

MODIS B35 and B36 Radiometric Biases

Difficult Question

What is the physical nature of MODIS
biases wrt AIRS observations?

Chris Moeller,

University of Wisconsin

Jan 25, 2010

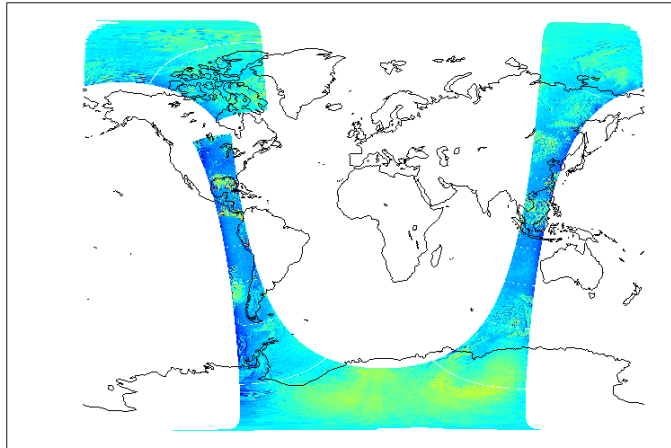
MODIS Calibration Workshop

(This work is an extension of work begun by Dave Tobin at U. Wisc.)

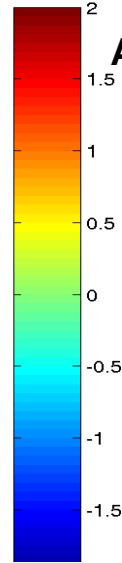
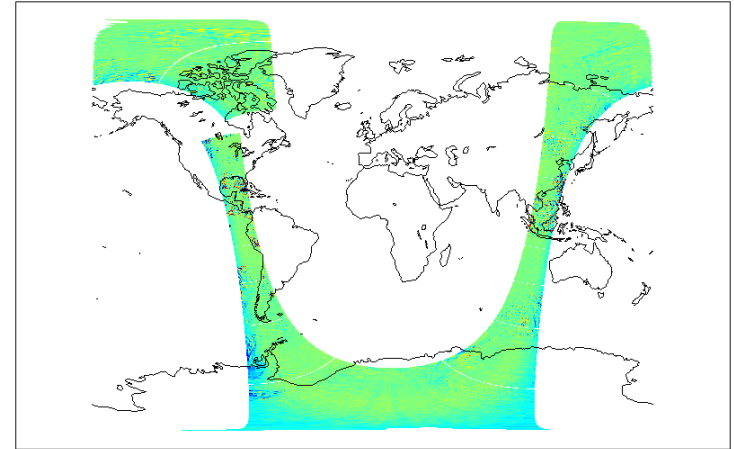
Tobin's work suggests spectral influence

MODIS Band 35 (13.9 μm)

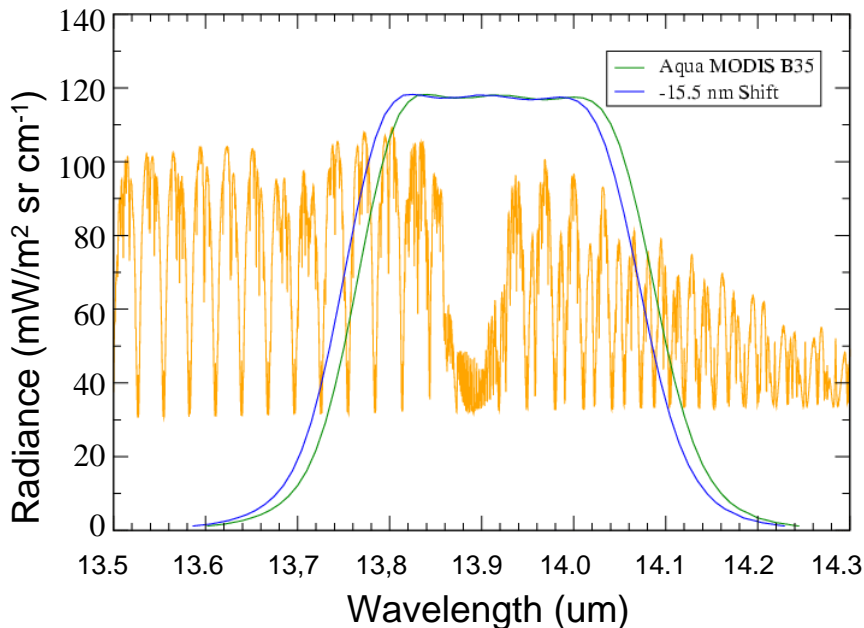
AIRS-MODIS, no shift



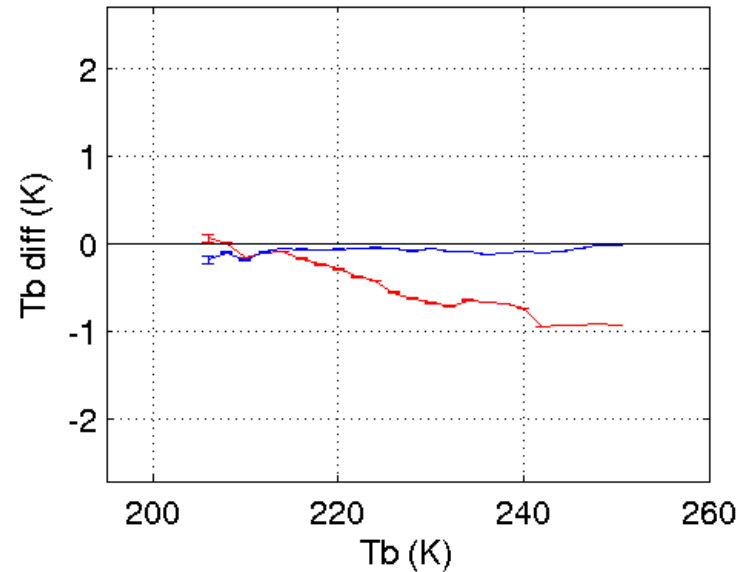
AIRS-MODIS, MODIS SRF shifted by +0.8 cm^{-1} (15.5 nm)



2

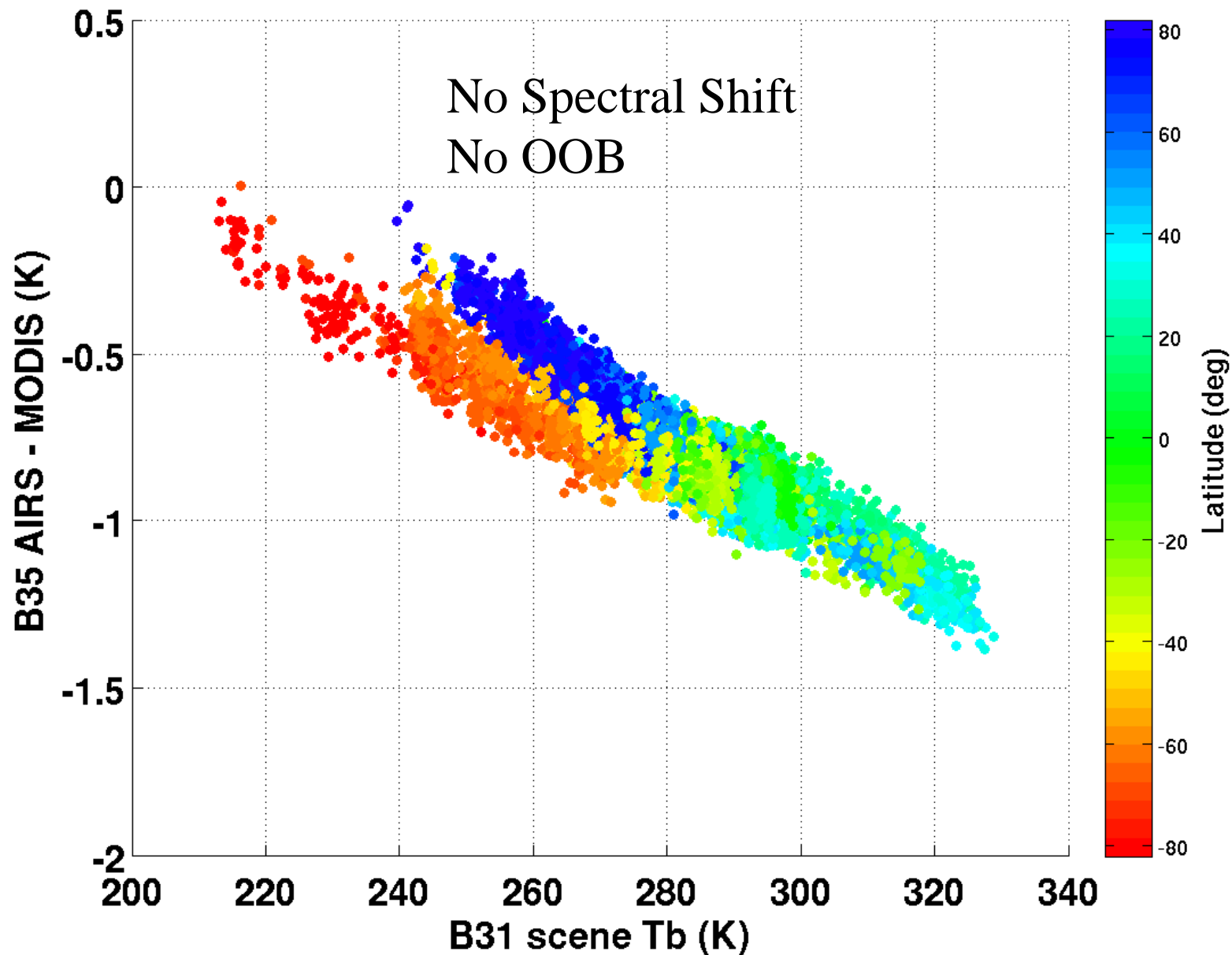


AIRS-MODIS: unshifted, shifted



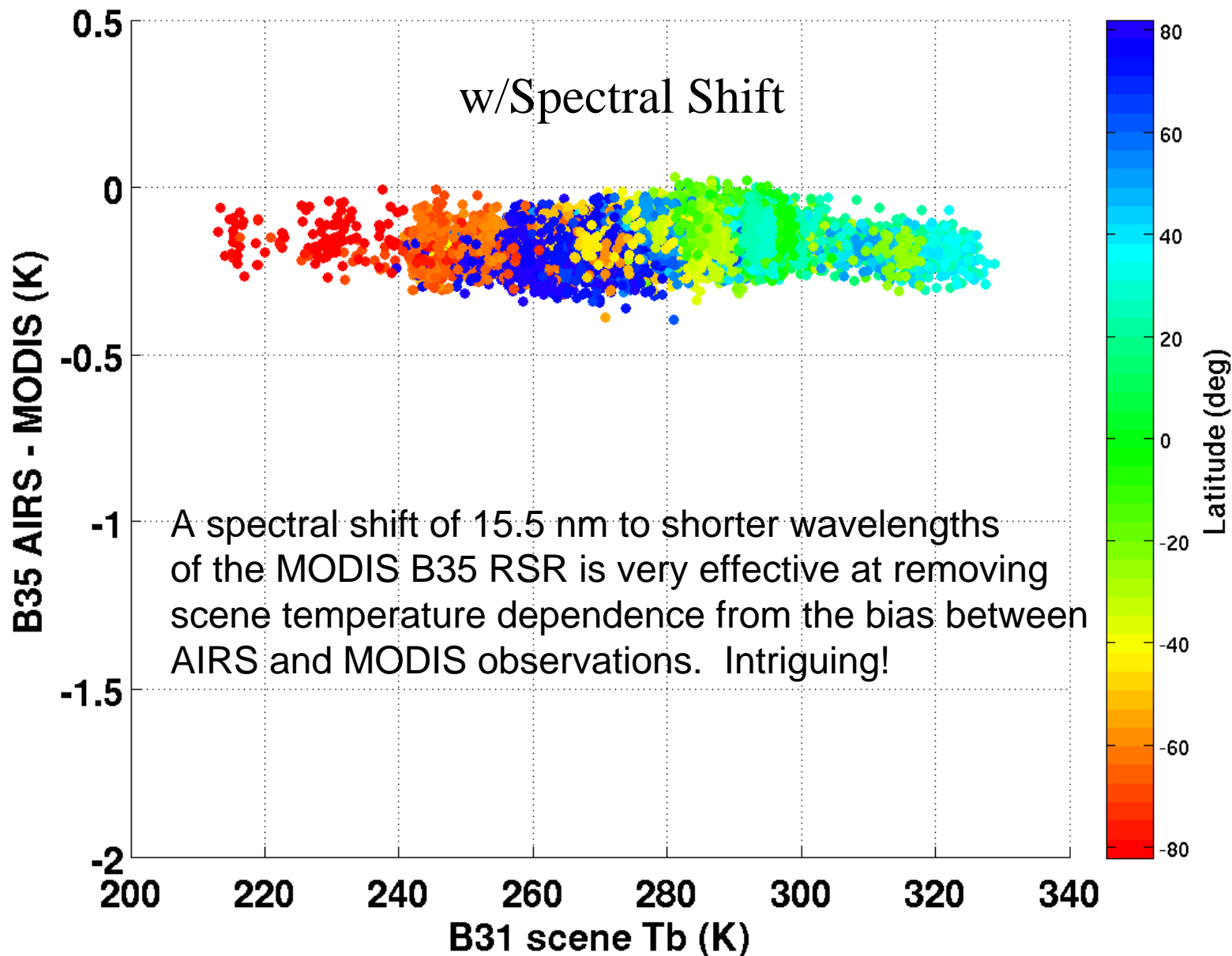
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Sep-2006



