GSICS Progress in NOAA

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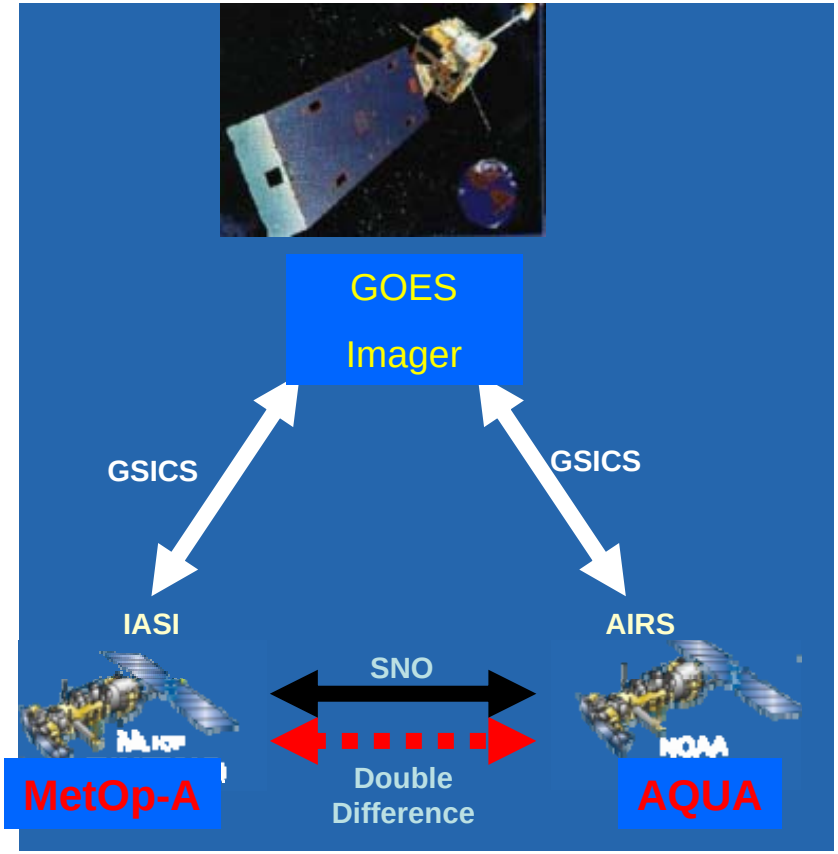
1. Perot System Government Service

2. NOAA/NESDIS/STAR

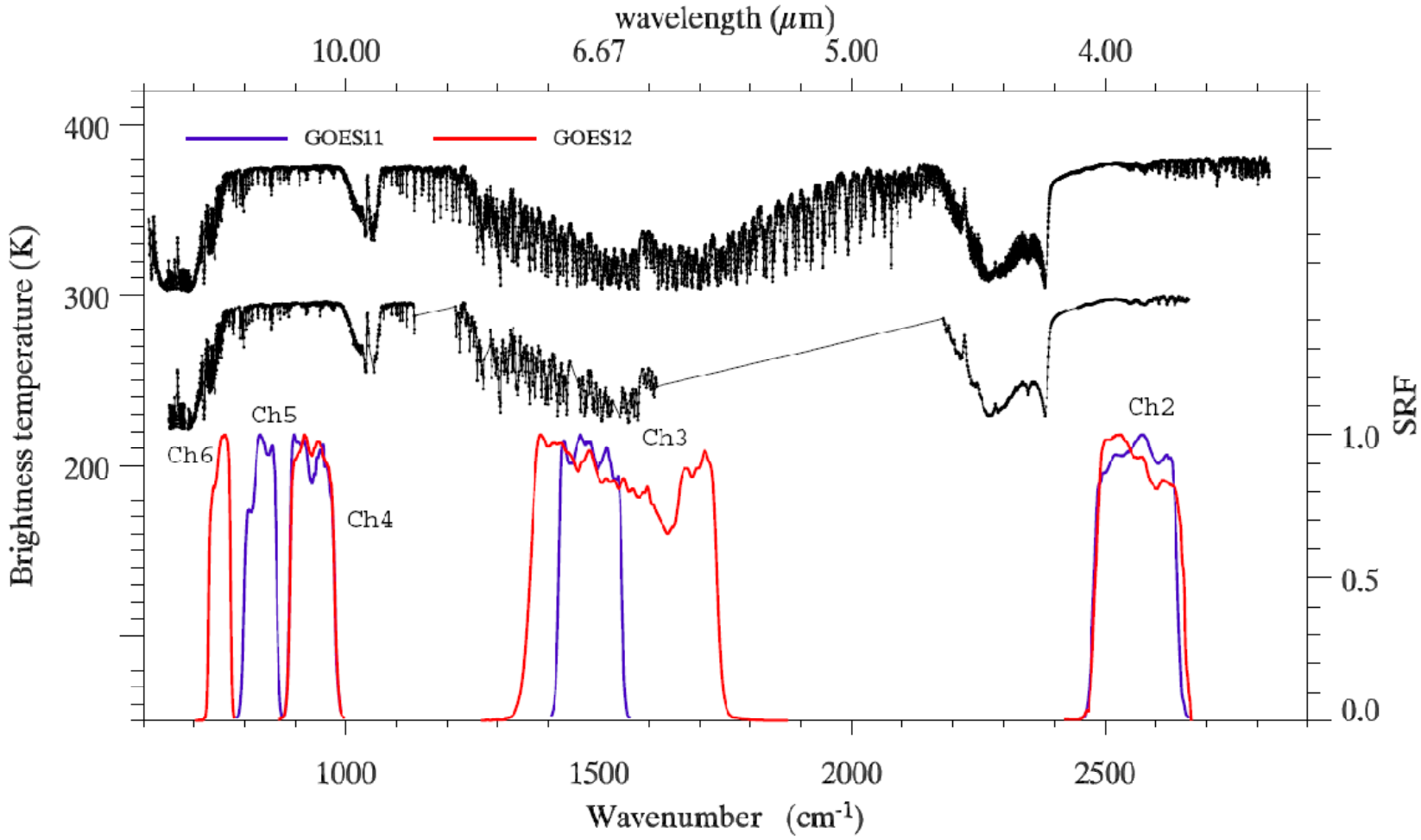
With thanks to:
Yaping Li and Seung-Hee Sohn

