Calibration Requirements for Climate Science

- AIRS 17+ year record long enough to address key climate questions
- Stability of radiometric calibration is key
- AIRS sensitivity to CO_2, SST, etc allows stringent tests of stability

Climate Science Questions

All require min ~0.1K/decade stability

- Global Trending: T(z), H_2O (z), T_{surf}
- Water vapor feedback (Does relative humidity vary)
- Cloud feedback
- Trends in PBL cloud occurrence
- OLR anomalies separated by cause: T/H_2O/cloud/surface, etc.

Hyperspectral IR Advantages

- AIRS senses both climate forcings, and responses
- Clean separation of tropospheric vs stratospheric temperature trends (unlike microwave)
- Multiple long-term overlapping missions (AIRS, CrIS, IASI)
- AIRS, CrIS, IASI already agree to ~0.1-0.3K and can be merged to 0.03K or better.

Significant AIRS calibration drifts have **already** resulted publication of in-accurate data that were publicized by NASA/GSFC and the media (Washington Post, Scientific American). *This talk suggests how to make AIRS an accurate instrument for climate science.*