AIRS minus MODIS, Band 35, with 0.8 cm⁻¹ SRF shift

01-Sep-2006

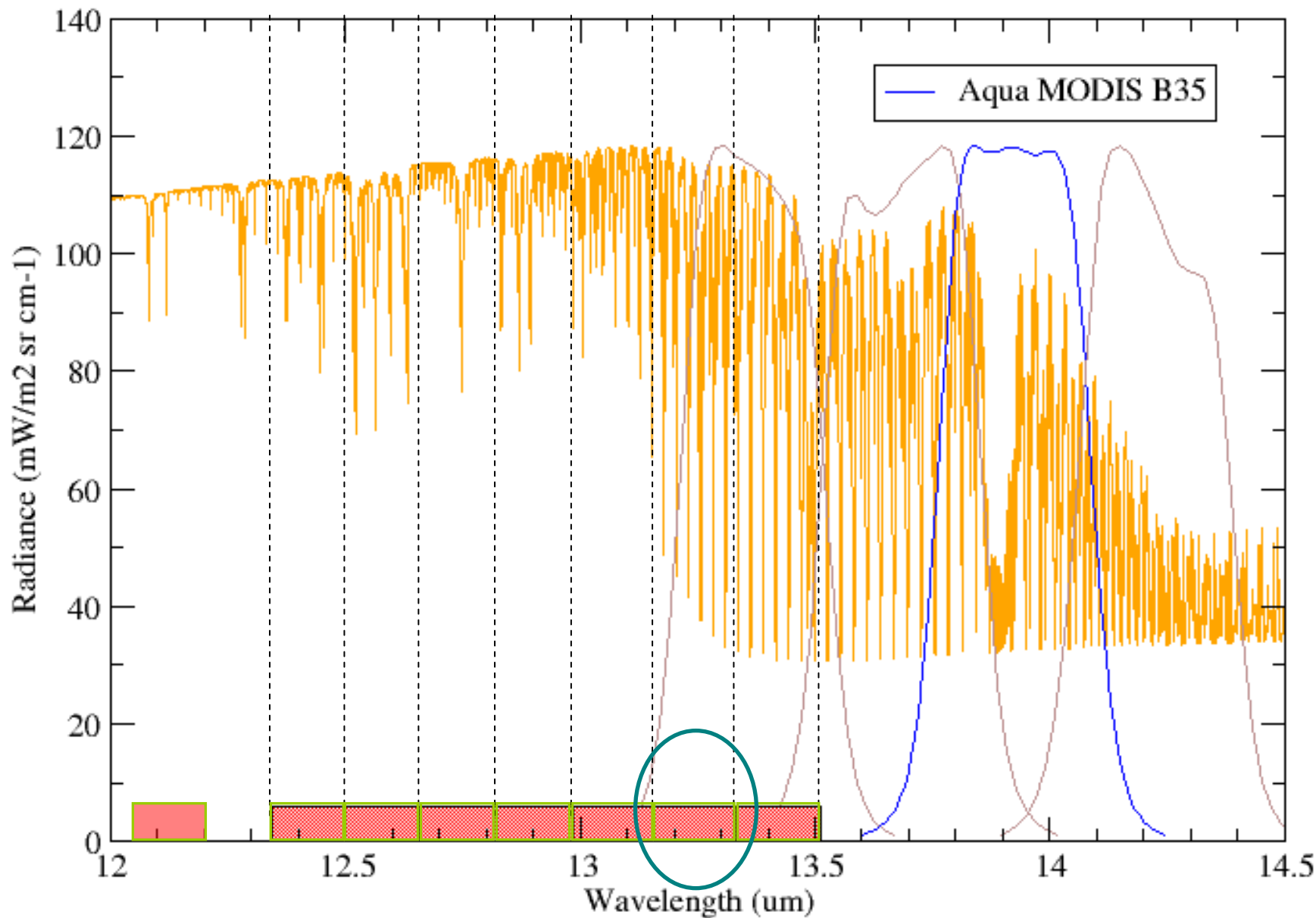


But.....

1. Could MODIS prelaunch RSR characterization of B35 have been off by ~16nm?
2. Could there have been a postlaunch shift in the MODIS B35 RSR of ~16nm?
3. Might there be undetected OOB influence in MODIS that also could explain the AIRS-MODIS behavior?
4. Some combination of all of the above?

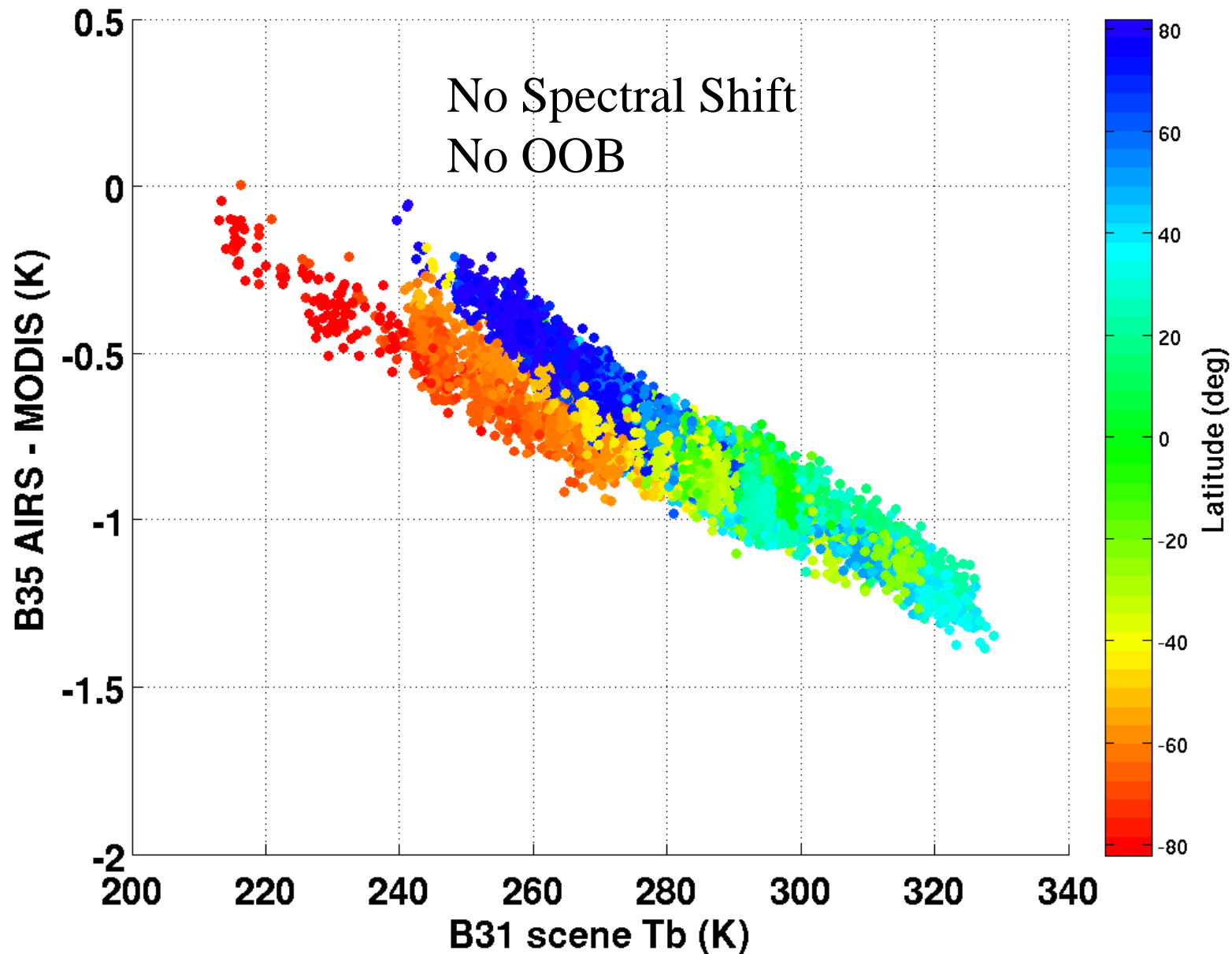
MODIS Radimetric Calibration

OOB Influence



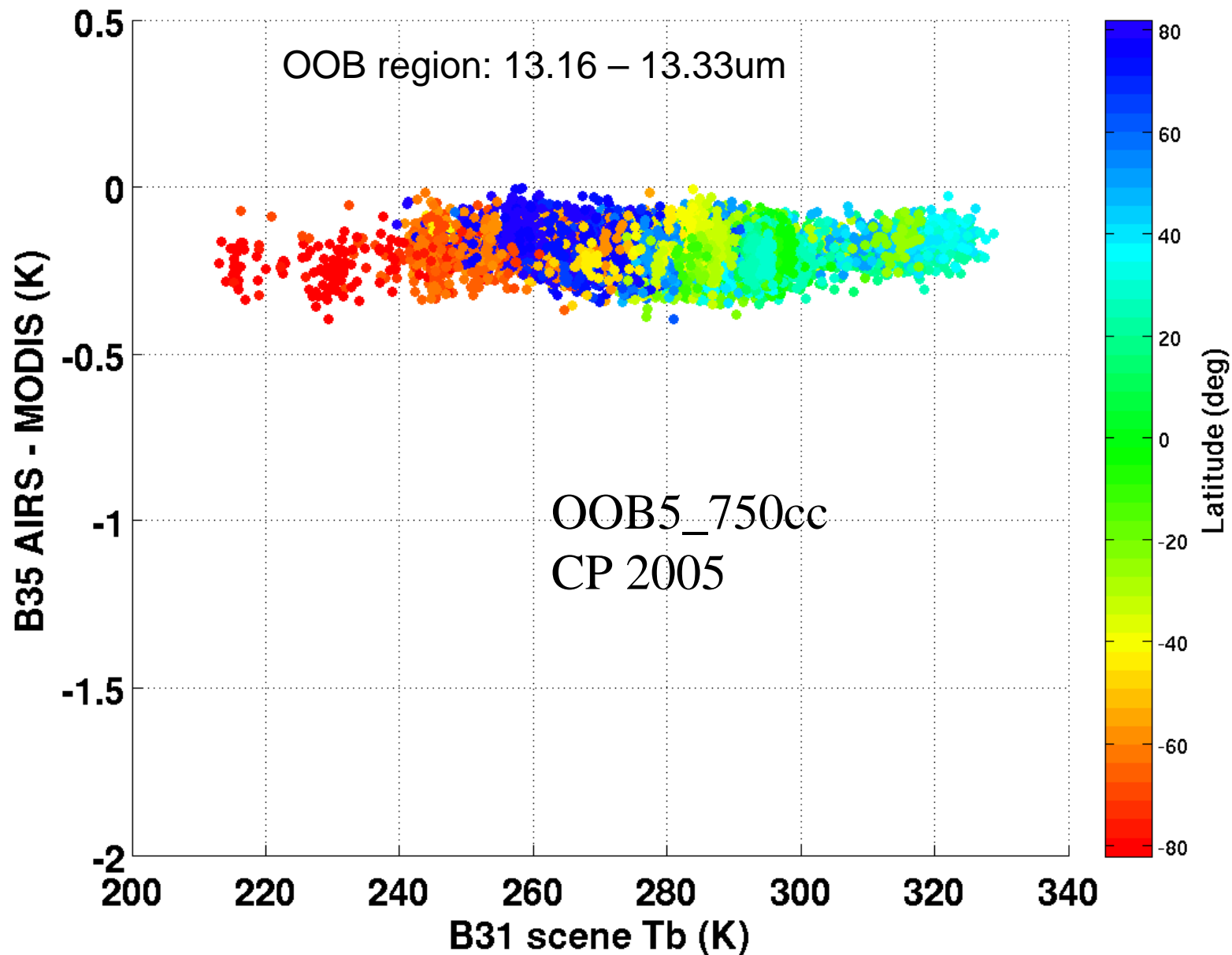
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Sep-2006



