

# AMSR-E Rainfall - Status and Plans

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Colorado State University

## Status:

- ✓ All systems go.

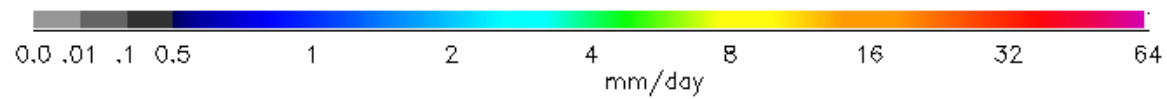
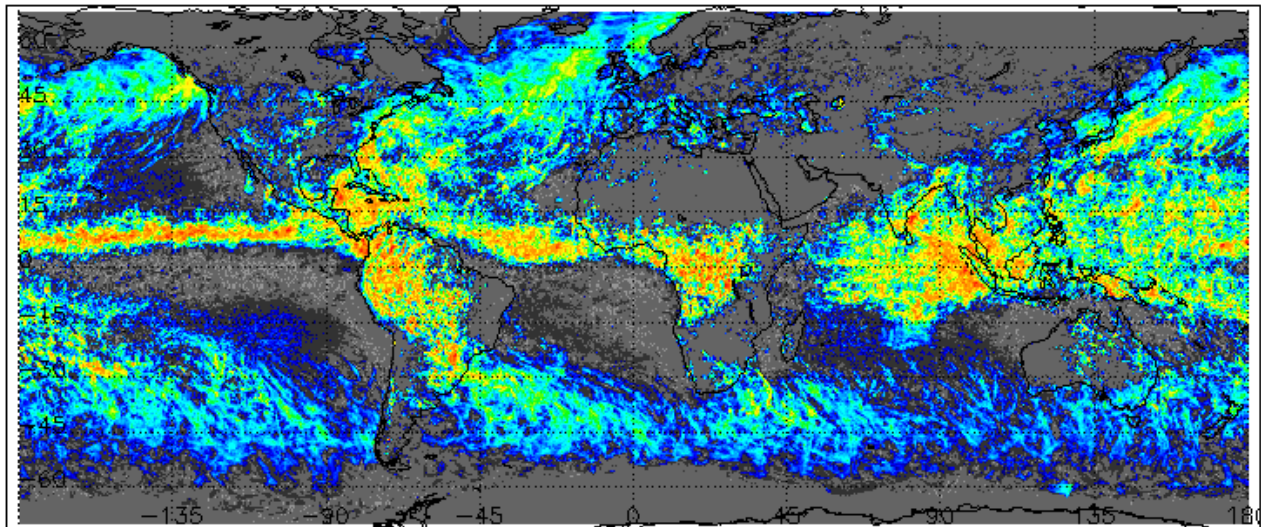
## Plans:

- Improved a-priori database using TRMM PR & CRMs (in tropics)
- Careful look at cloud water/rain transition
- Comparison with CloudSat for high latitude rainfall

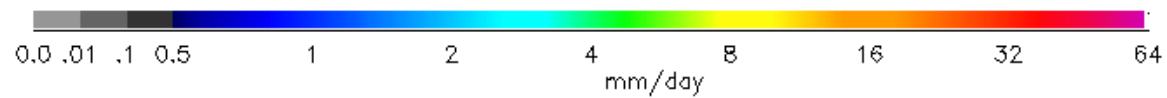
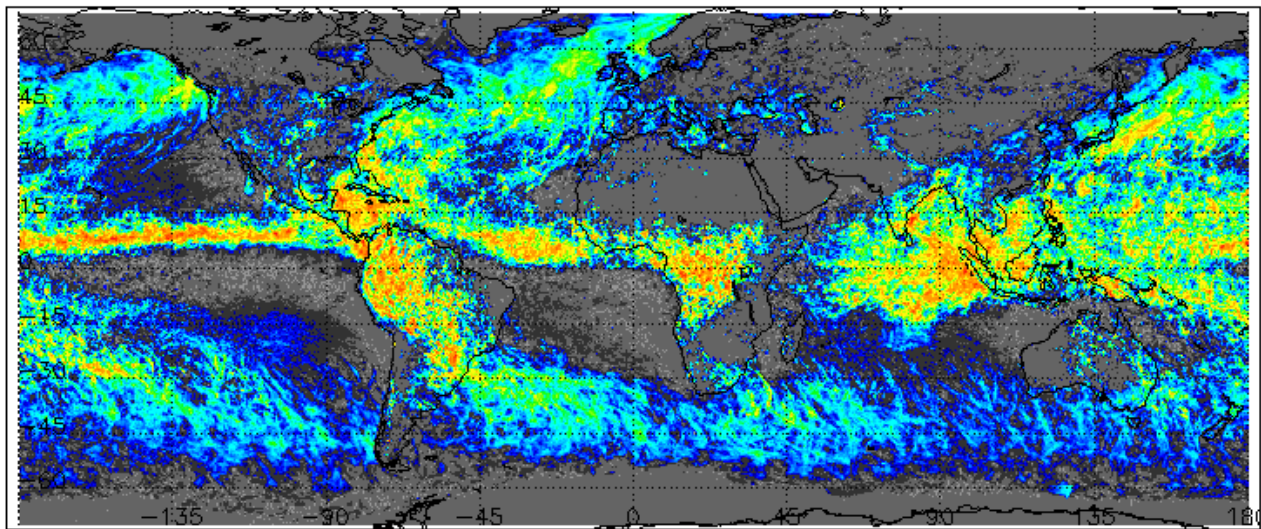
## Projects:

- Experimenting with Surface emissivity for improved land databases
- Considering changes in output to add profile information
- Considering changes in output to assign rainfall probability

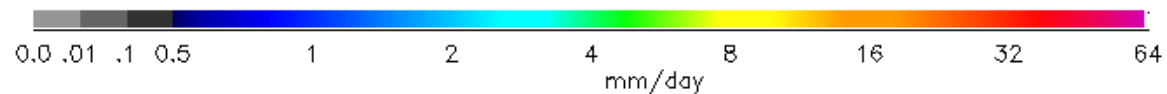
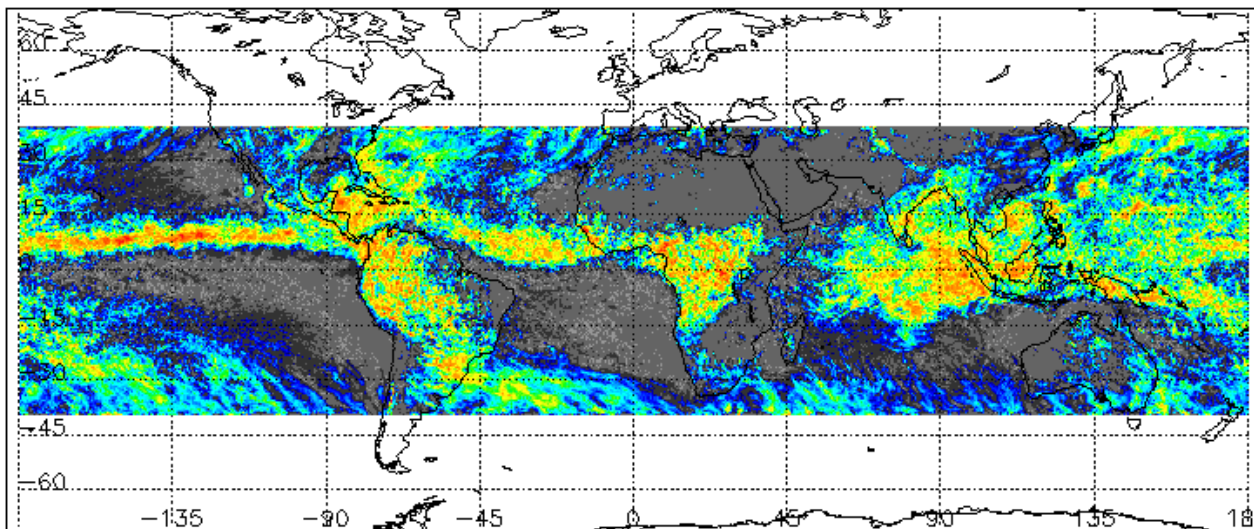
AMSR-E from B06 October 2005