GSICS Strategy in NOAA

- **Evaluating GOES Imager Calibration Accuracy**
  - Diurnal variation
  - Seasonal variation
  - Effects of instrument sudden change on calibration accuracy
  - Midnight blackbody calibration error
- **Track IASI-AIRS Difference Based on Double Difference Method:**
  - (GOES – AIRS) – (GOES – IASI)
  - GOES Imager calibration bias is canceled out by calculating double difference
  - GOES Imagers play as transfer radiometers
  - Complement for SNO direct comparison
  - **Linking AIRS, IASI, and future CrIS**



Spectral Coverage: GOES-11 (West) and GOES-12 (East)



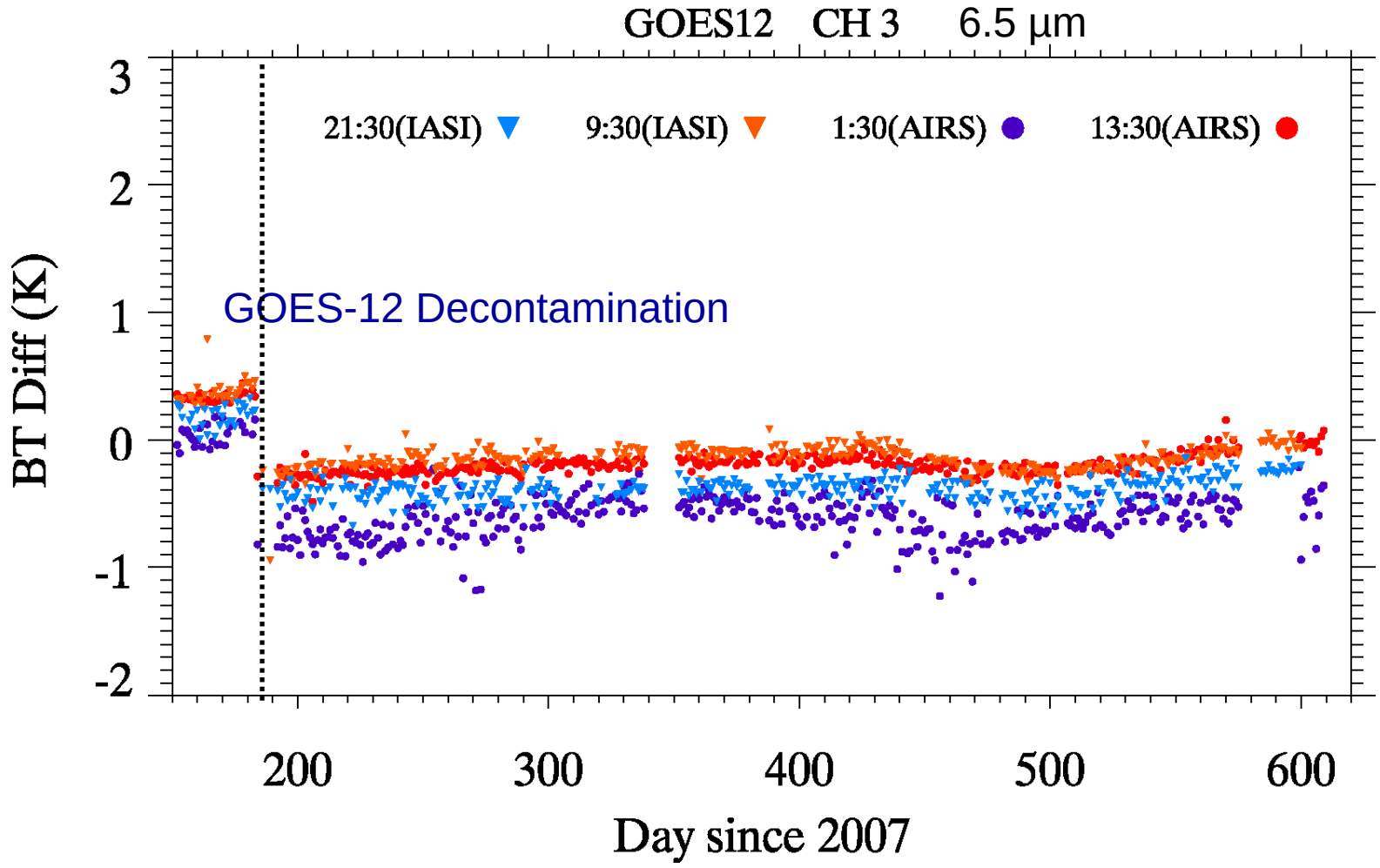
Collocation Criteria

- **Time difference: less than 300 seconds**
- **|cos(geo_zen)/cos(leo_zen)-1| < 0.01**
- **AIRS Spectral Gap-fillings: JMA method**
- **Scene homogeneity:** $\frac{env\_stdv}{env\_mean} \le 0.05 \quad \frac{fov\_stdv}{fov\_mean} \le 0.01$
- **Double Difference:**

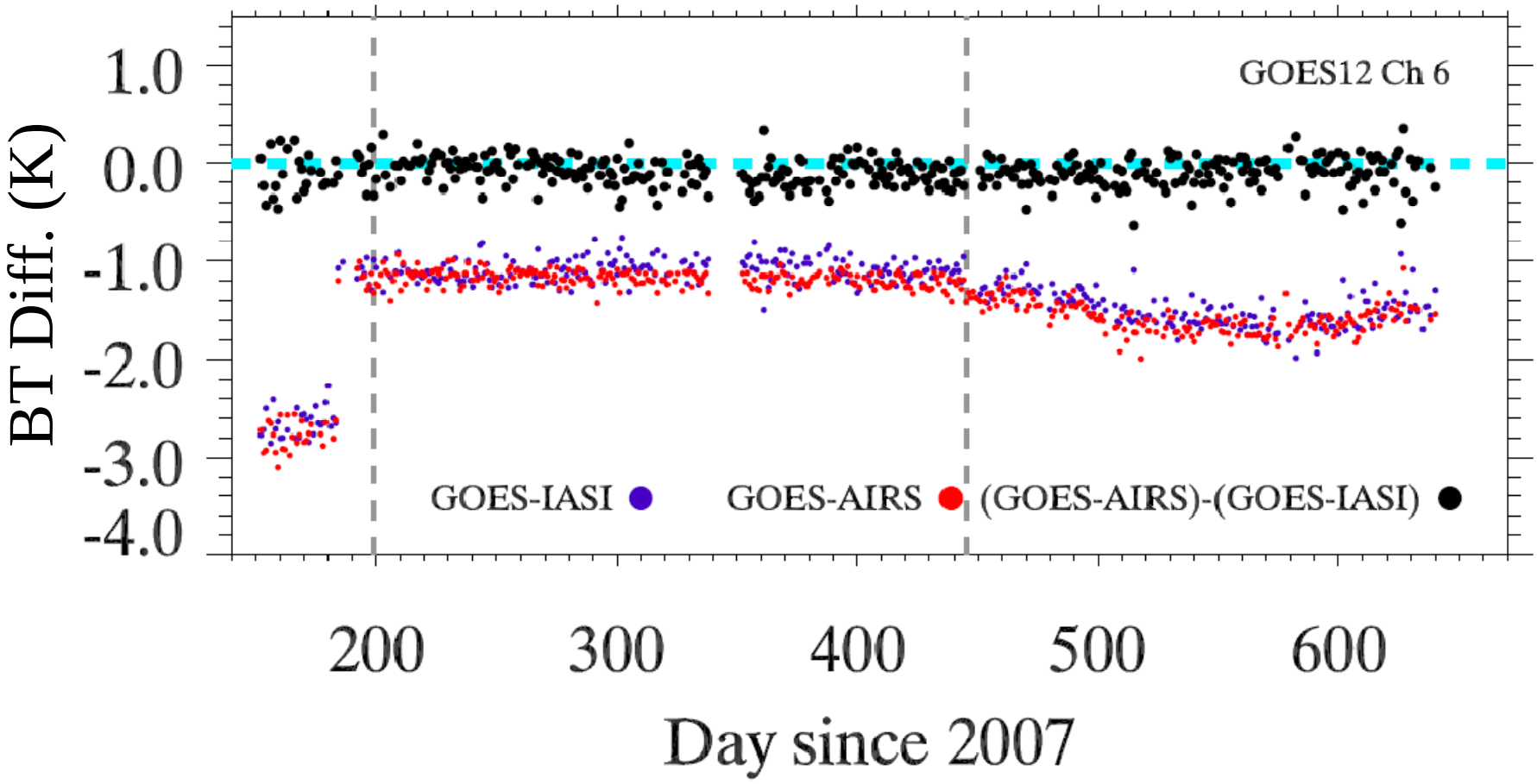
$$\Delta T = <BT_{GEOS} - BT_{AIRS}>_{mean} - <BT_{GEOS} - BT_{IASI}>_{mean}$$