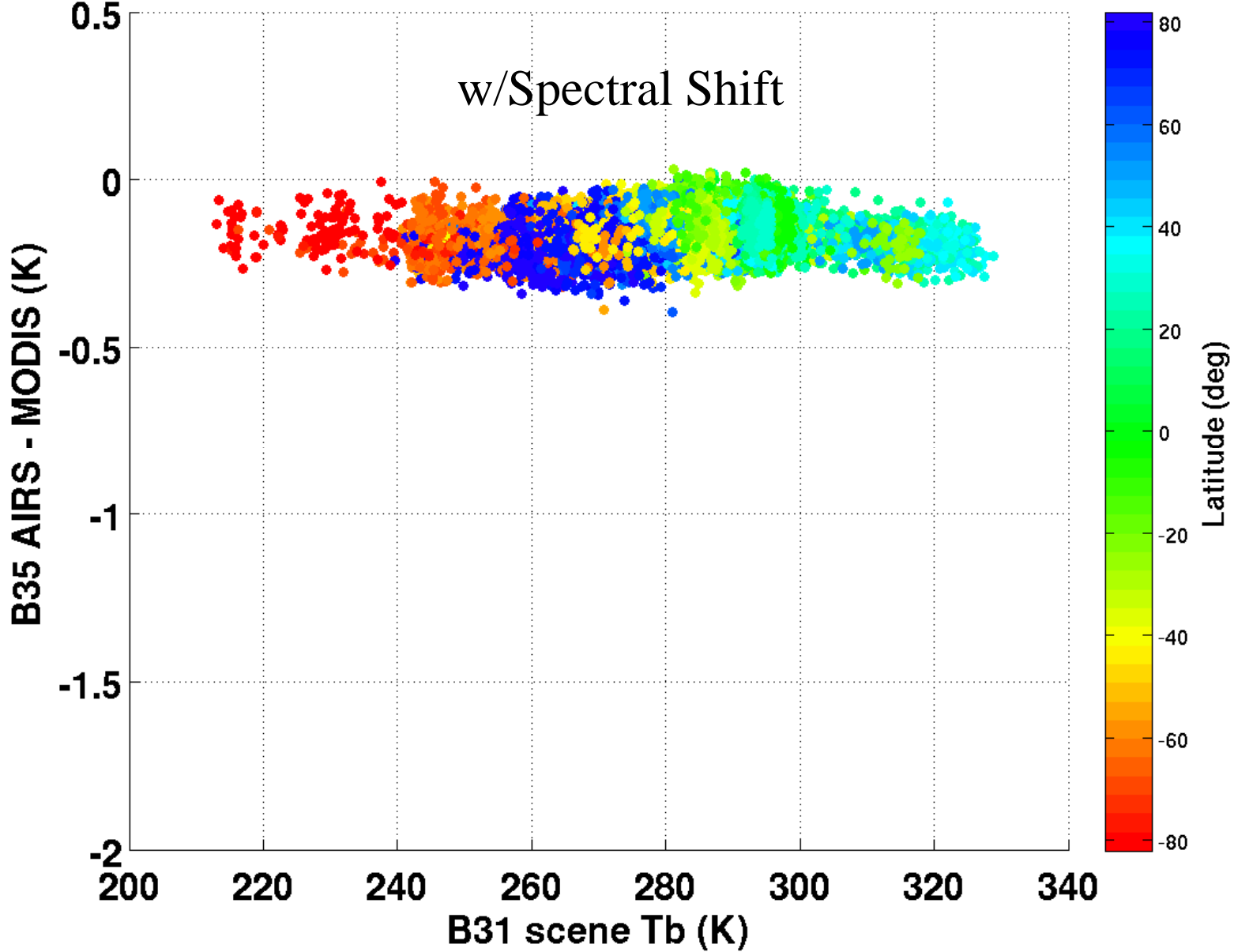
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Sep-2006



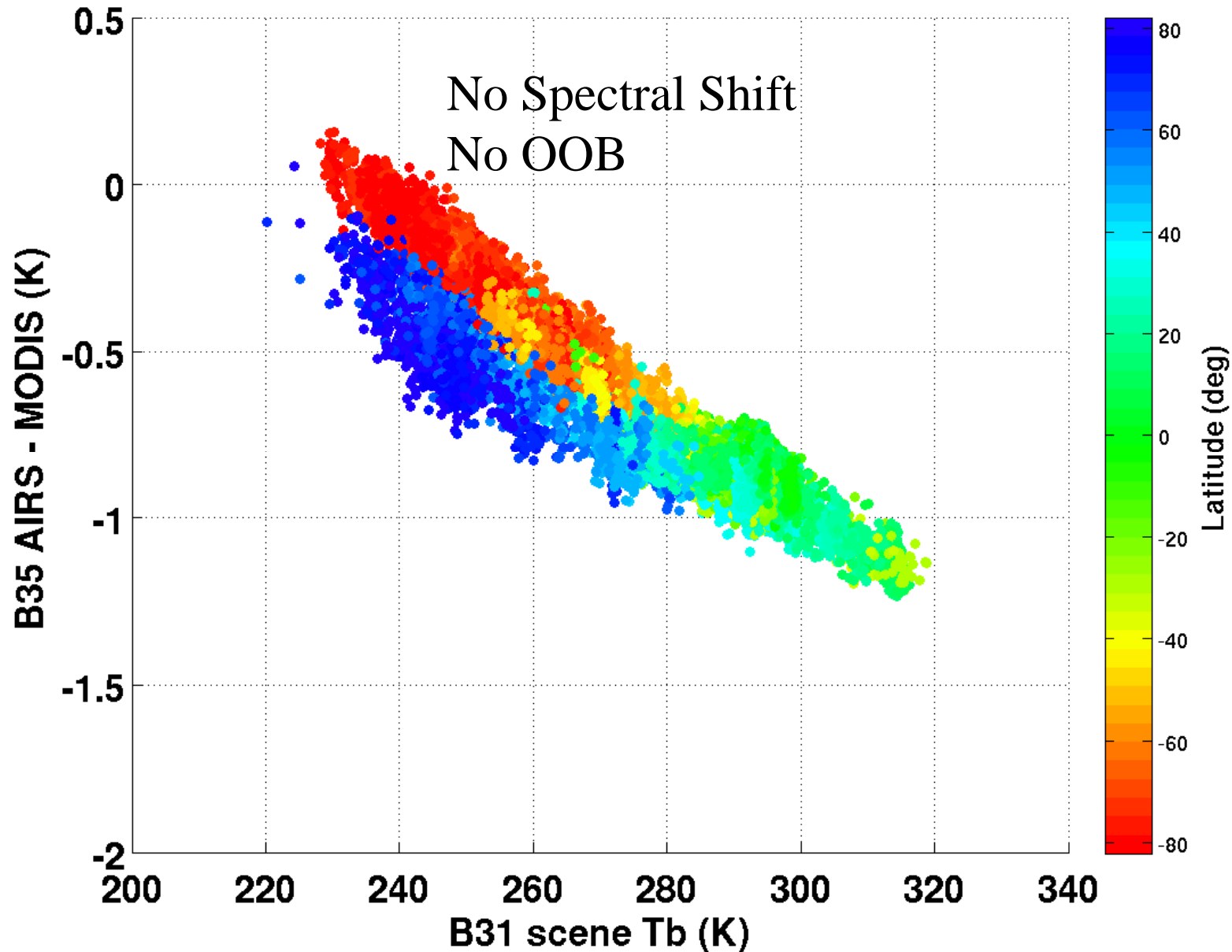
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Sep-2006



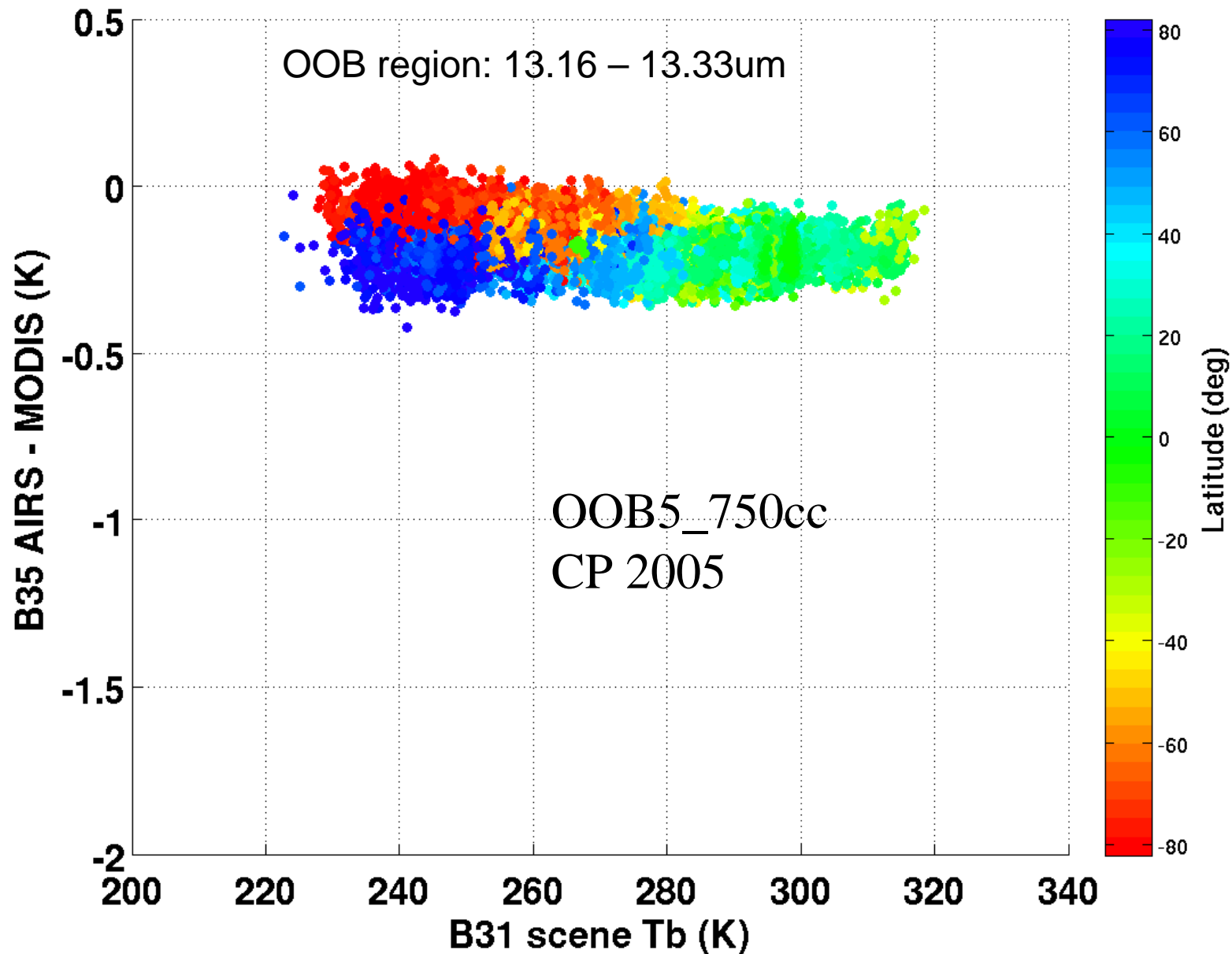
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Dec-2004



