Technology

How well do cloud-cleared and cloud-free radiances agree?

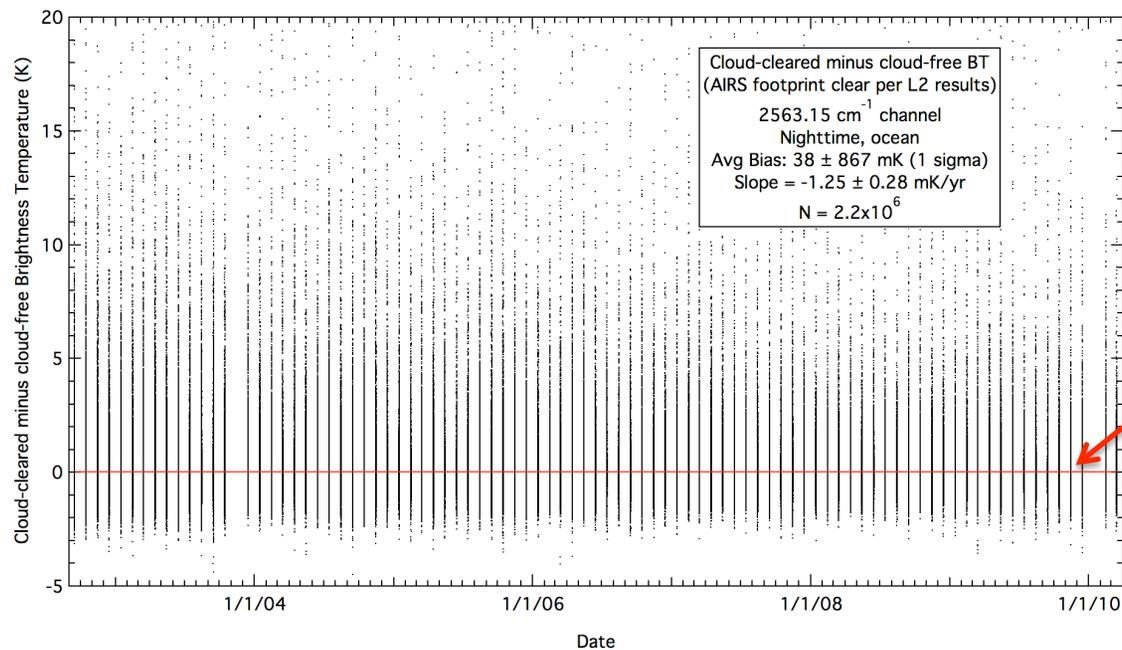
Take best-case scenarios : QualSurf = 0, QualCCRad = 0

- 1) Find **clear** L1B AIRS footprint inside AMSU footprint
 - nighttime, ocean only
 - use George Aumann's and Brian Kahn's methods [*Kahn et al.*, 2005] for cloud screening
 - use AMSR-E Total Water for BHK test

Take cloud-free L1B BTs and coincident cloud-cleared L2 BTs



- 2) Subtract cloud-free L1B BT from coincident cloud-cleared L2 BT
- 3) Do this for 15th of each month for Sept 15 from 9/02 to 3/10.
- 4) Get slope of ΔBT for each channel by linear regression (excluding channels gone bad.)



...and data can be binned by latitude, season, cloud pressure, etc.

This is a preliminary study, and results are sensitive to clear selection criteria.