  - Limited to the day-time observations only
  - The GOES calibration bias are canceled out.

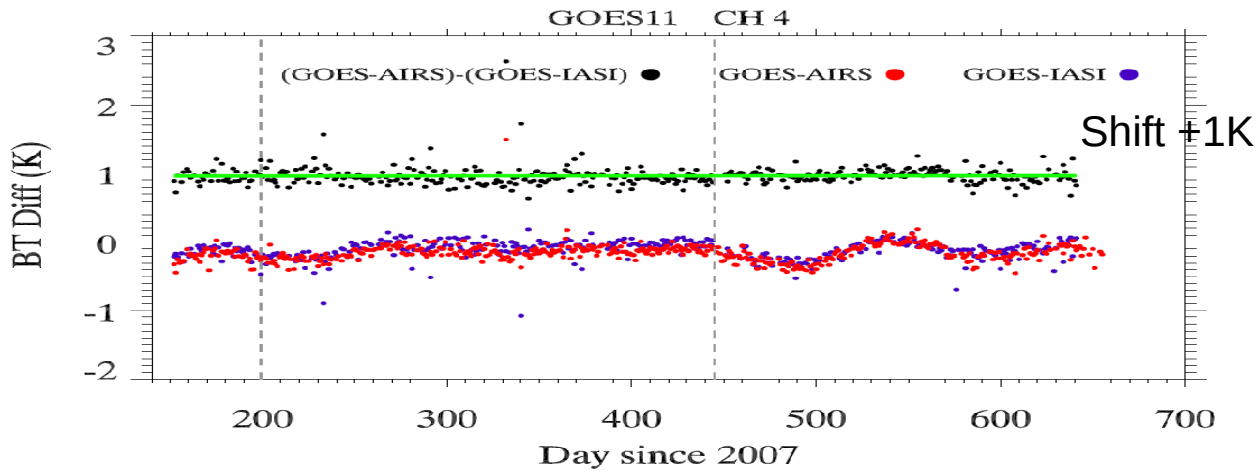
Diurnal variation of GOES Imager calibration accuracy



BT Difference Time Series



Channel 4: Same Spectral Coverage (10.7 μm)



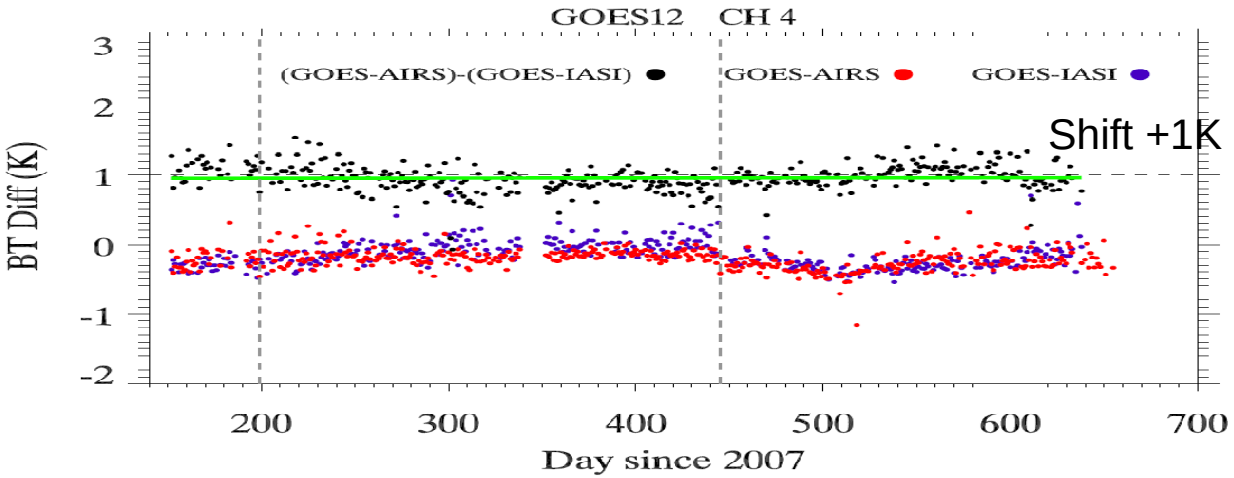
GOES-11

BT Diff.