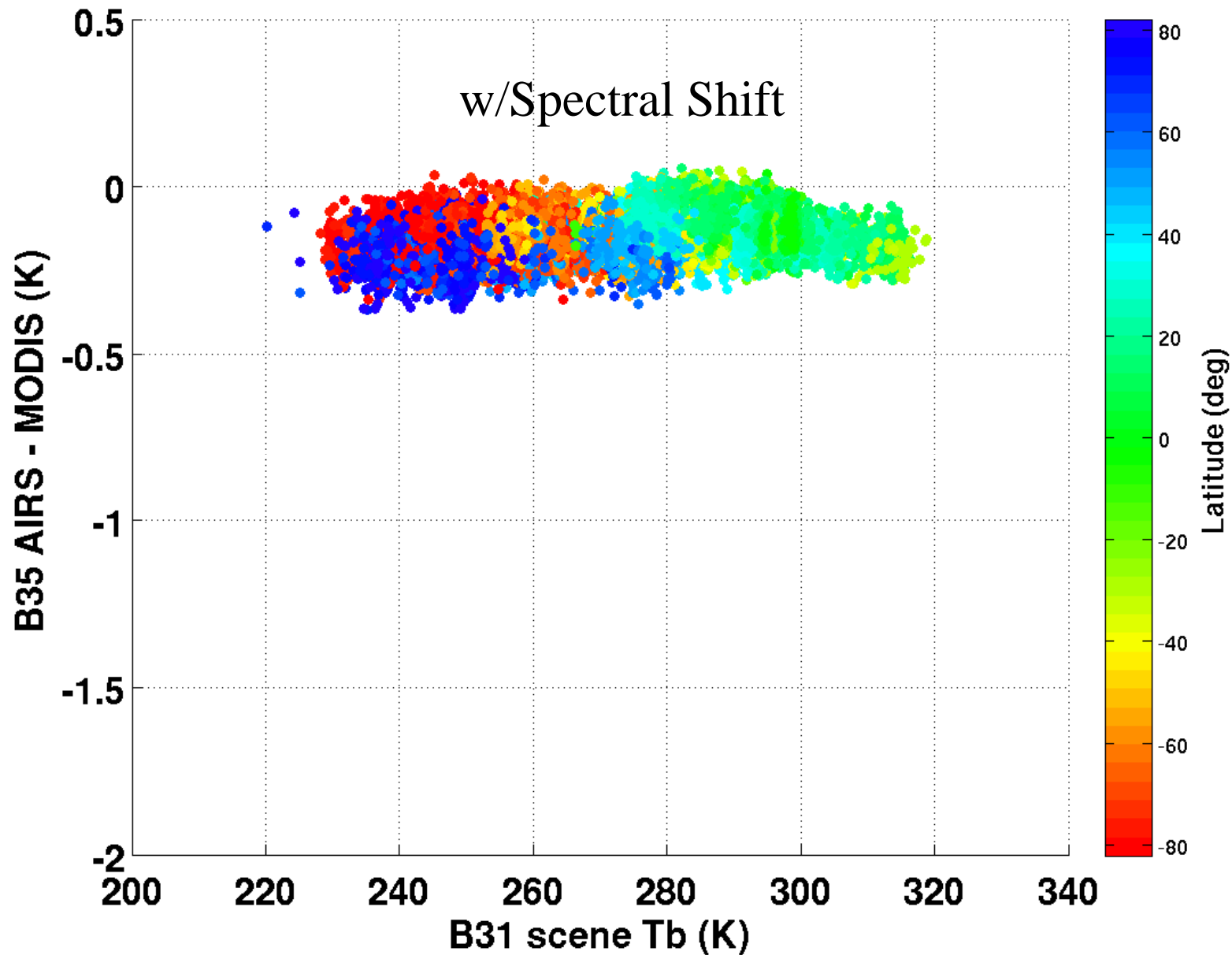
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Dec-2004



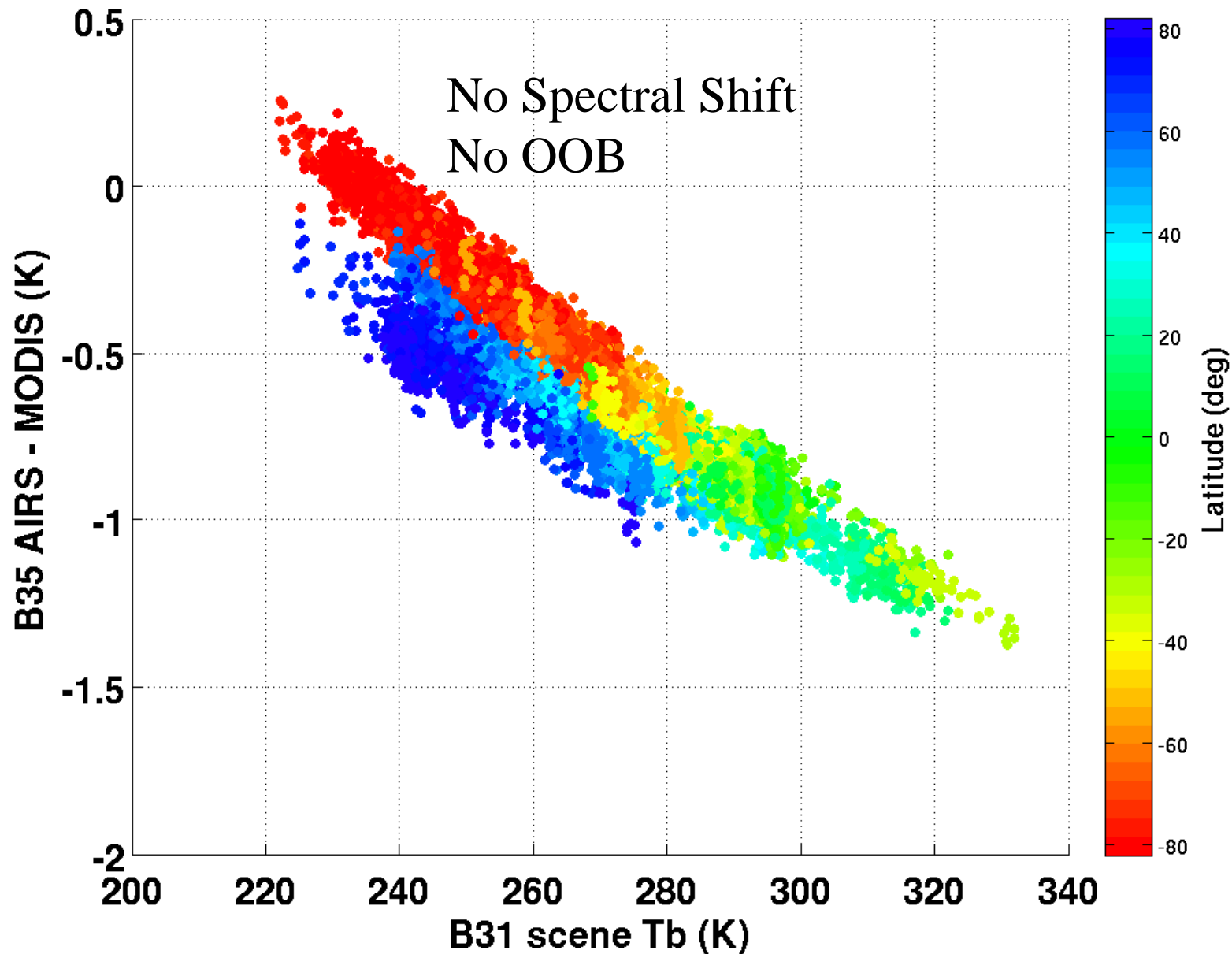
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Dec-2004



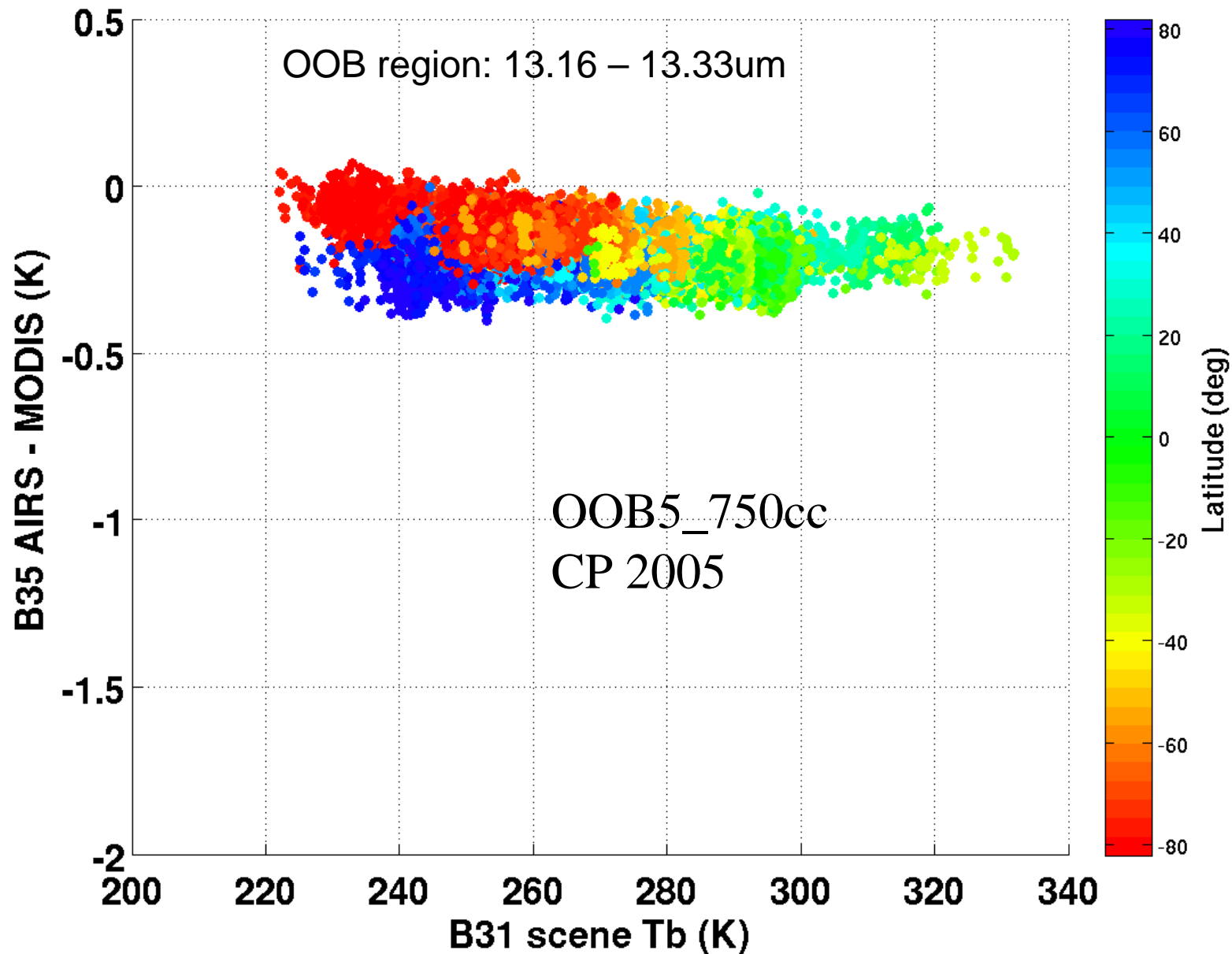
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Feb-2007



