### **AIRS/GEO Infrared Intercalibration**

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NOAA/NESDIS Cooperative Research Program Second Annual Science Symposium SATELLITE CALIBRATION & VALIDATION July 13-14, 2005 Pyle Center, 702 Langdon Street University of Wisconsin-Madison http://cimss.ssec.wisc.edu/corp/

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Especially important during post-launch check-outs.



Comparisons can only show differences between instruments; they cannot truly measure calibration accuracy. Must account for spectral response function differences between broad-bands channels.



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There are spectral gaps (some very large) in AIRS data







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Convolve AIRS Radiance spectra with GEO SRF.

• Compare mean scene brightness temperatures (converted from mean scene radiances).

	Convolve radiances and convert to an effective temperature using FK1, FK2, BC1, BC2			Convert radiances to temperature using monochromatic conversion and then convolve temperatures			Effective Temperature – Convolved Temperature Difference			Average Difference			
μm	std	wet	dry	col	std	wet	dry	col	Std	wet	dry	col	for each band
3.9	288.28	301.31	306.12	274.65	288.23	301.17	306	274.65	0.05	0.14	0.12	0	0.1
<mark>6.8</mark> (10)	238.34	249.89	248.59	244.09	236.18	246.6	245.85	241.57	2.16	3.29	2.74	2.52	2.7
6.8 (12)	242.23	253.9	252.32	246.83	238.46	249.29	248.31	243.45	3.77	4.61	4.01	3.38	3.9
11	288.75	299.15	305.76	275.55	288.72	299.12	305.72	275.54	0.03	0.03	0.04	0.01	0.0
12	287.46	296.68	303.52	275.01	287.41	296.62	303.4	275.01	0.05	0.06	0.12	0	0.1
13	270.58	279.24	282.14	261.2	269.33	277.91	280.46	260.04	1.25	1.33	1.68	1.16	1.4
Std	Std = U.S. Standard Atmosphere Wet = Warm & Moist												

Dry = Hot & Dry Col = Cold

\* Bands are from GOES-12 except for 6.8(10) and 12 which are from GOES-10



MTSAT 11µm 07 July 2005 at 15:33UTC



AIRS convolved with MTSAT 11 $\mu$ m 07 July 2005 at 15:36UTC



100km-smoothed MTSAT comparison area



100km-smoothed AIRS convolved with MTSAT comparison area  $(\Delta Tbb = -0.4 \text{ K})$ 

#### 1-23 June 2005



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6.8μm (7.3μm)Water Vapor Brightness Temperature Differences (GEO-AIRS with spectral gaps)



### IR Window (11 $\mu$ m) comparisons with AIRS (1-23 June 2005).

Geo:	GOES-9	GOES-10	GOES-12	Met-8
Ν	13	5	14	15
ΔTbb (K)	0.8	-0.3	0.1	0.6
STD (k)	0.8	0.2	0.5	0.1

WV channel(~ $6.8\mu$ m) comparisons with AIRS (1-23 June 2005).

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Meteosat-8 7.3µm Spectral Response (blue) with AIRS spectra (black). Gaps filled with adjusted US Standard Atmosphere spectra (green).



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### Shortwave channel( $3.9\mu m$ ) comparisons with AIRS (1-23 June 2005).

Geo:	GOES-9	GOES-10	GOES-12
Ν	13	5	14
Day	5	0	10
Night	8	5	4
ΔTbb (K)	0.3	0.3	-0.4
Day	0.4	NA	-0.6
Day Night	0.4 0.2	NA 0.3	-0.6 -0.04
Day Night STD (k)	0.4 0.2 0.5	NA   0.3   0.1	-0.6 -0.04 0.4
Day Night STD (k) Day	0.4 0.2 0.5 0.3	NA   0.3   0.1   NA	-0.6 -0.04 0.4 0.4



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