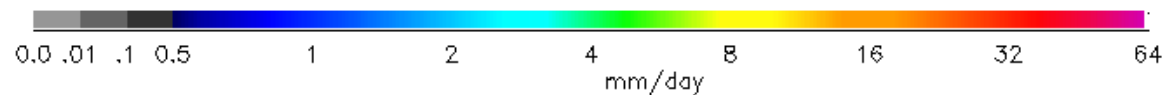
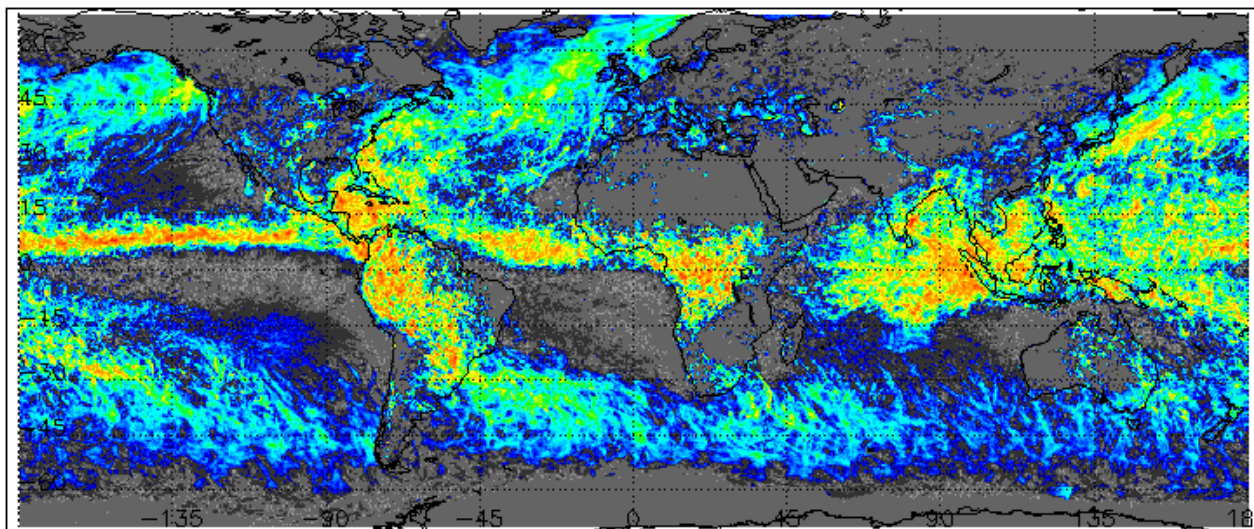
AMSR-E B08 October 2005