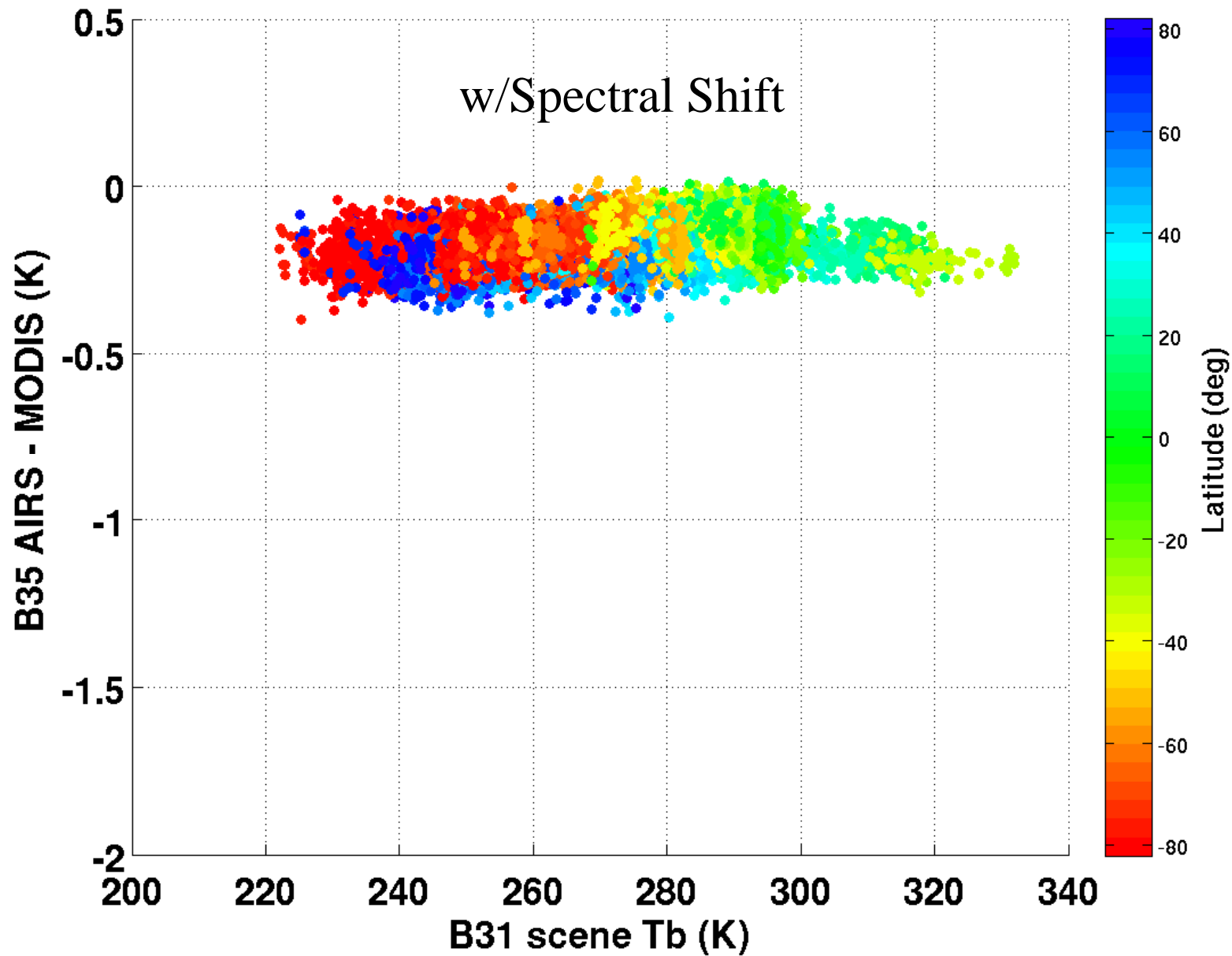
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Feb-2007



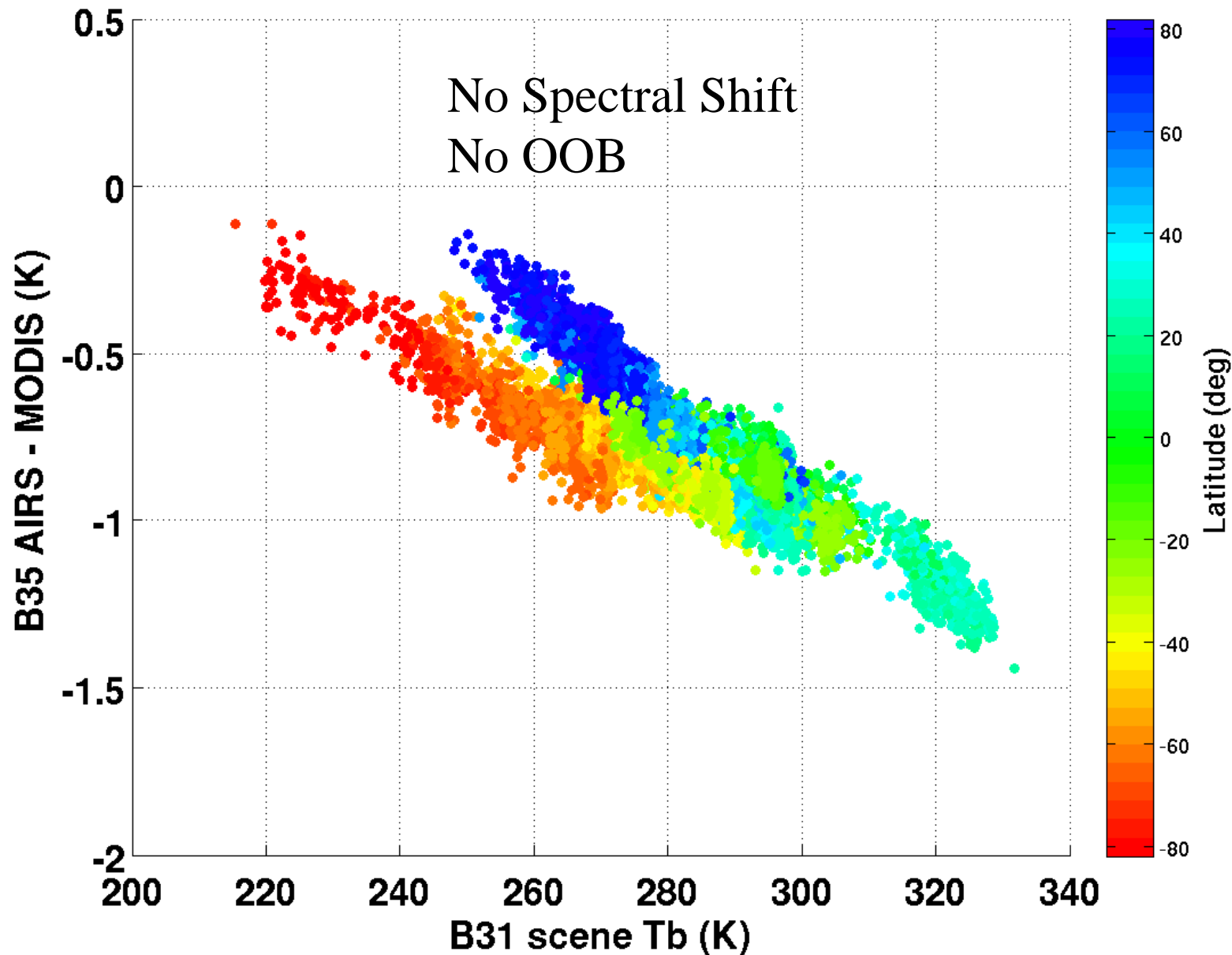
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Feb-2007



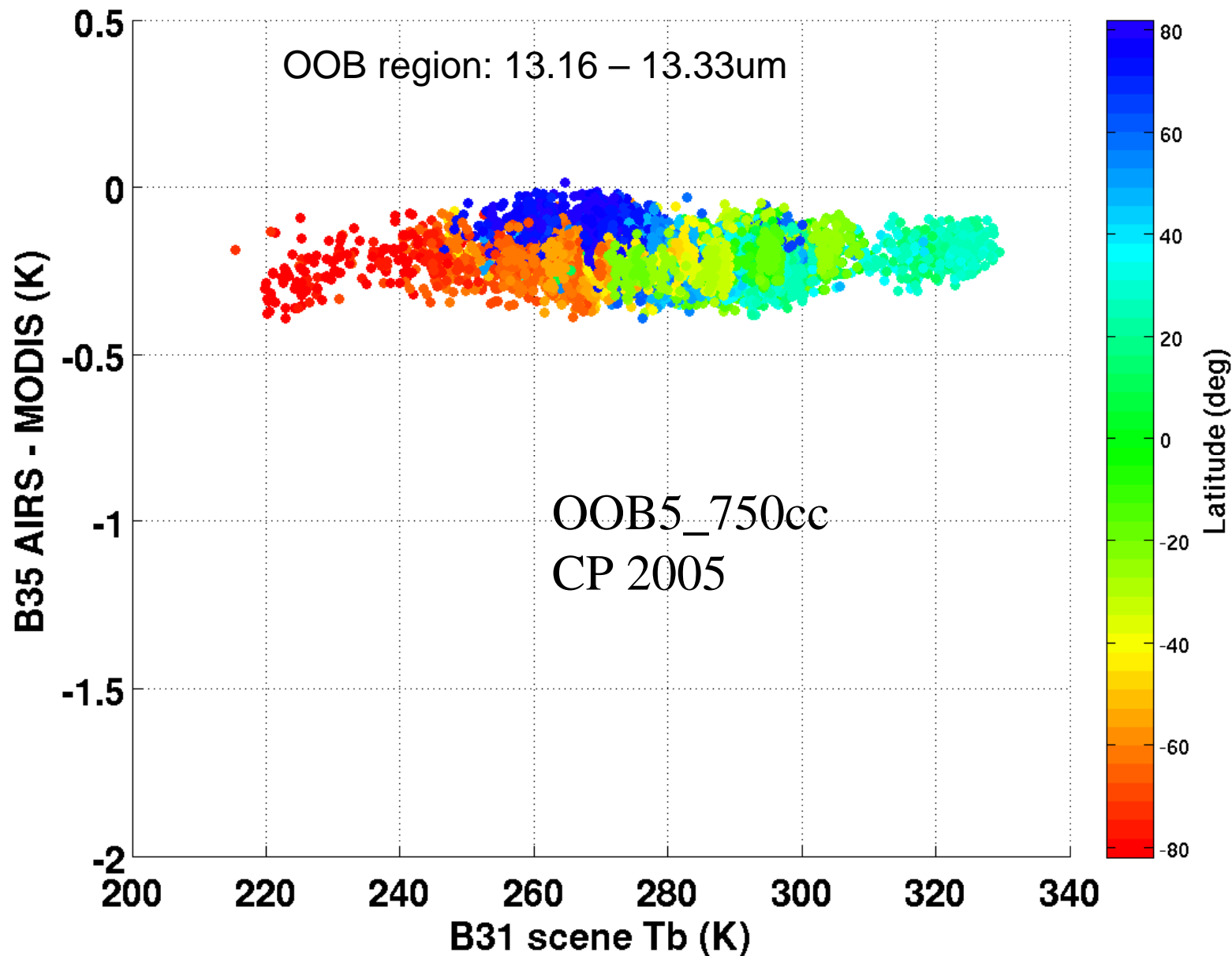
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Jul-2006



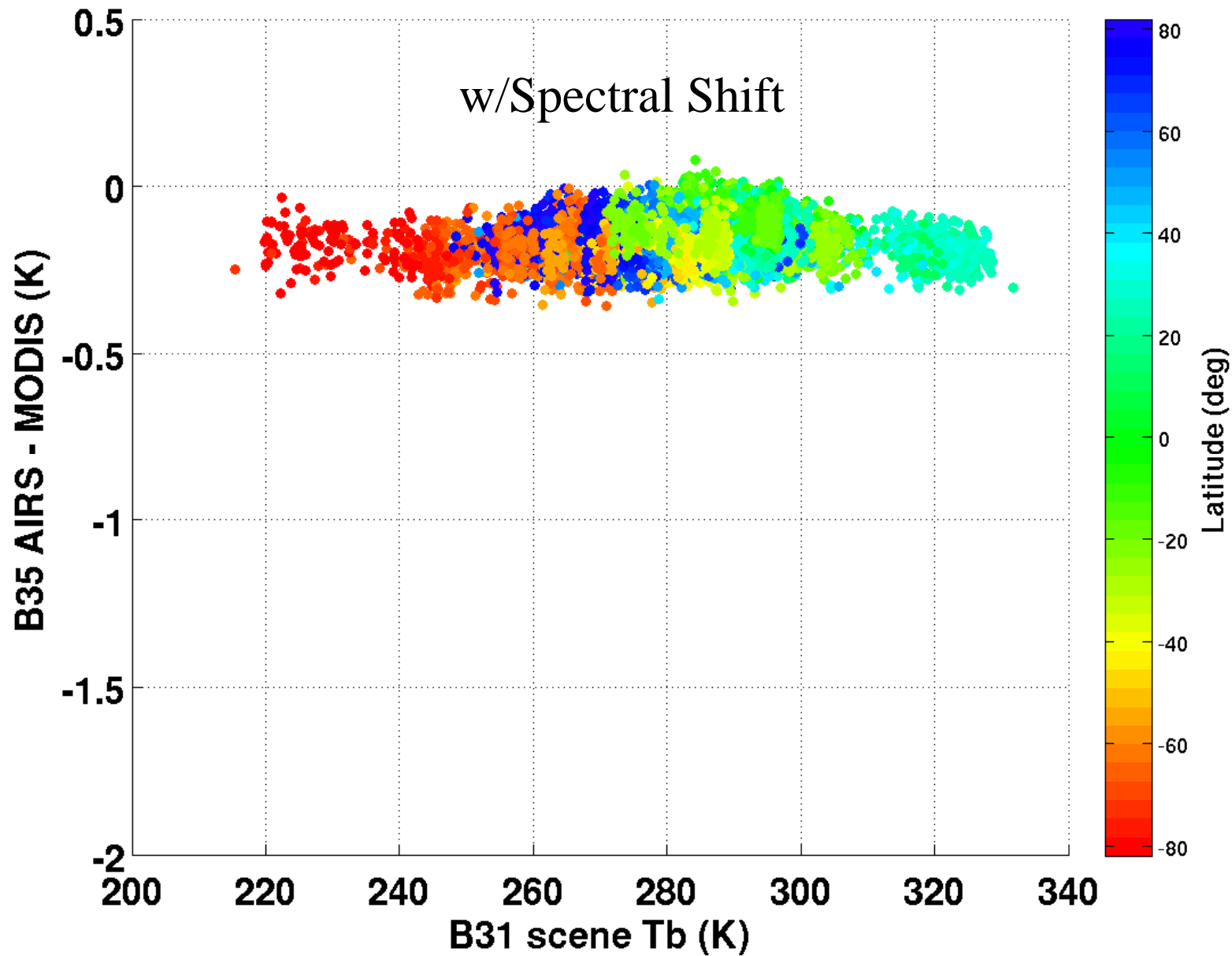
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Jul-2006