-0.043±0.109 K

Slope:

0.0014±0.018 K/year



GOES-12

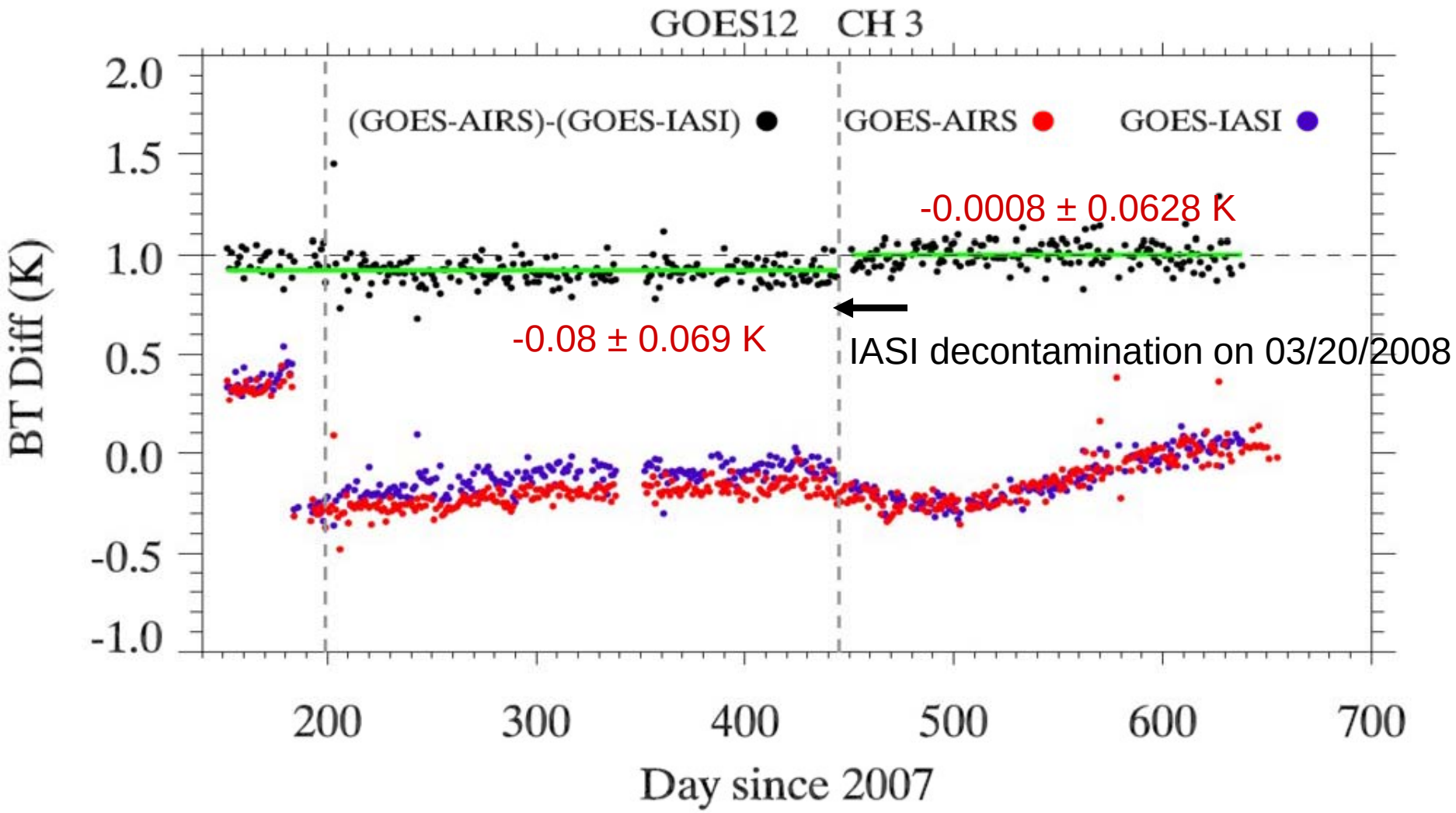
BT Diff.