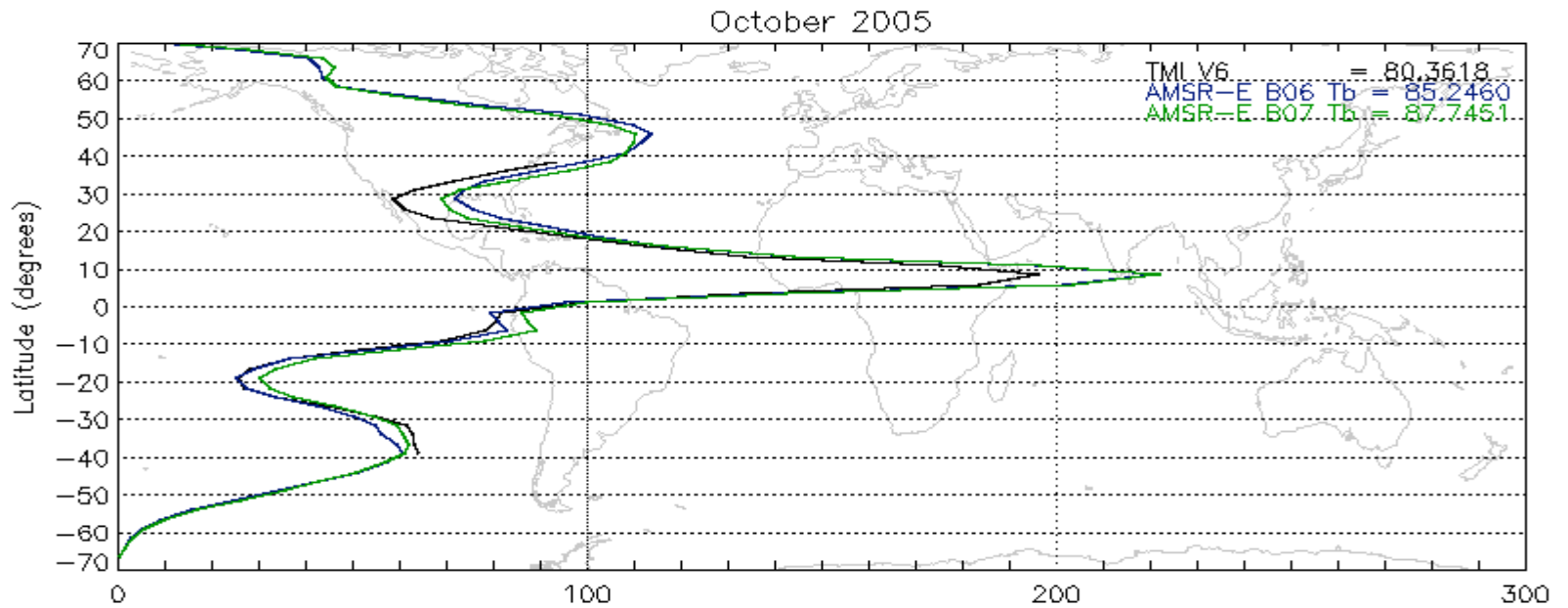
TMI V6 October 2005



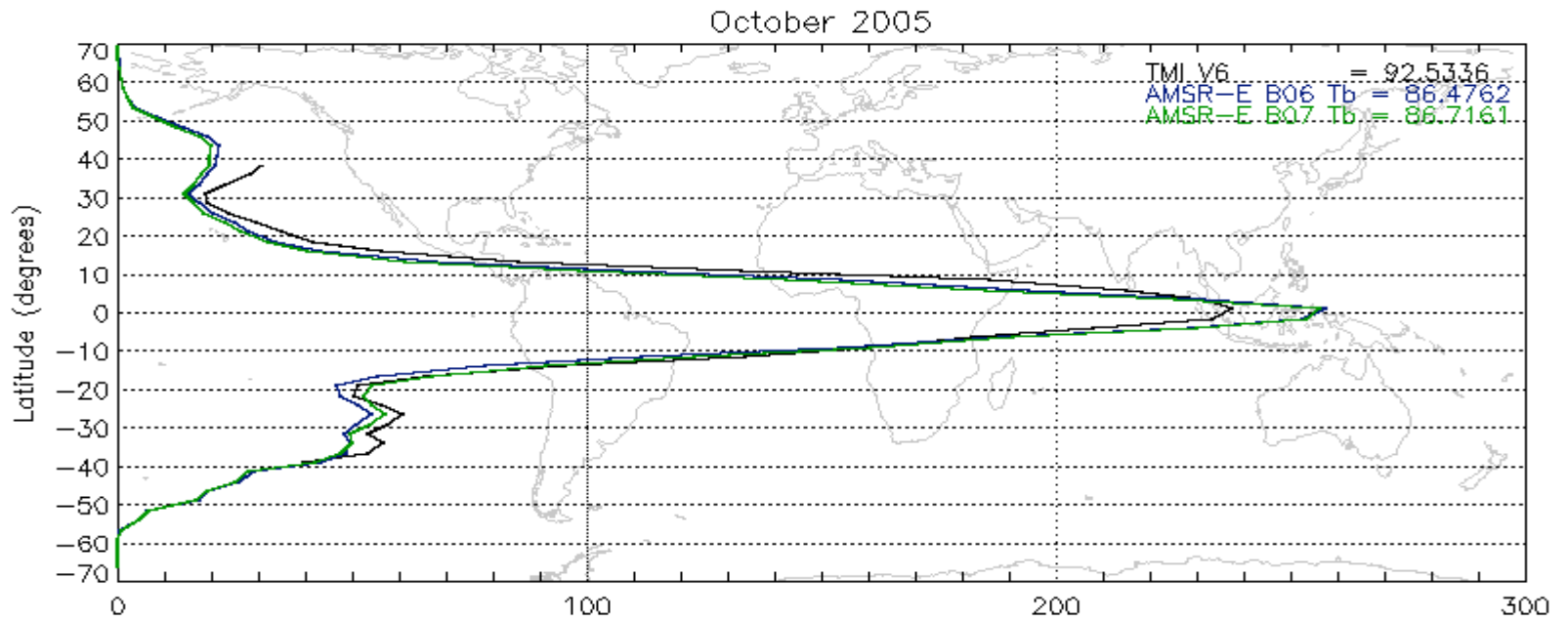
AMSR-E B08 October 2005



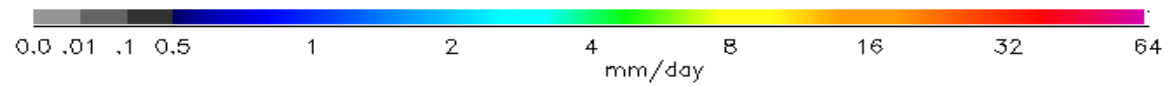
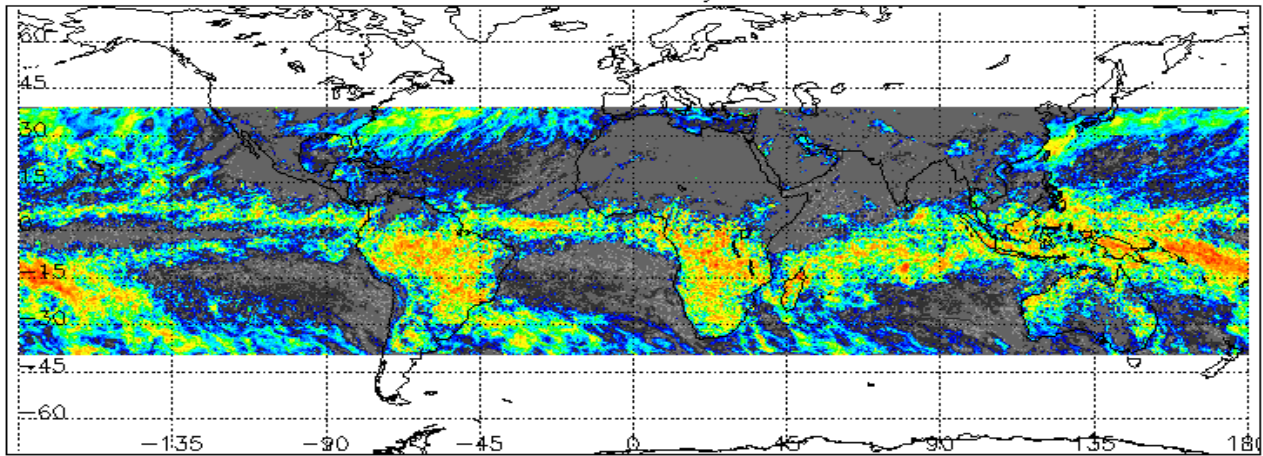
Ocean