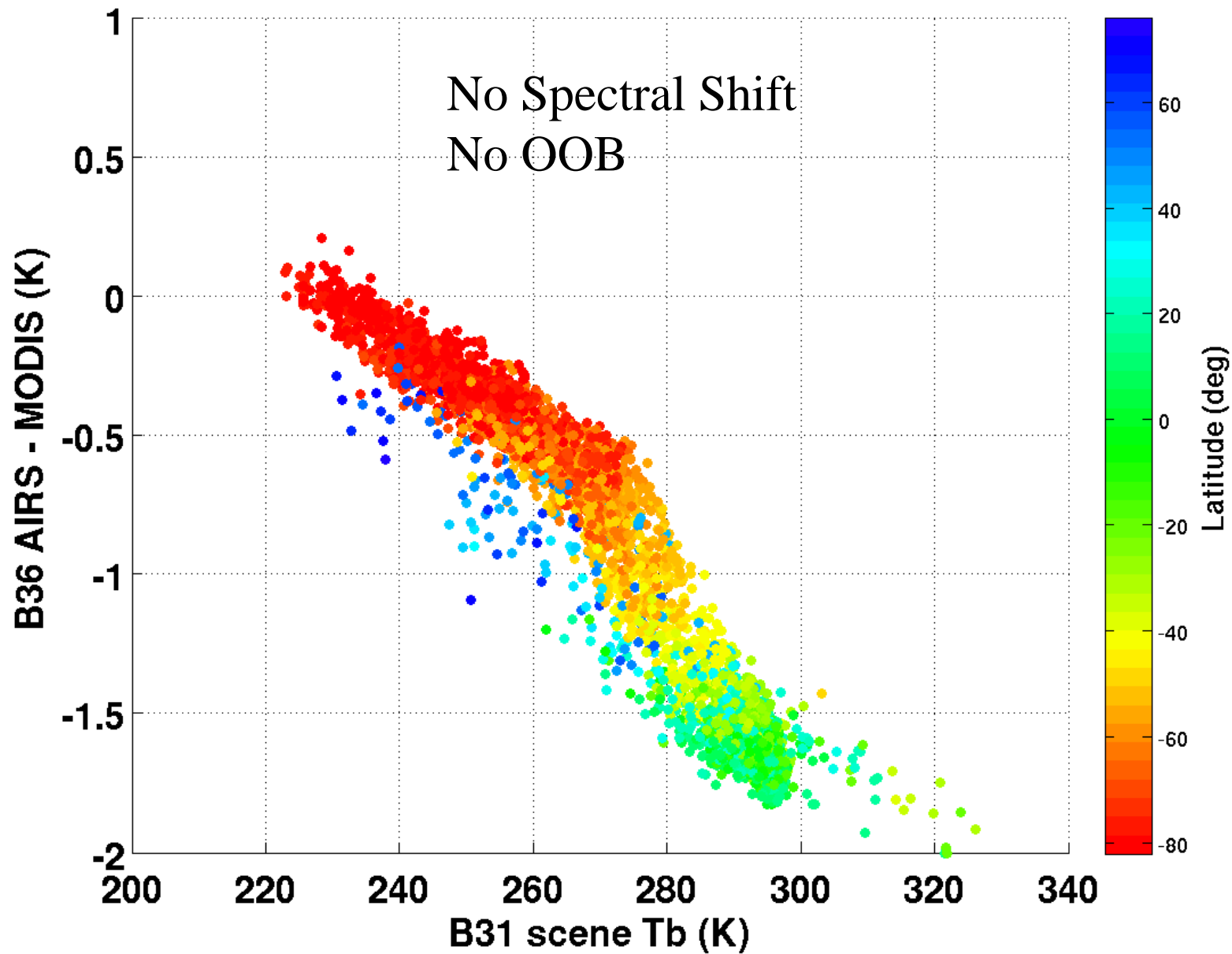
AIRS minus MODIS, Band 35 vs B31 Scene Temp

01-Jul-2006



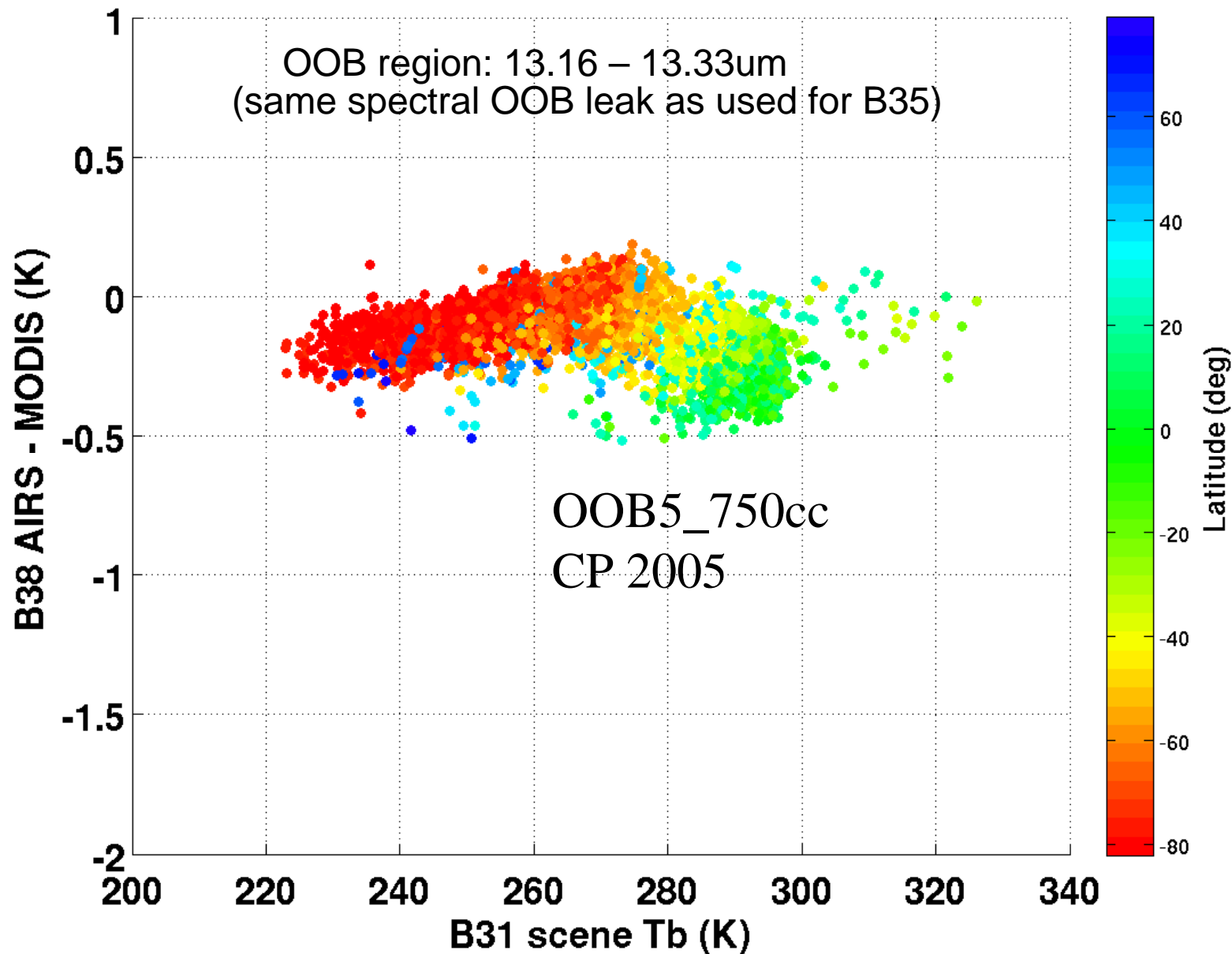
AIRS minus MODIS, Band 36 vs B31 Scene Temp

01-Feb-2007



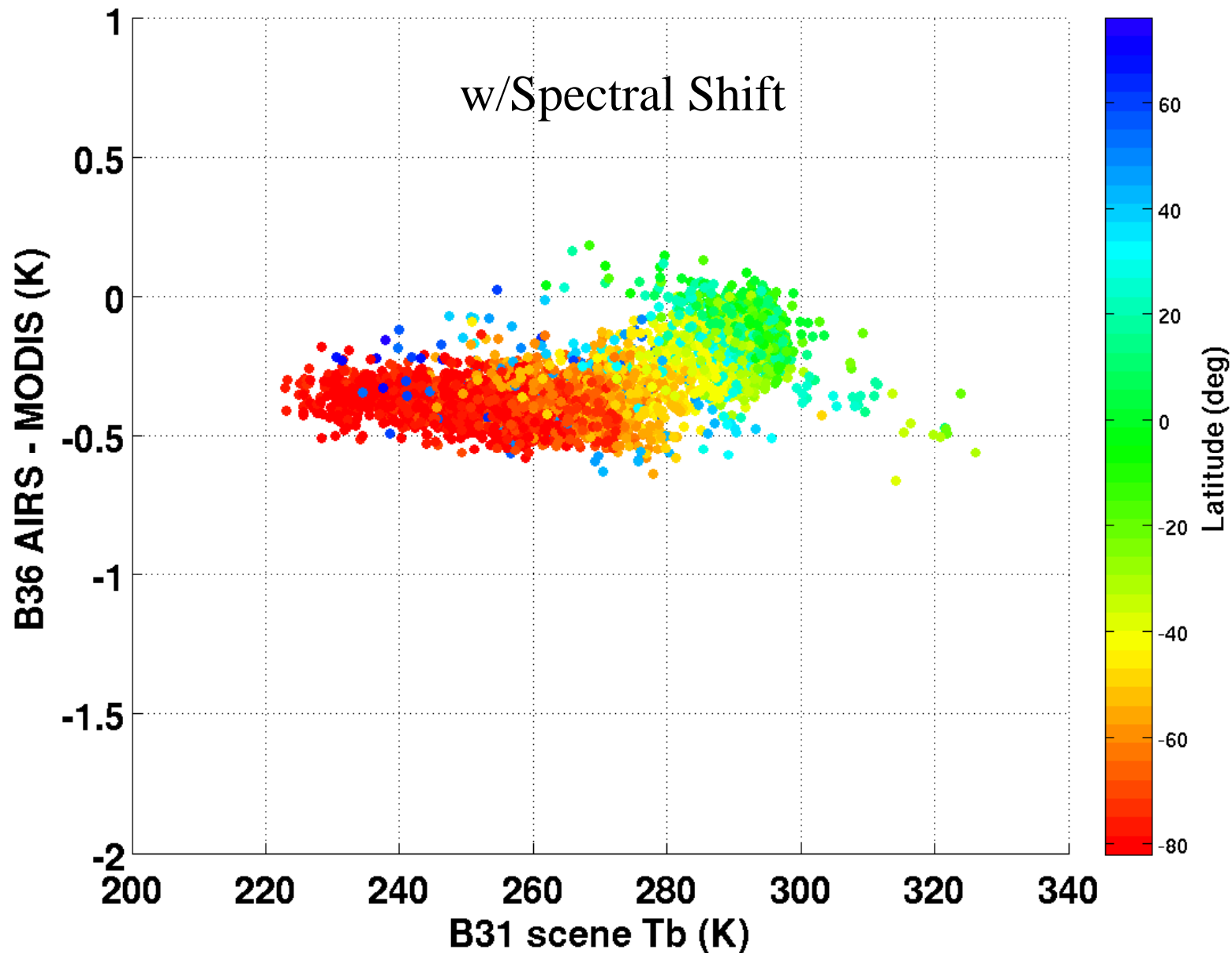
AIRS minus MODIS, Band 36 vs B31 Scene Temp

