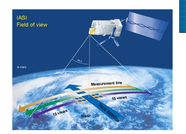
Suomi NPP CrIS and MetOp IASI Sounding Validation

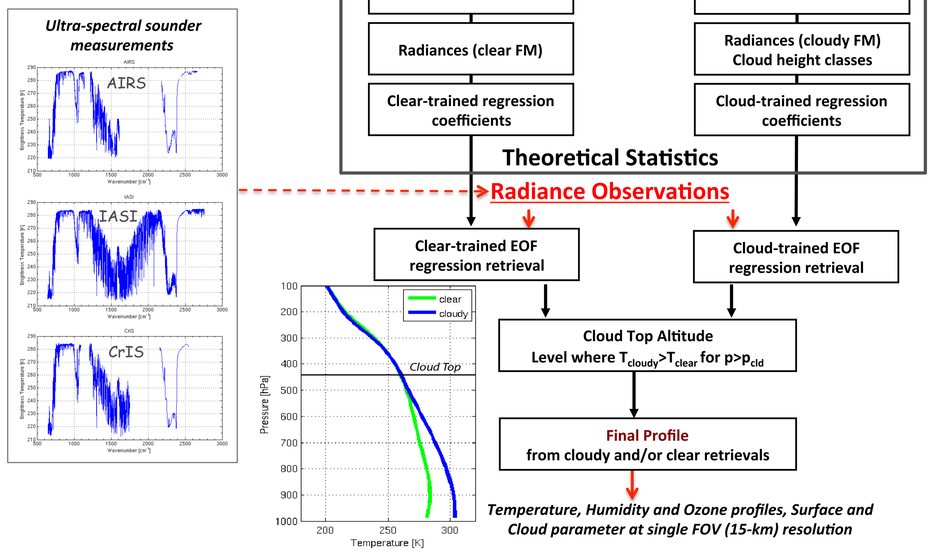
William L. Smith Sr.[1], Elisabeth Weisz[1], Henry Revercomb[1], Allen Larar[2], Joseph Taylor[1]

[1]Space Science and Engineering Center/University of Wisconsin-Madison, [2]NASA LaRC



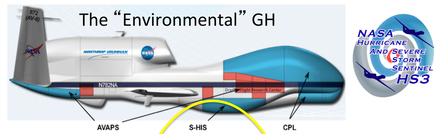
Suomi NPP CrIS and Metop IASI sounding retrieval accuracy and potential forecast utility have been validated through the analysis of data obtained during three airborne campaigns: the 2013 S-NPP Cal/Val-1 conducted over North America and surrounding waters, the 2014 NASA Hurricane and Severe Storms Sentinel (HS3) campaign held over the North Atlantic, and the 2015 S-NPP Cal/Val-2 campaign held over the Greenland/Iceland Arctic region. Dropsonde, radiosonde, and aircraft remote sensing data were used in the validation studies. The results demonstrate the utility of the S-NPP CrIS and Metop-IASI data.

*"Dual-Regression" Retrieval Algorithm**



** Smith, William L., Elisabeth Weisz, Stanislav V. Kireev, Daniel K. Zhou, Zhenglong Li, Eva E. Borbas, 2012: Dual-Regression Retrieval Algorithm for Real-Time Processing of Satellite Ultraspectral Radiances. J. Appl. Meteor. Climatol., 51, 1455–1476.*

"Global Hawk SHIS/Dropsonde Data" Hurricane Edouard (9/16/14)



Airborne Vertical Atmospheric Profiling System (AVAPS)

89 Dropsondes / flight

Temperature, Pressure, wind, humidity vertical profiles

Scanning High Resolution Infrared Sounder (S-HIS)

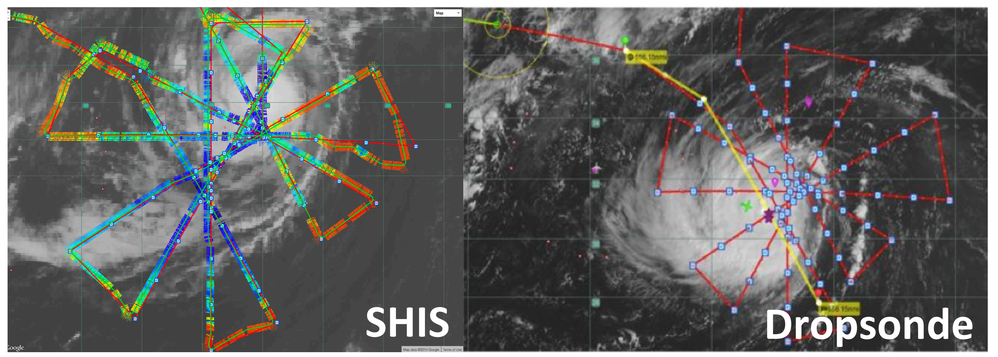
Upwelling thermal radiation at high spectral resolution between 3.3 and 18 microns.