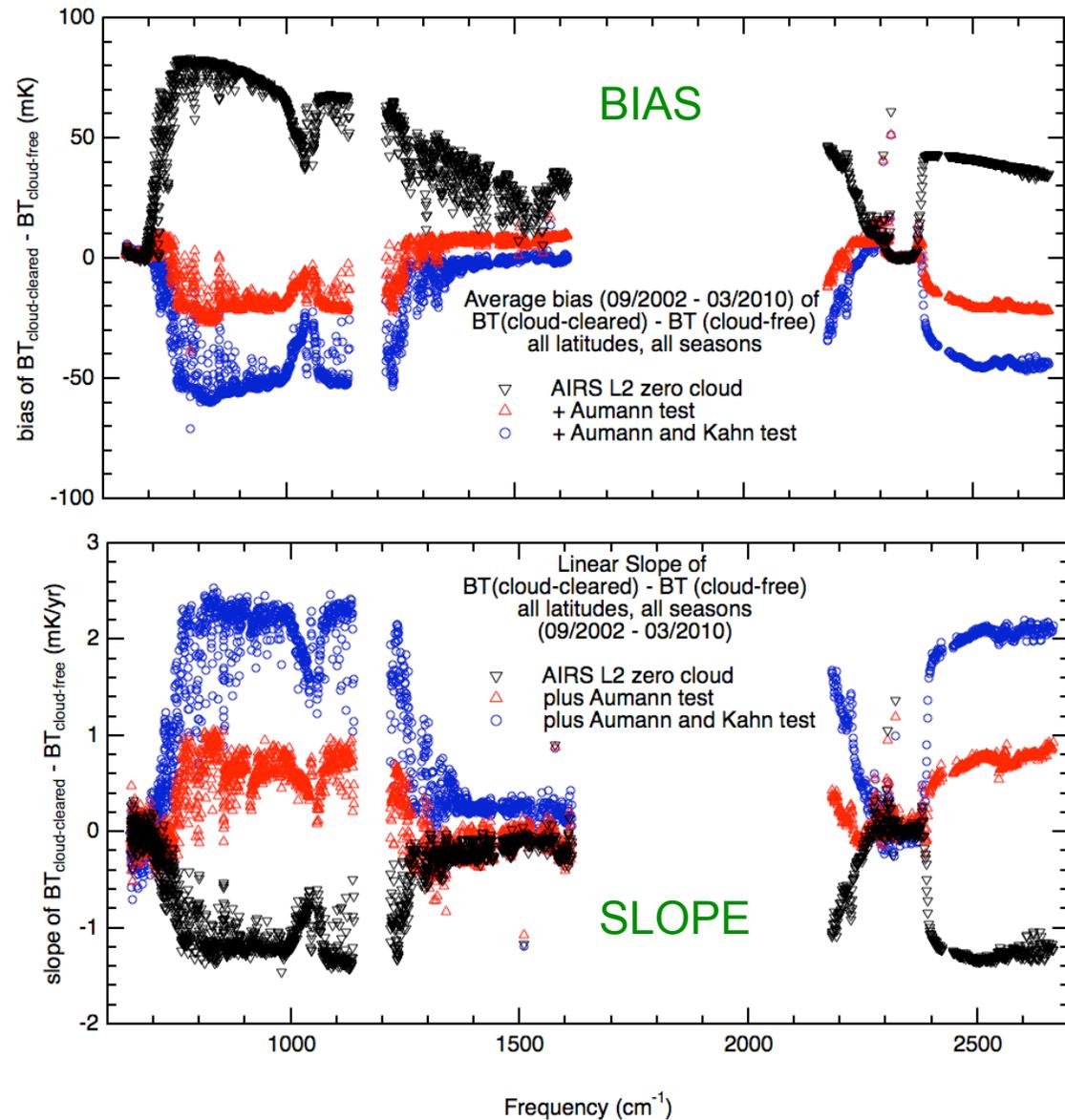
Global results

All lats, seasons,
clouds in CC spectra

Binned by clear test
procedure

Bias and slopes small,
but calculations are
sensitive to clear test
criteria

Biggest effect is
mostly on window
channels.