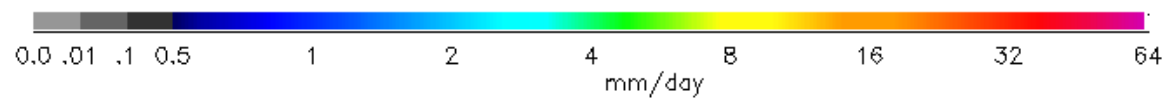
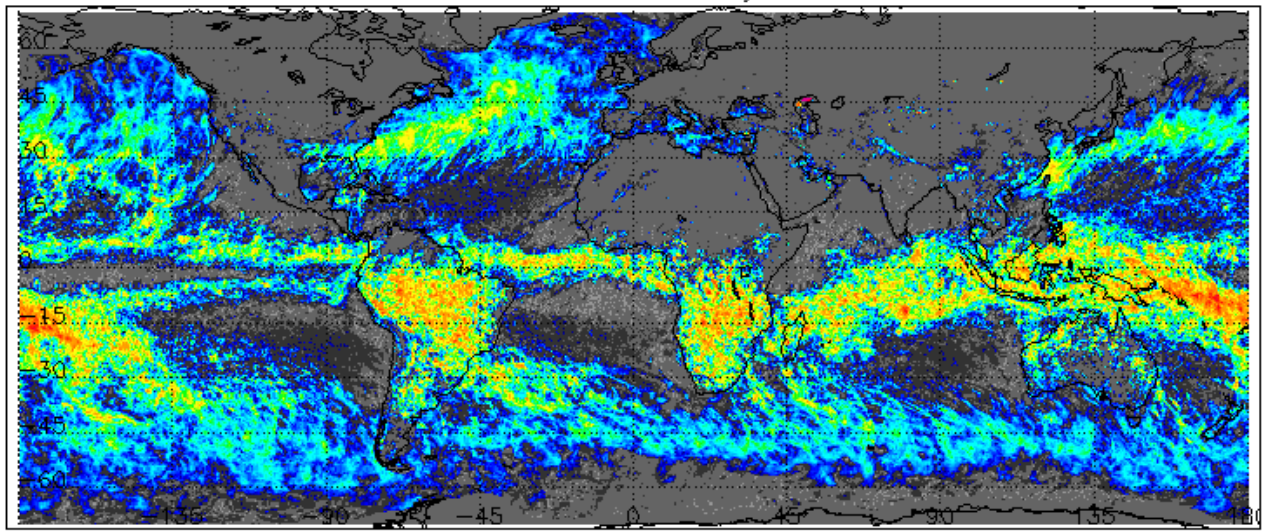
Land