-0.042±0.173 K

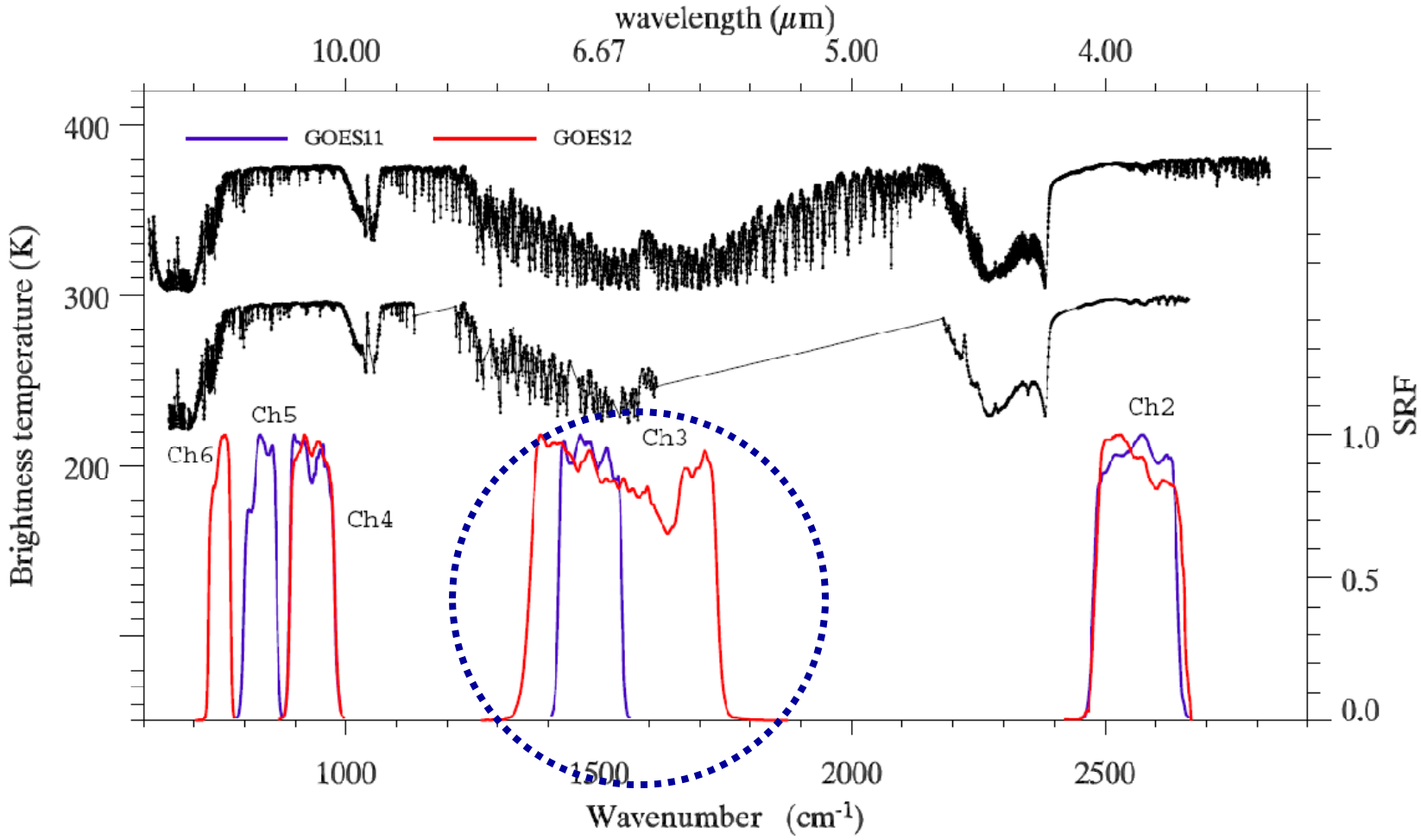
Slope:

0.0057±0.025 K/year

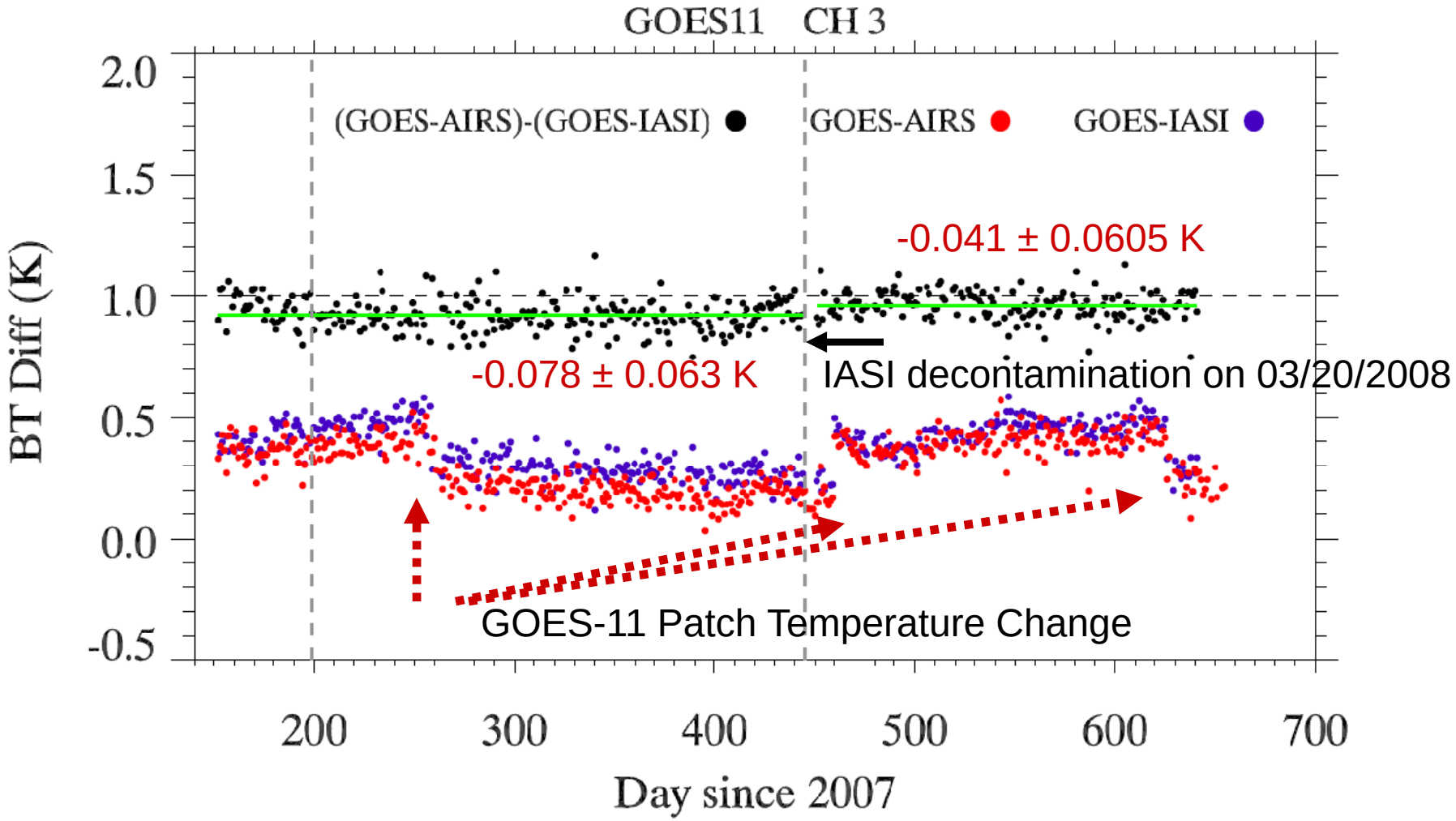
IASI Decontamination Effects:
GOES12: 6.5 μm channel