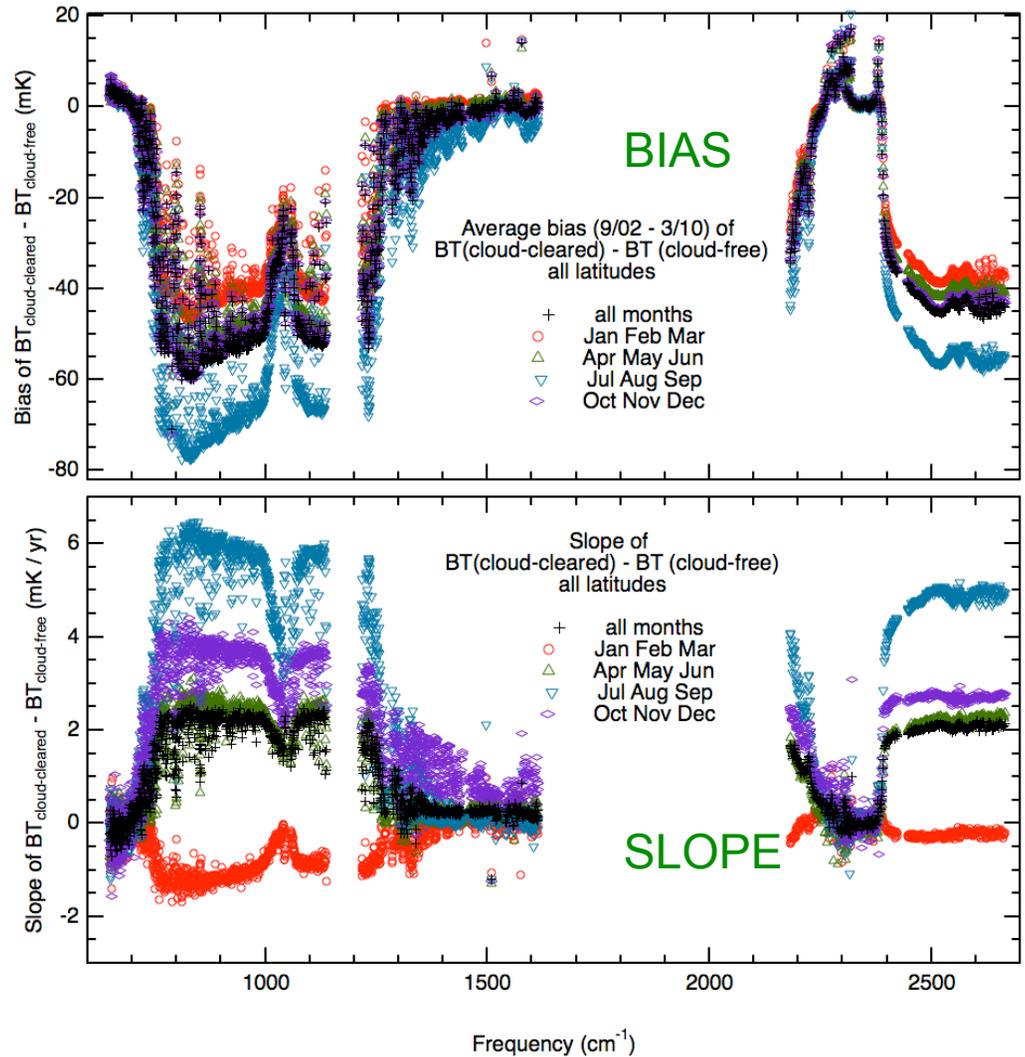


Global results
binned into season

All lats, clouds in CC
spectra

Aumann and Kahn