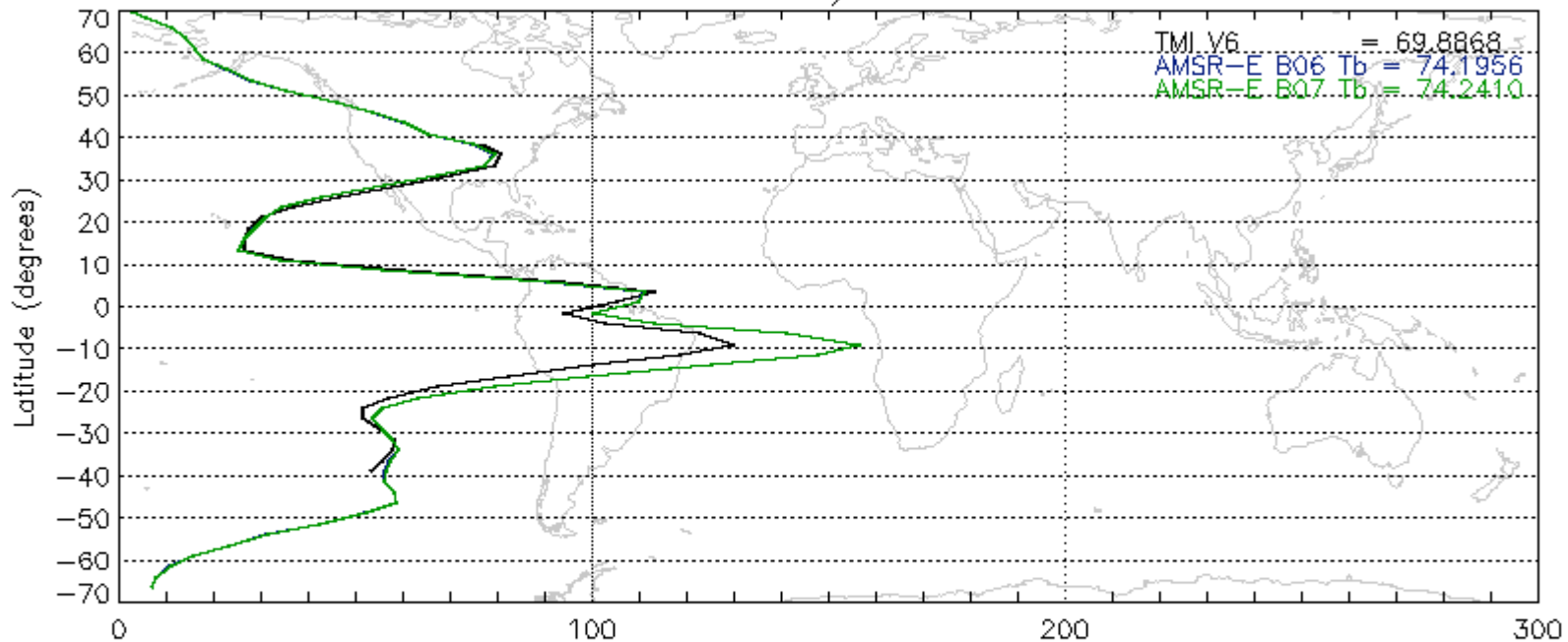
TMI V6 February 2006



AMSR-E B08 February 2006

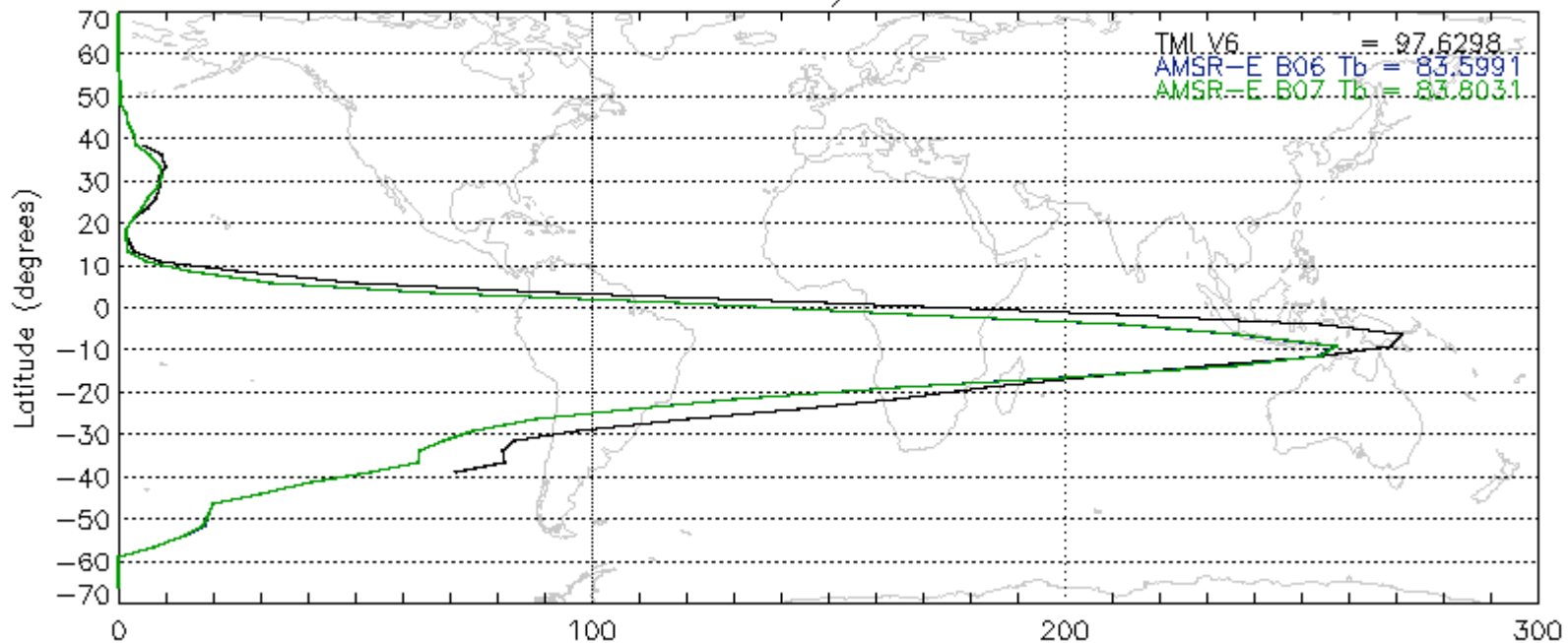


February 2006



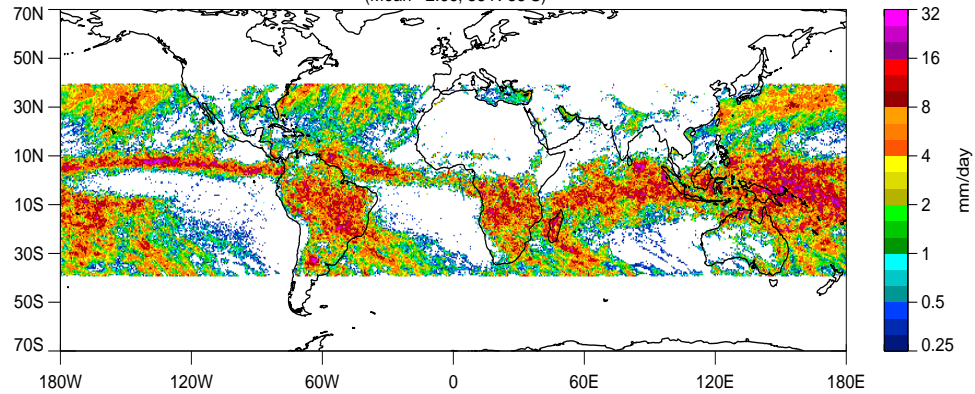