01-Feb-2007



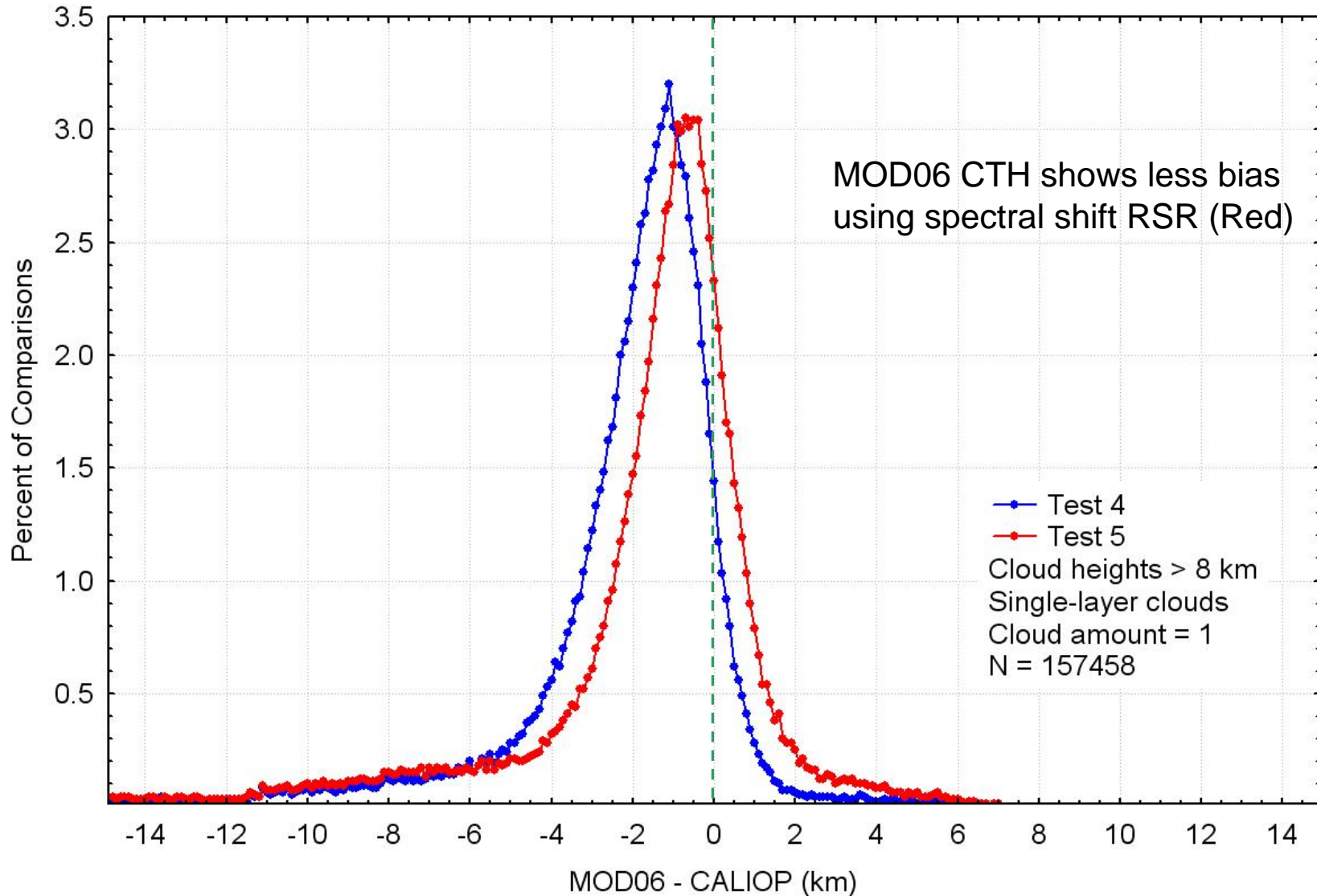
AIRS minus MODIS, Band 36 vs B31 Scene Temp

01-Feb-2007



MODIS MOD06 (Cloud Top Heights) Retrievals

Distribution of Aqua MODIS vs. CALIOP Cloud Top Heights
August 2006



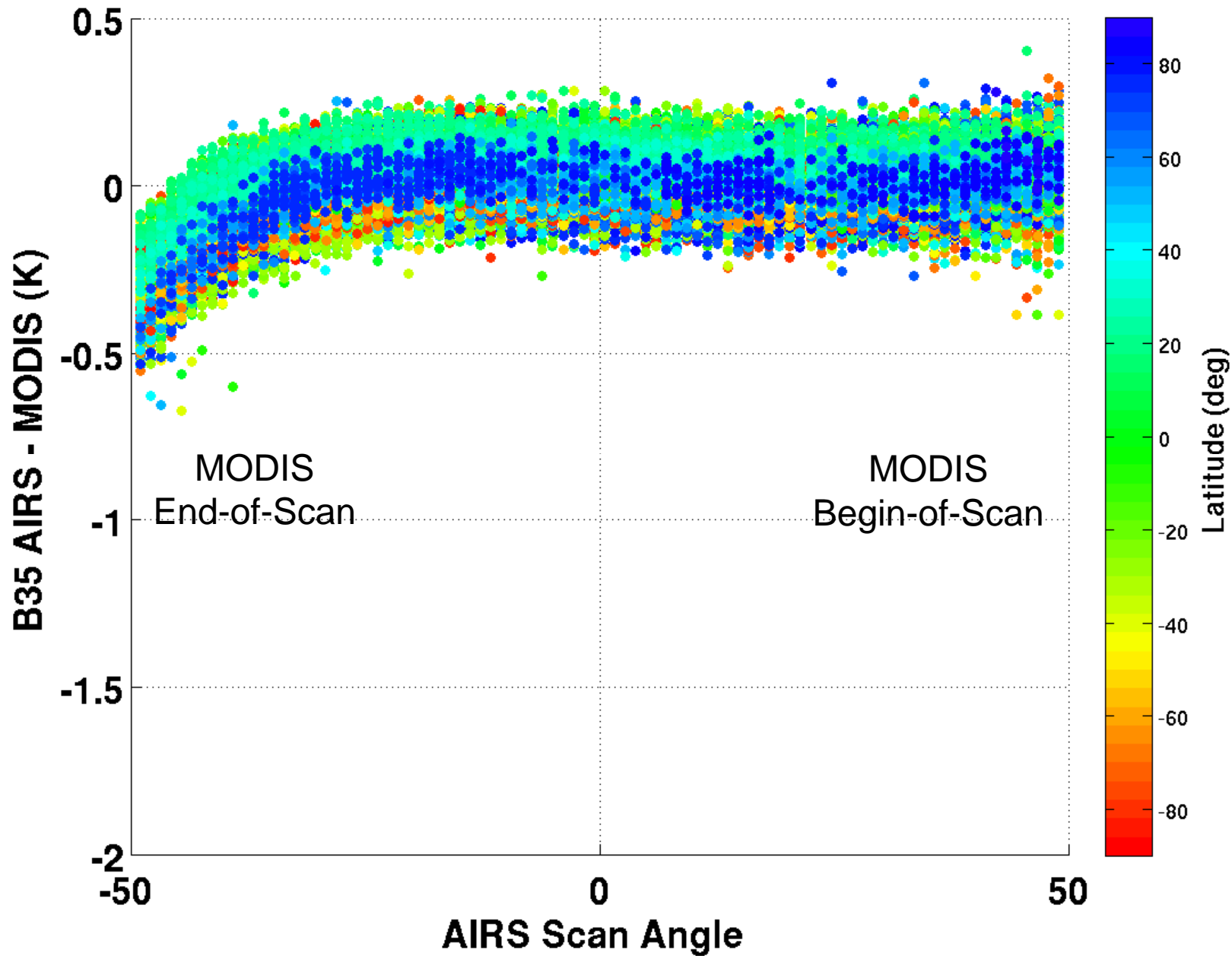
Summary

- It *appears* that AIRS-MODIS biases for MODIS Band 35 (and 36) can be largely explained by either a spectral shift or an OOB filter leak.
- Which of these two mechanisms is the true cause of AIRS-MODIS biases is not known.
- MOD06 (Cloud Top Property) statistics indicate improved agreement with Calipso observations after applying the spectral shift to MODIS bands 34-36.

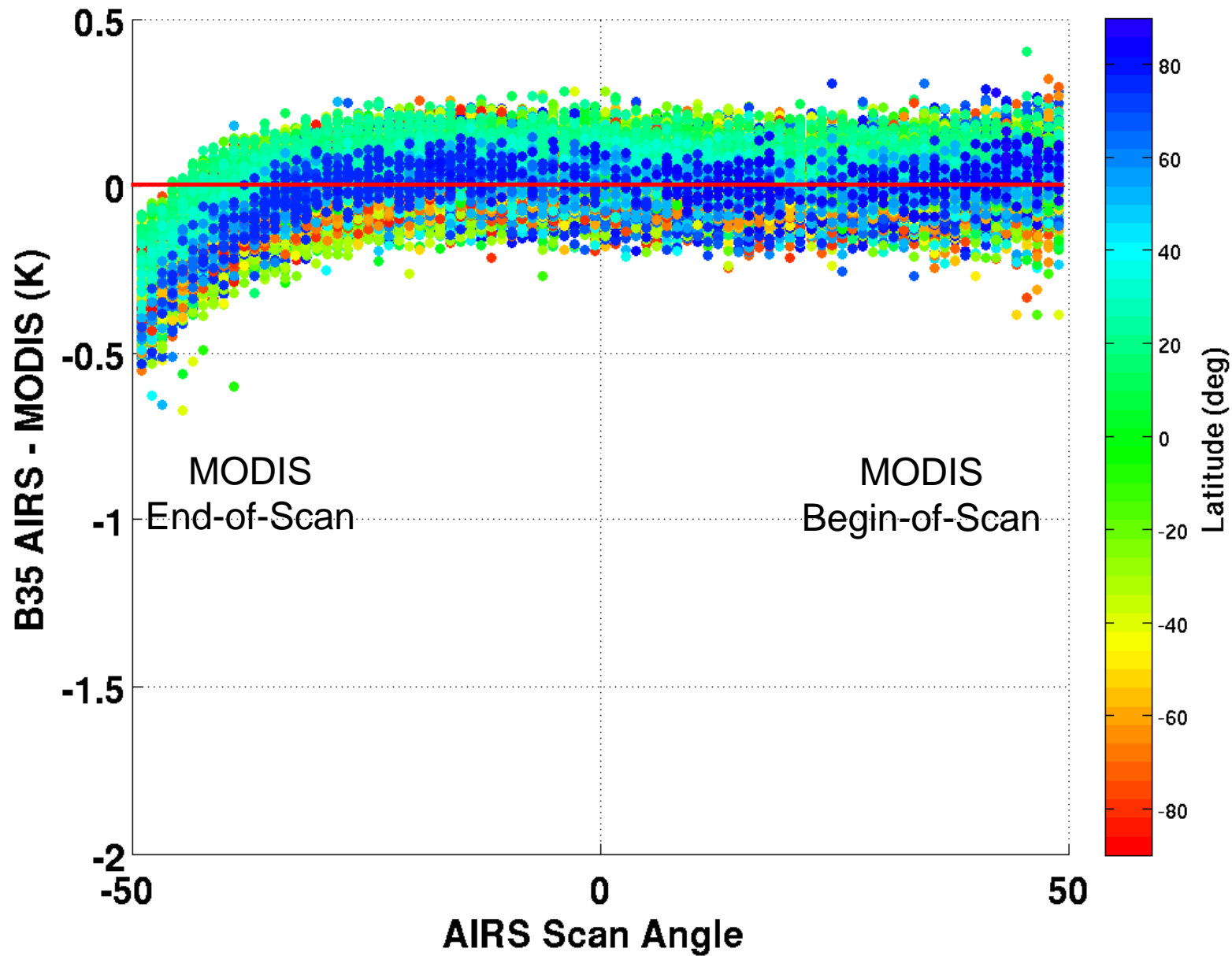
A quick look at Aqua B35 and 36 RVS Stability as portrayed by AIRS-MODIS comparisons