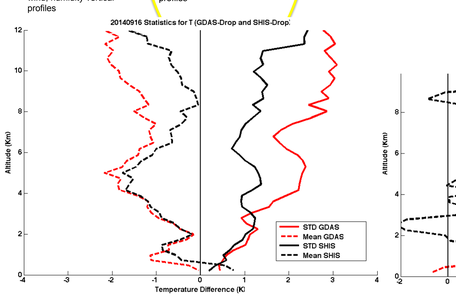
Temperature, water vapor vertical profiles

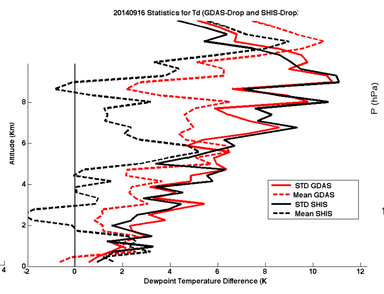
Cloud Physics Lidar (CPL)

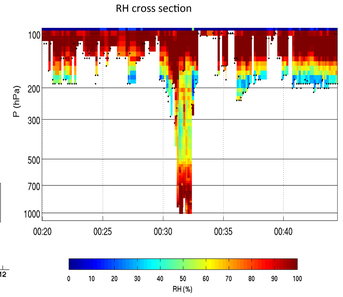
532/1064 nm Lidar Reflection

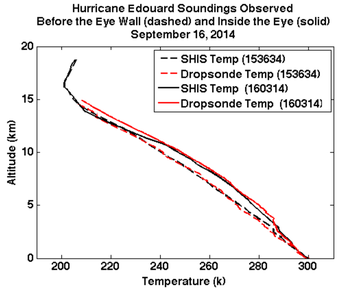
Cloud structure and depth



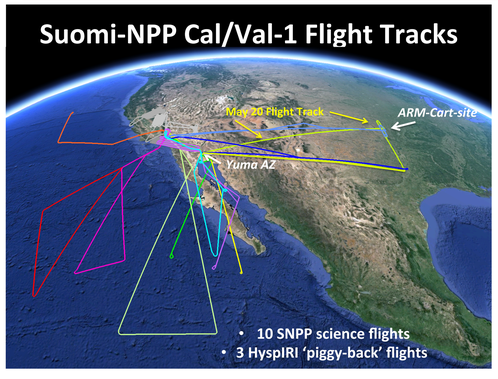




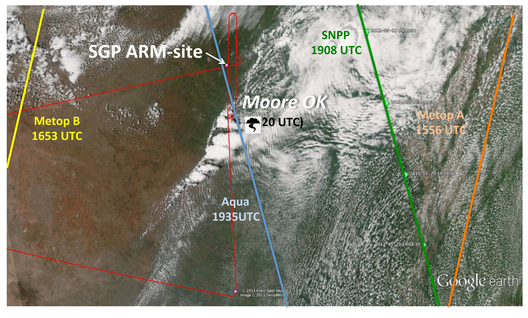




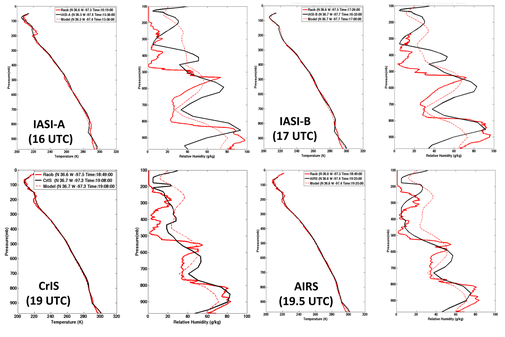
*"SNPP Cal/Val-1 Airborne Mission (May 2013)**

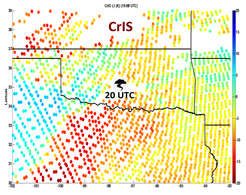


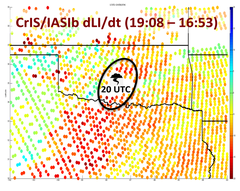
Aircraft Track and Satellite Orbits

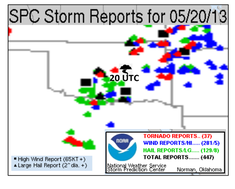


Profile Validation at ARM-site (5/20/2013)

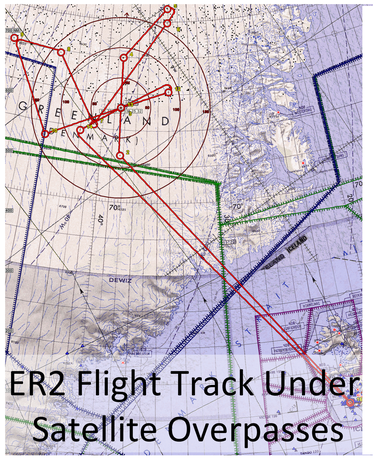




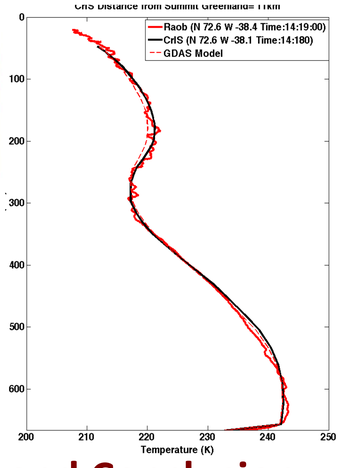


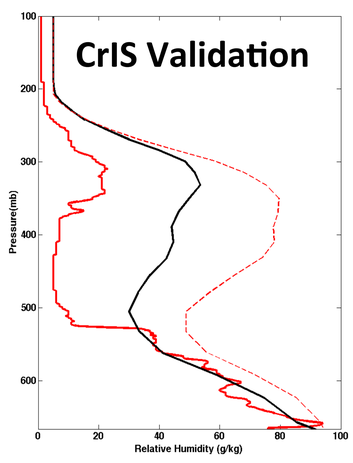


*"SNPP Cal/Val-2 Airborne Mission (March 23, 2014)**



ER2 Flight Track Under Satellite Overpasses





Summary and Conclusion

- **Ground-based and airborne Soundings are used to validate CrIS and IASI Retrievals**
- **High density dropsondes enable the validation of mesoscale atmospheric features**
- **Utility is shown for observing stability changes associated with severe storm onset**
- **Recent validation data obtained over Greenland are being used to improve satellite sounding retrievals at high latitudes and over high terrain**