Ocean

February 2006

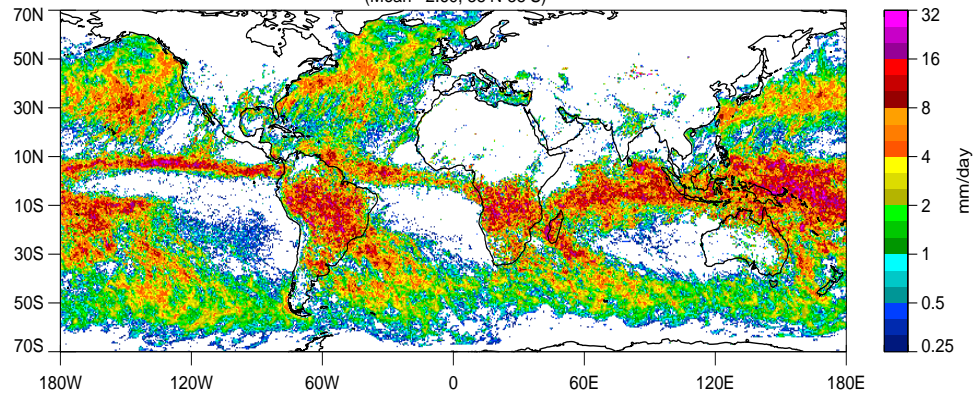


Land

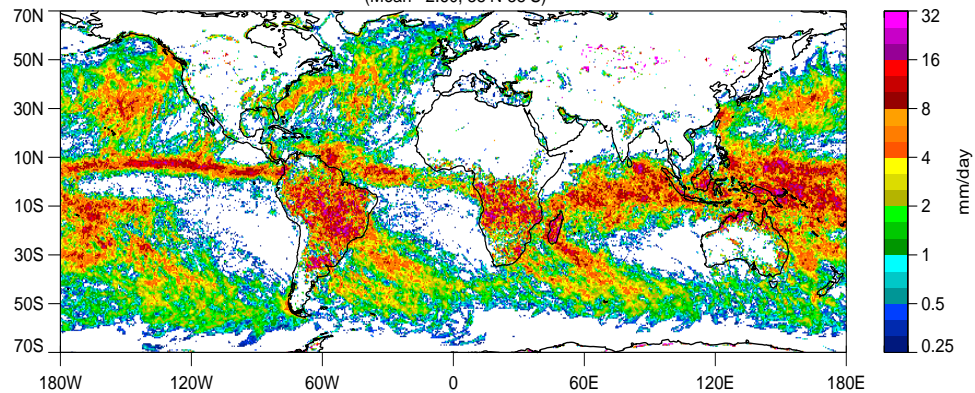
January 2005 Monthly Rainfall from TRMM TMI  
(Mean= 2.66, 38°N-38°S)