- In general RVS appears to be stable over 5 year period of monthly comparisons
- Some suggestion that small changes (< 0.2 K) may be occurring near the End-of-Scan on MODIS
- No way of being certain that this is a MODIS effect

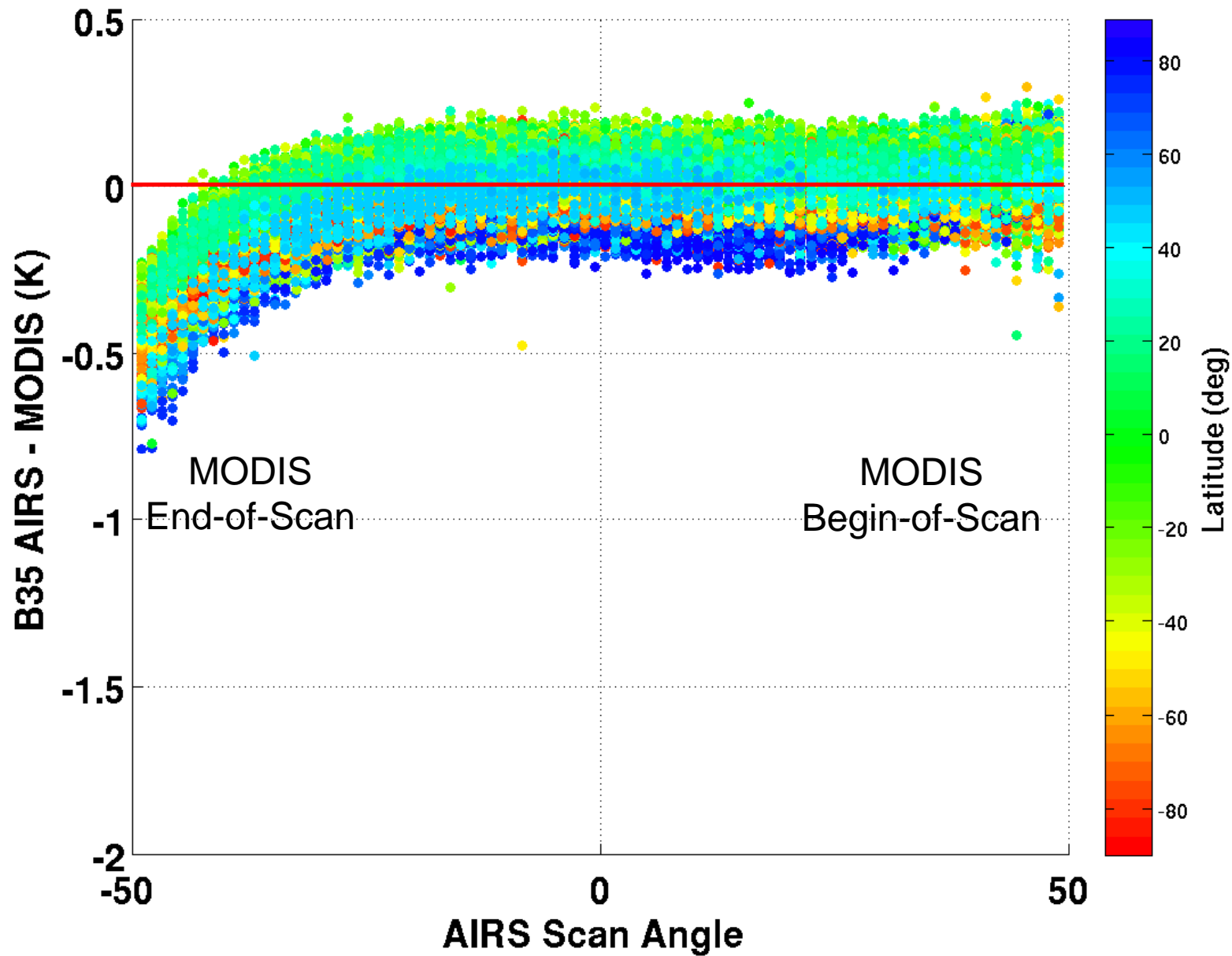
01-Jan-2003



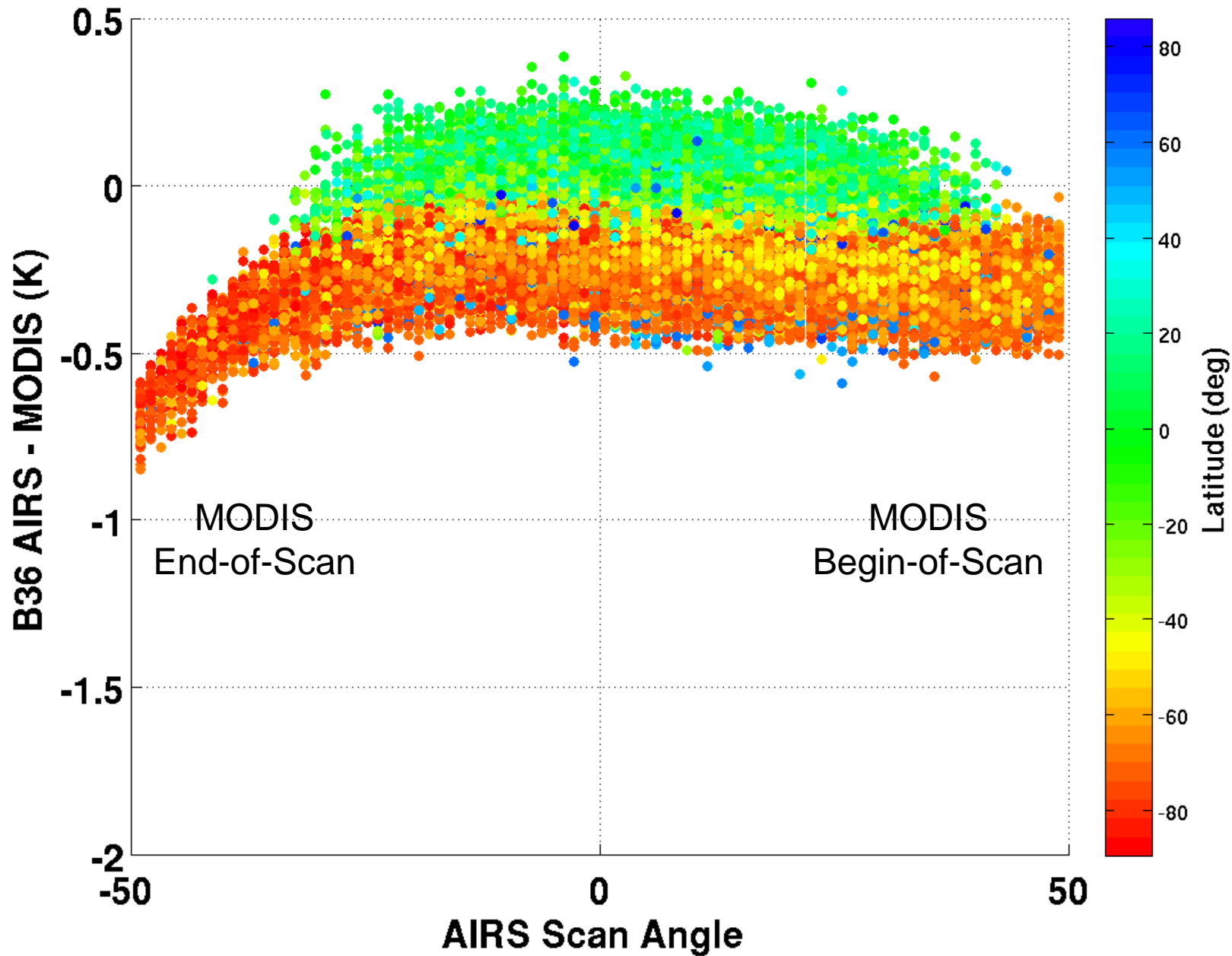
01-Jan-2003



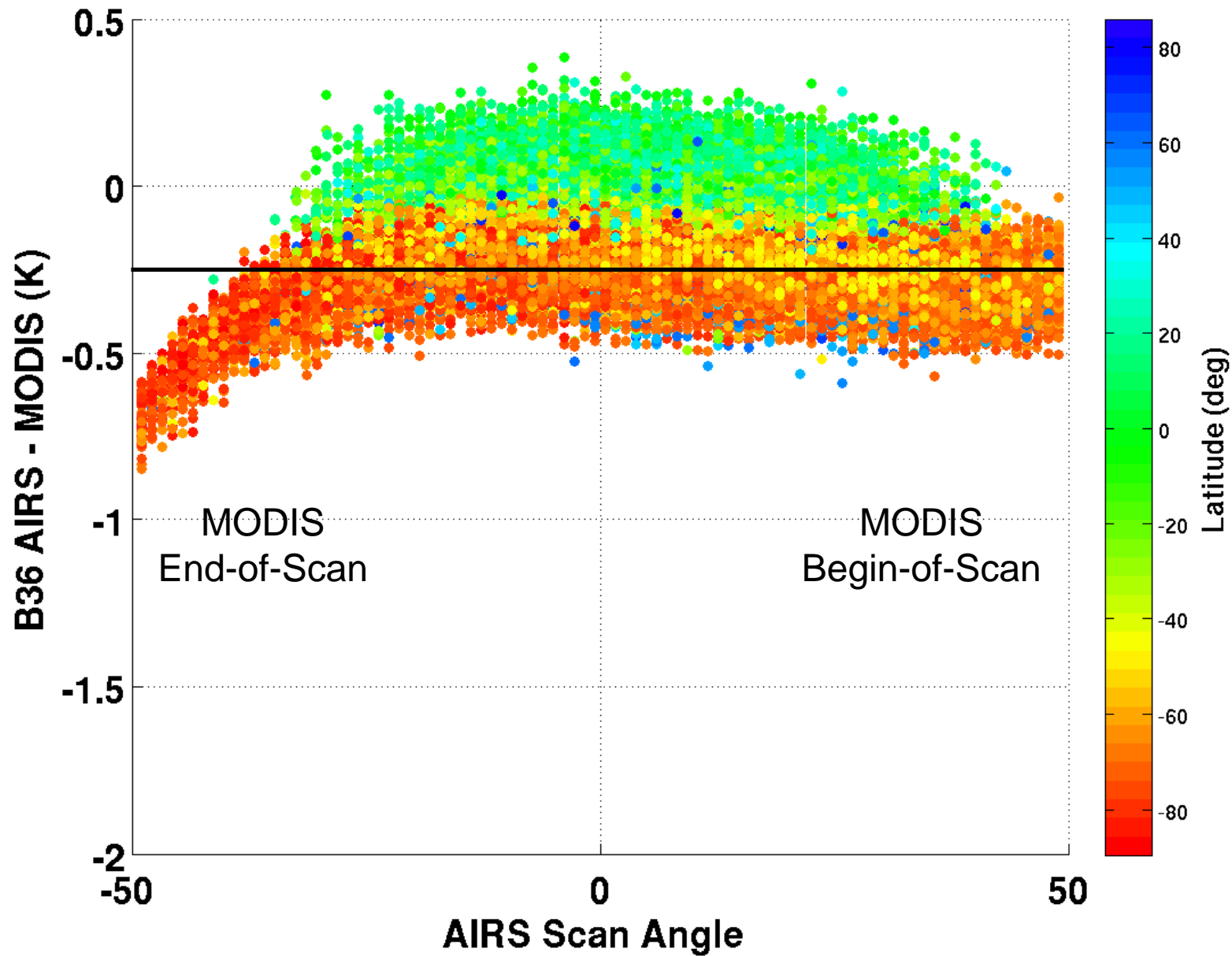
01-Jan-2008



01-Jan-2003



01-Jan-2003



01-Jan-2008