tests applied

Bias and slope vary by
season

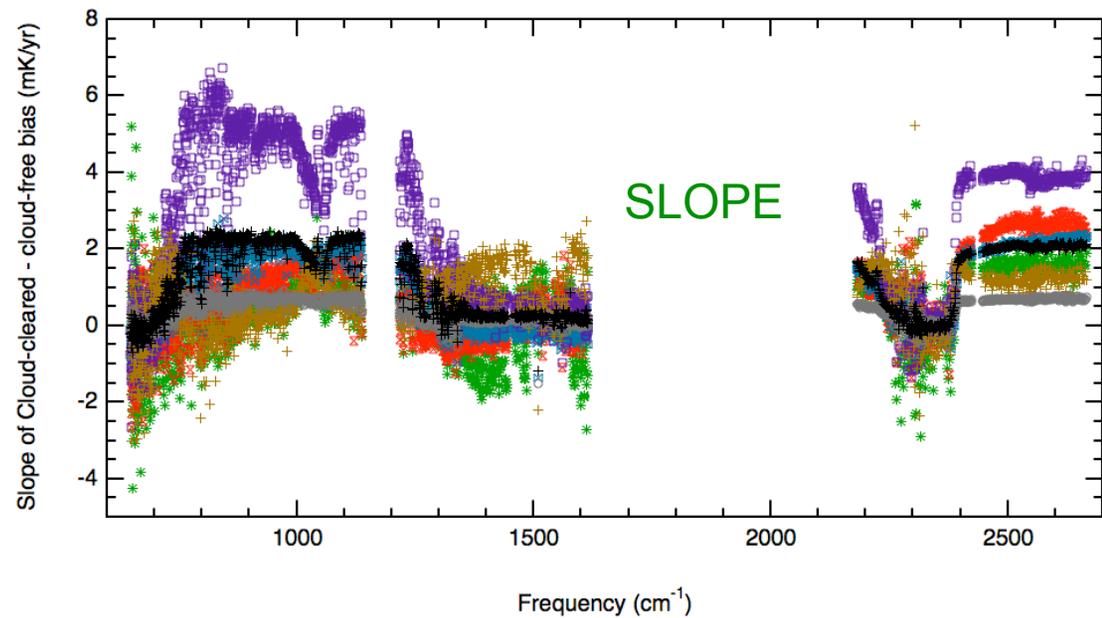
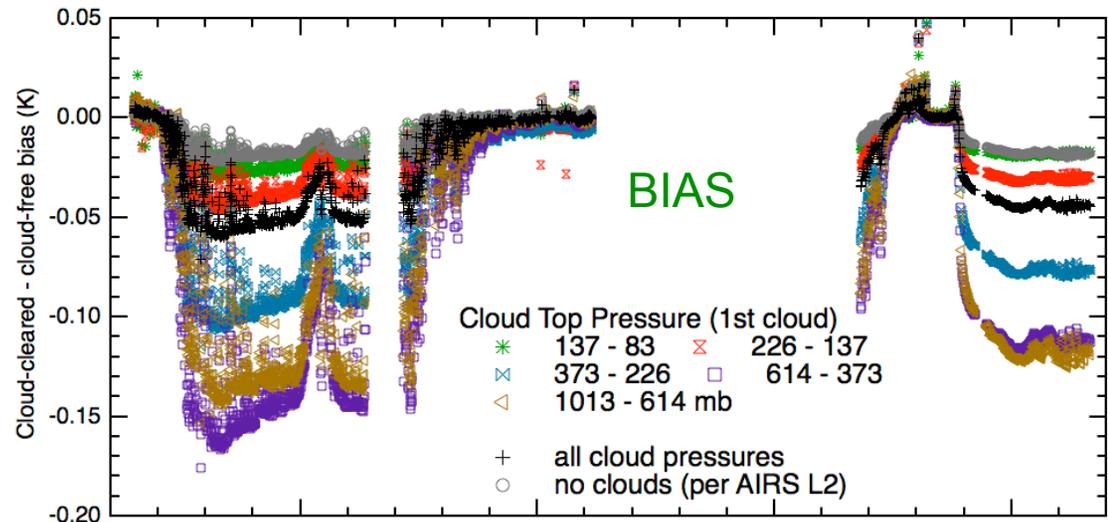


