

SSMIS Radiometer Data Reprocessing

April 23, 2004

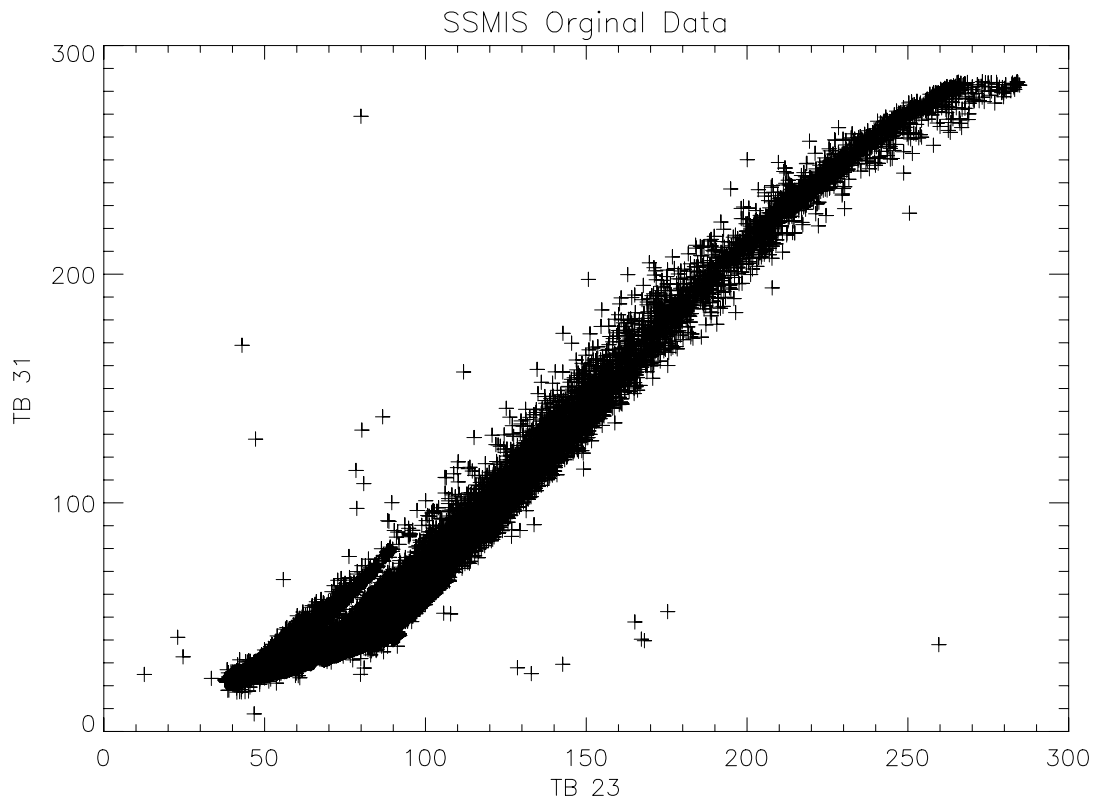
Duane Hazen

Experiment Summary

This experiment was conducted on board the NOAA RV Ronald Brown from Oct 26 through Nov. 22, 2003. The sponsor of the experiment was National Research Laboratory (NRL-DC). The purposes of this portion of the experiment was to provide ground truth data for the validation of the SSMIS instrument on board the DMSP F-16 satellite launched on September 18, 2003.

Original Data as processed on board.

The SSMIS Radiometer data did not look all that bad from the start. (See plot below of org. data.)