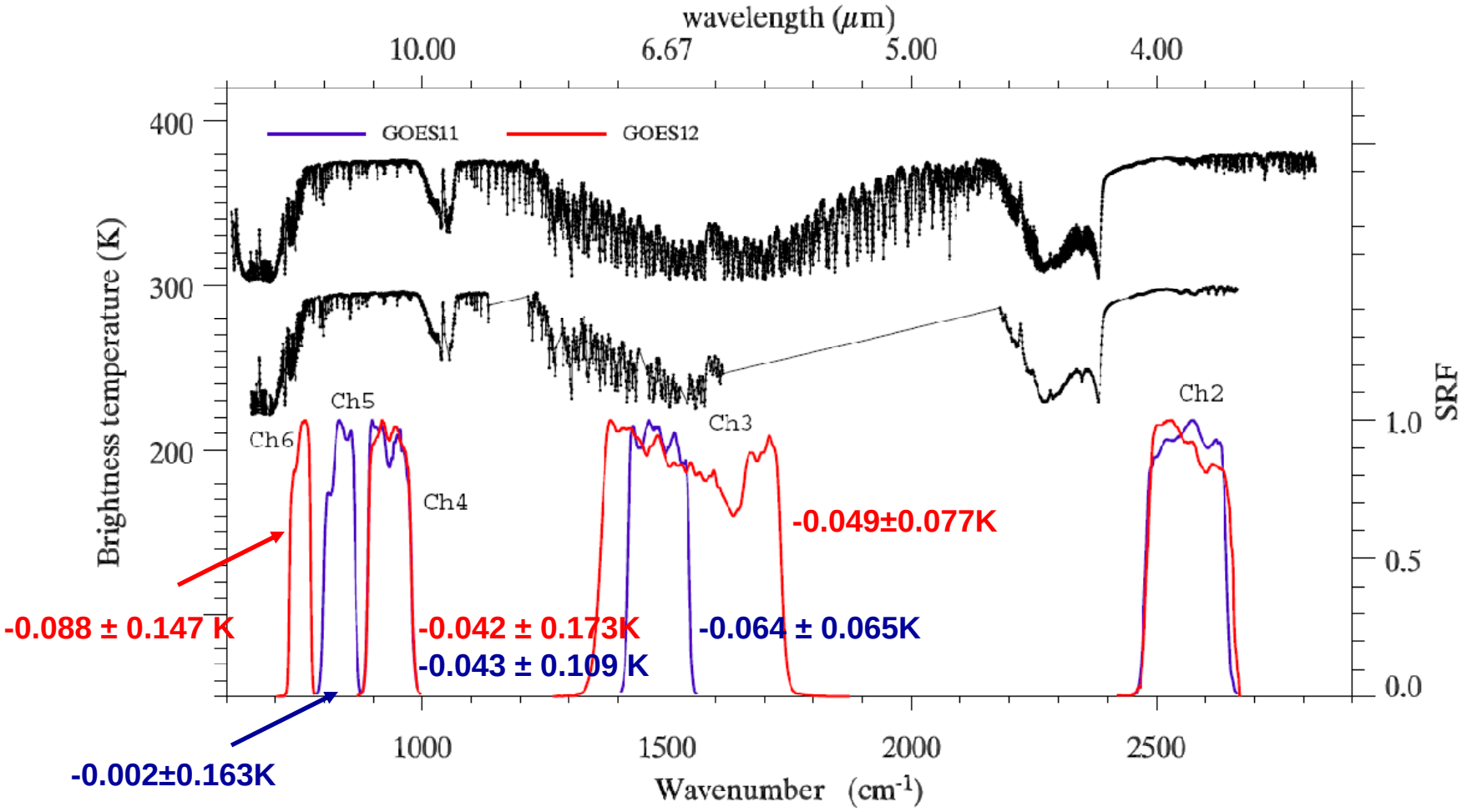
Spectral Coverage



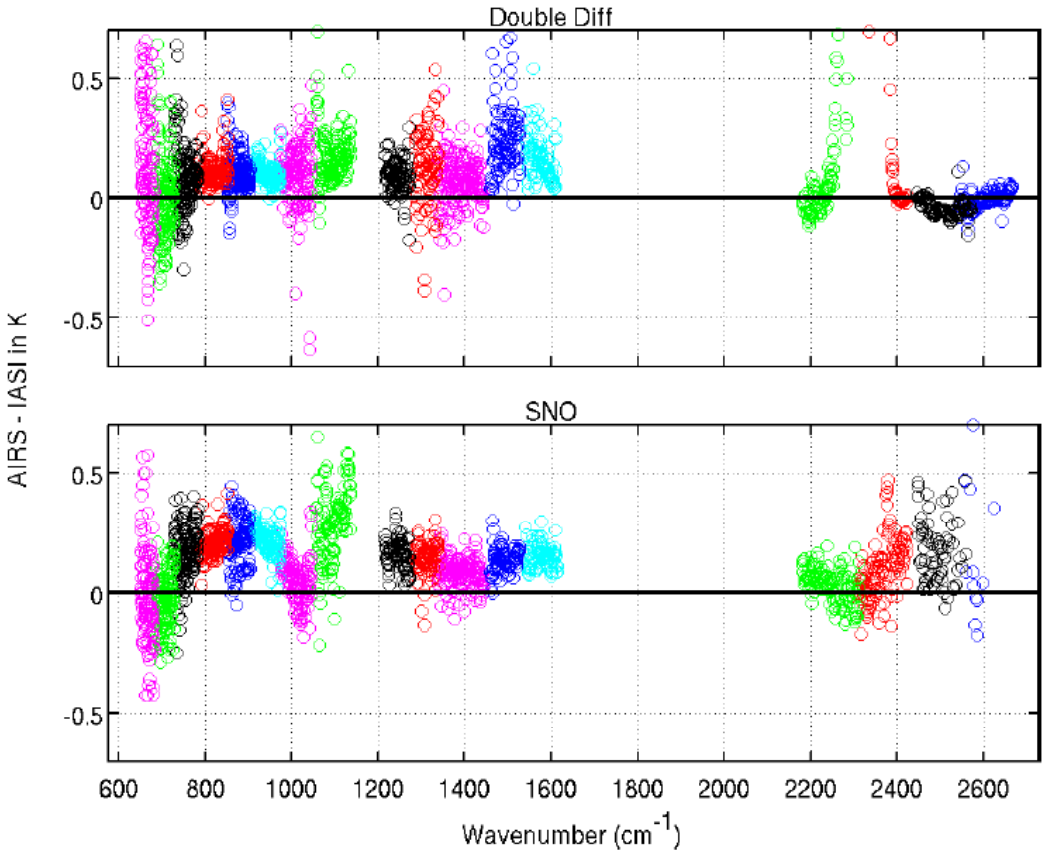
IASI Decontamination Effects: GOES-11 6.7 μm channel



IASI-AIRS Difference Along Spectral Region



IASI-AIRS difference from other results



Double Difference relative to RTM calculations

L. Strow's Results (UMBC)

SNO at North Pole
D. Tobin's Results (UW)

IASI and AIRS agrees on the order of ~0.1 K level but IASI lightly colder than AIRS (less than 0.1K), confirmed by three impendent studies .

Summary

- **The GSICS tools have been used to assess the calibration accuracy of current operational GOES Imagers.**

- **We extended the GISCS results to successfully track the IASI and AIRS radiometric calibration difference at a relative large spectral region.**