Global results
binned into cloud-top
pressure

All lats, seasons in CC
spectra

Aumann and Kahn
tests applied

Bias and slope vary by
cloud-top pressure

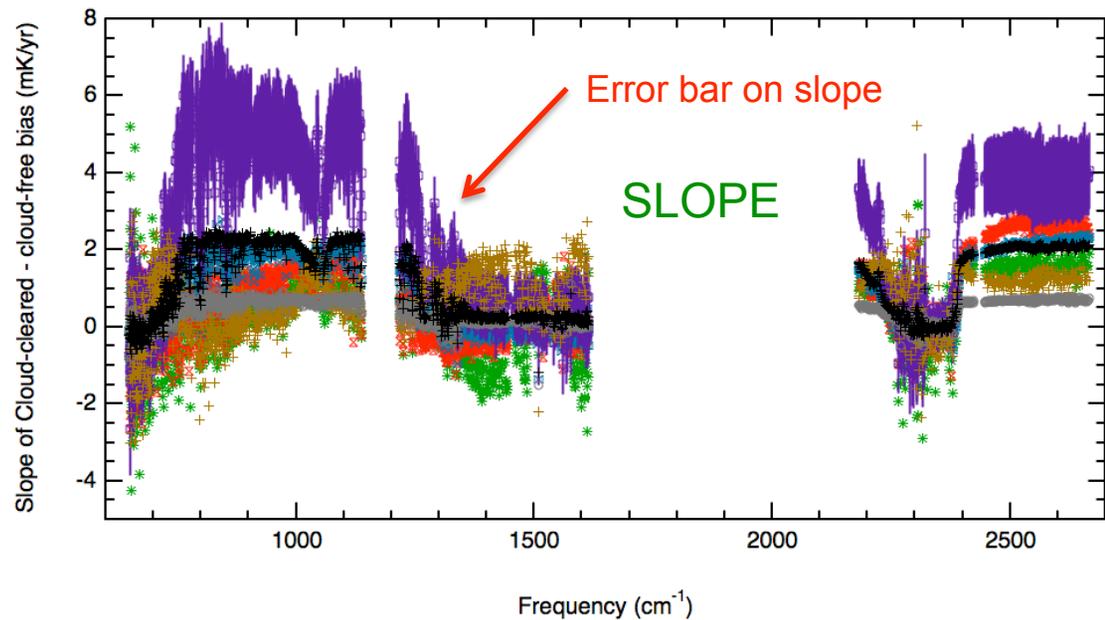
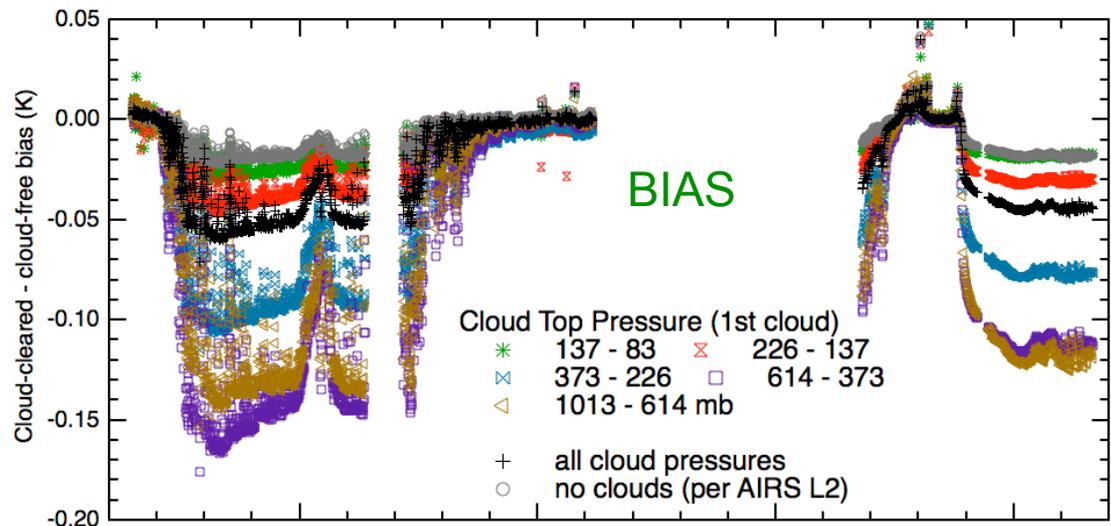


Global results
binned into cloud-top
pressure

All lats, seasons in CC
spectra

Aumann and Kahn
tests applied

Bias and slope vary by
cloud-top pressure



This is a preliminary study

Biases and slopes are small, but are highest on window channels.
In time, higher-valued slopes may add significant bias?

Calculation of biases and slopes strongly dependent on criteria for finding a clear AIRS footprint.

This is likely not a large source of the temperature bias trends (and is often of opposite sign).

BUT

These are observations where cloud-clearing should be expected to work extremely well, and so this can be useful as a sanity check on calculation of cloud-cleared radiances under different conditions.



Thank you.

No, this is not one of my dogs.