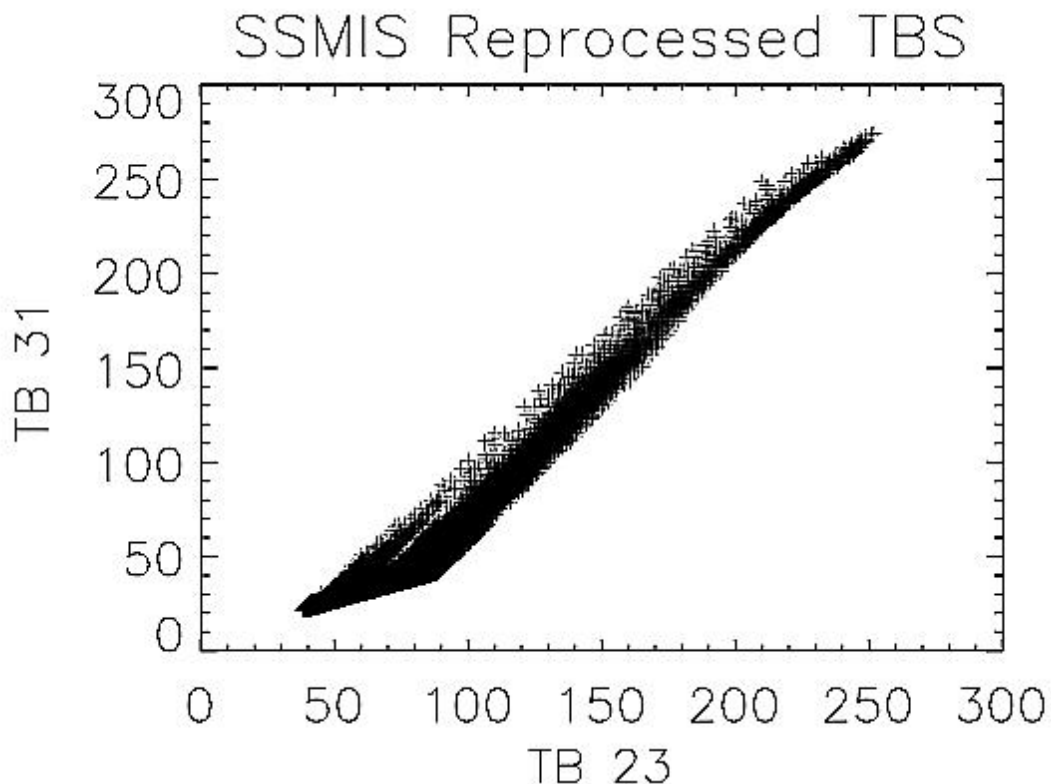
Reprocessing of Data

In reprocessing the data I have adjusted the minimum acceptable correlation value used in the tip curve software to decide if the tip curve is acceptable. The change was from 0.990 to 0.999.

I have also added the constraints on the data as follows to remove outliers.

1. The TBs must be above the zero liquid line, as calculated from the liquid/vapor retrieval coefficients from processing the sondes of all the PACS cruises (1995 – 2002).
2. The TB's must be above the constant vapor line passing through the minimum 23.8 GHz brightness temperature/ zero liquid point. Again this line was calculated from the liquid/vapor retrieval coefficients and the minimum 23.8 GHz TB from the data set.
3. The TB's must be below the Total Mean Radiating Temperature.

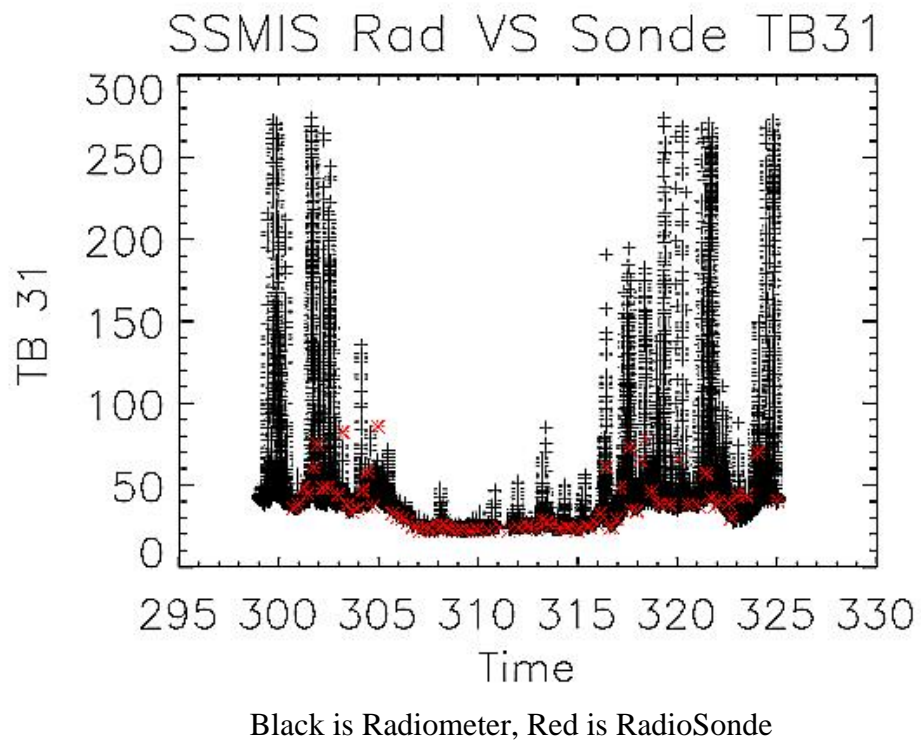
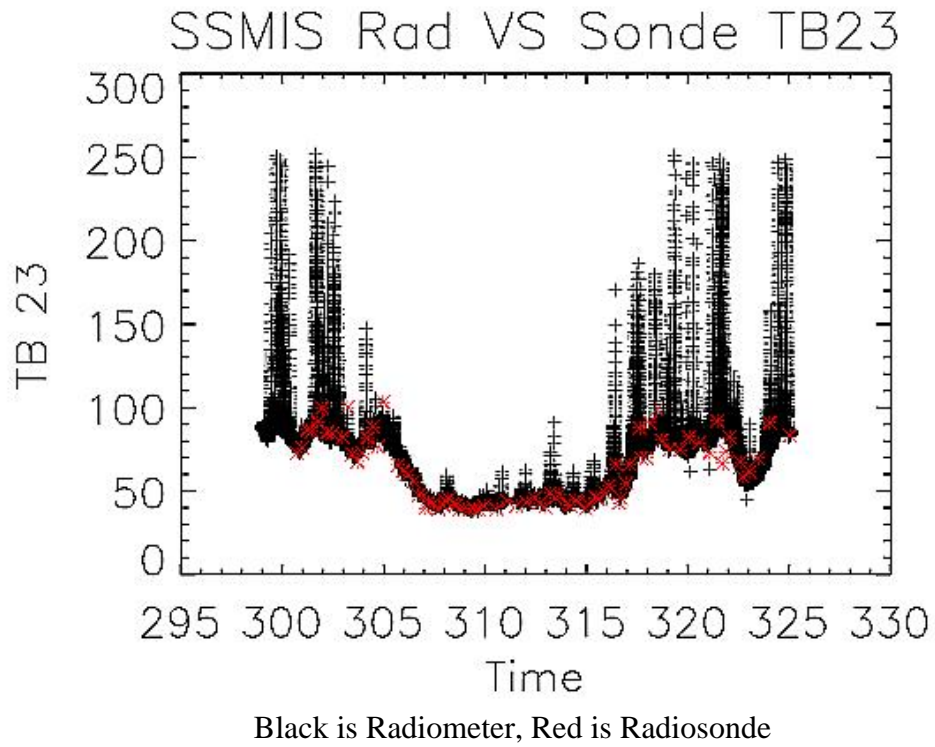
Here is a plot like the one shown above that shows the effects of the above reprocessing.



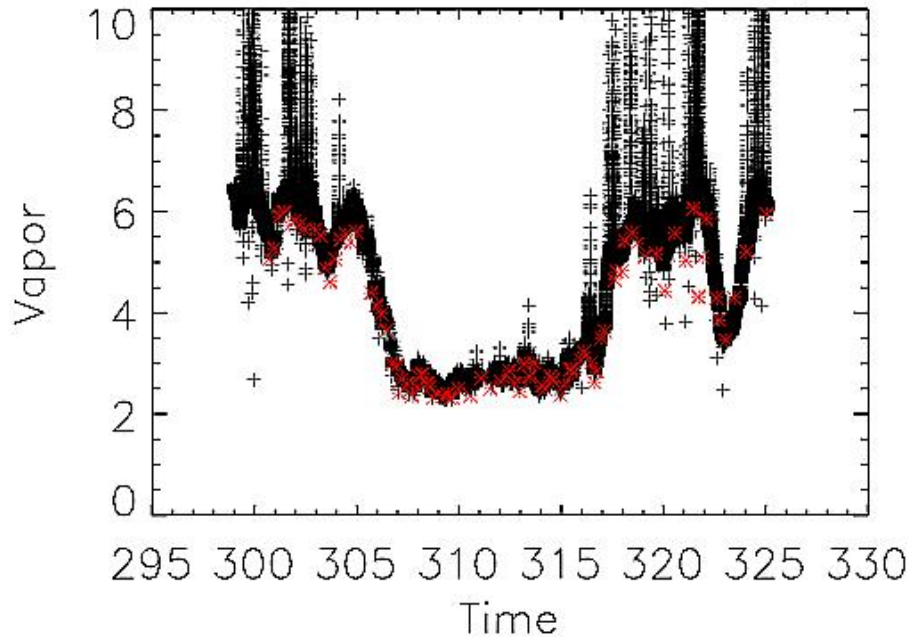
Minimum Liquid Value is 0.0001 cm.

Minimum Vapor Value is 2.2885 cm.

Comparison to Sondes

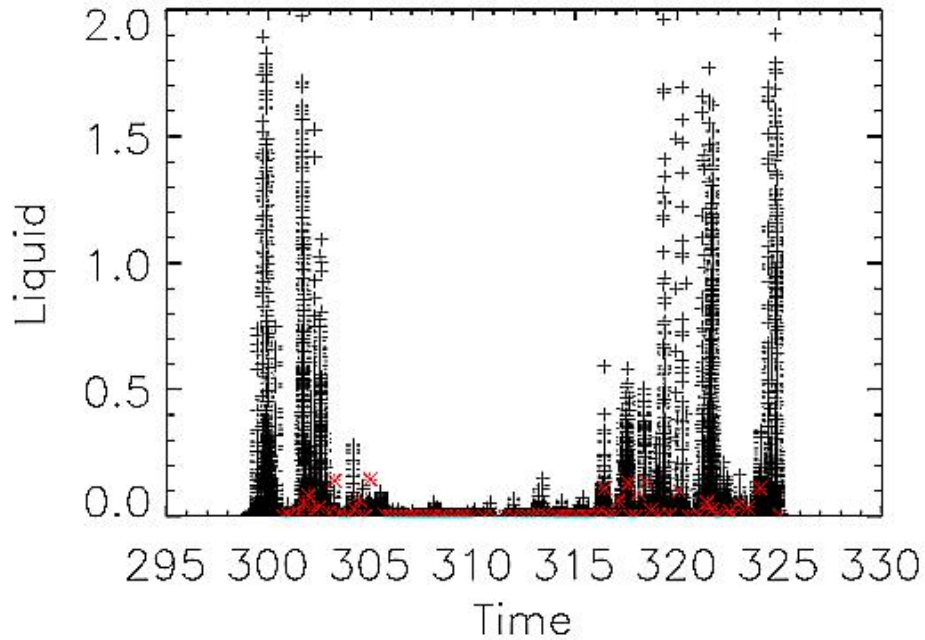


SSMIS Rad VS Sonde Vapor



Black is Radiometer, Red is Radiosonde

SSMIS Rad VS Sonde Liquid



Black is Radiometer, Red is Radiosonde

Comparison of Sonde VS Radiometer

	All	All	Clear	Clear
	Mean	StdDev	Mean	StdDev
TB23 Rad-Sonde	5.19545	24.7533	2.82088	2.40955
TB31 Rad-Sonde	3.48928	33.8146	1.93996	2.13083
Vapor Rad-Sonde	0.304464	0.863847	0.18917	0.17024
Liquid Rad-Sonde	0.0342216	0.167315	0.00376	0.004146

Clear is where the humidity never gets above 95% in the sond flight.

Additional Information

Radiosonde TB's were computed using a microwave radiative transfer model (Schroeder and Westwater 1993) applying the absorption coefficients algorithm developed by Rosenkranz (1998).

References

Schroeder J.A., E.R. Westwater, 1993: User's guide to WPL microwave transfer software, NOAA Tech Memo ERL WPL-213.

Rosenkranz P.W., 1998: Water vapor microwave continuum absorption: A comparison of measurements and models, Radio Sci., Vol. 33, pp. 919-928