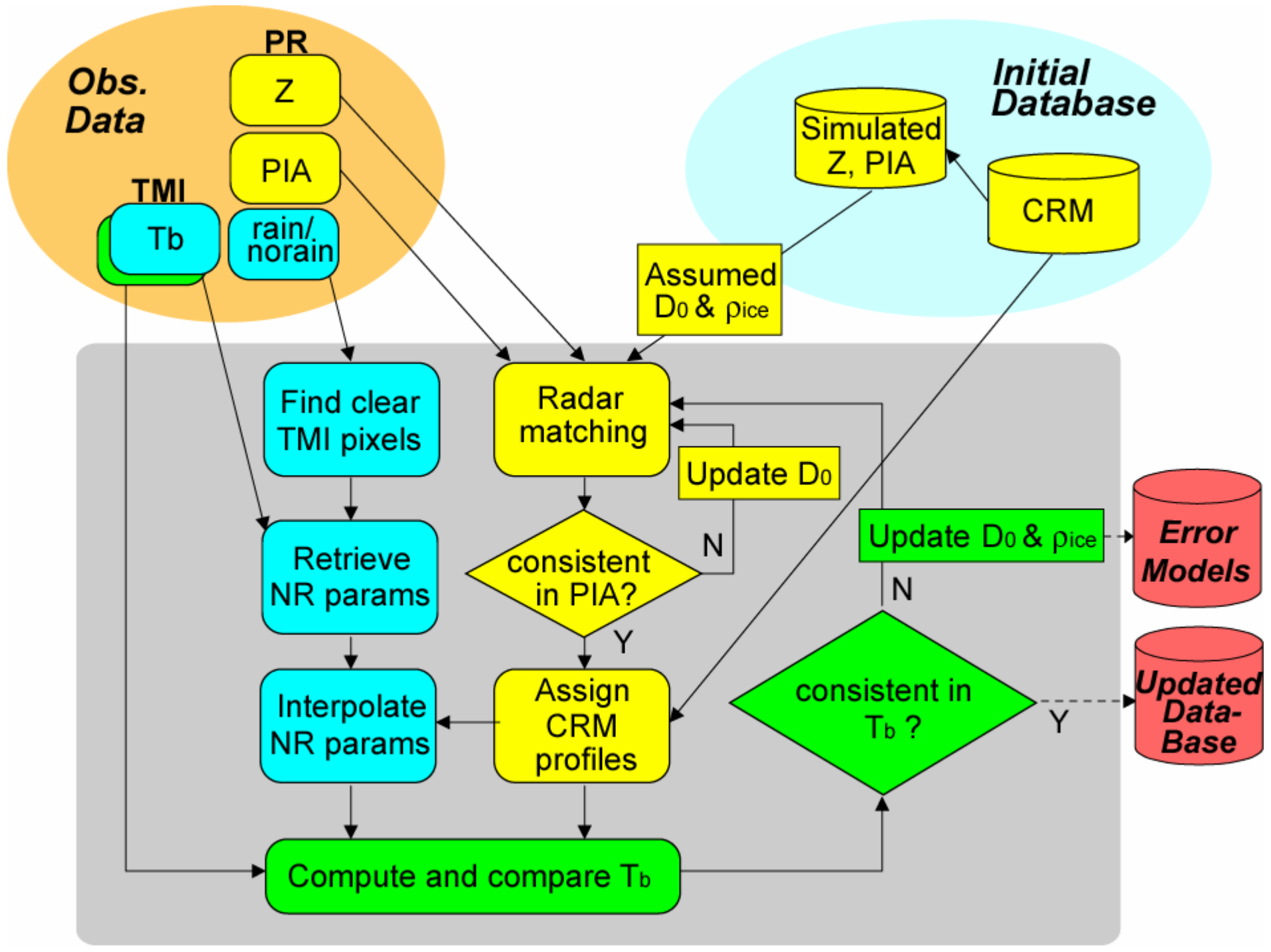


January 2005 Monthly Rainfall from AMSR-E  
(Mean= 2.69, 38°N-38°S)



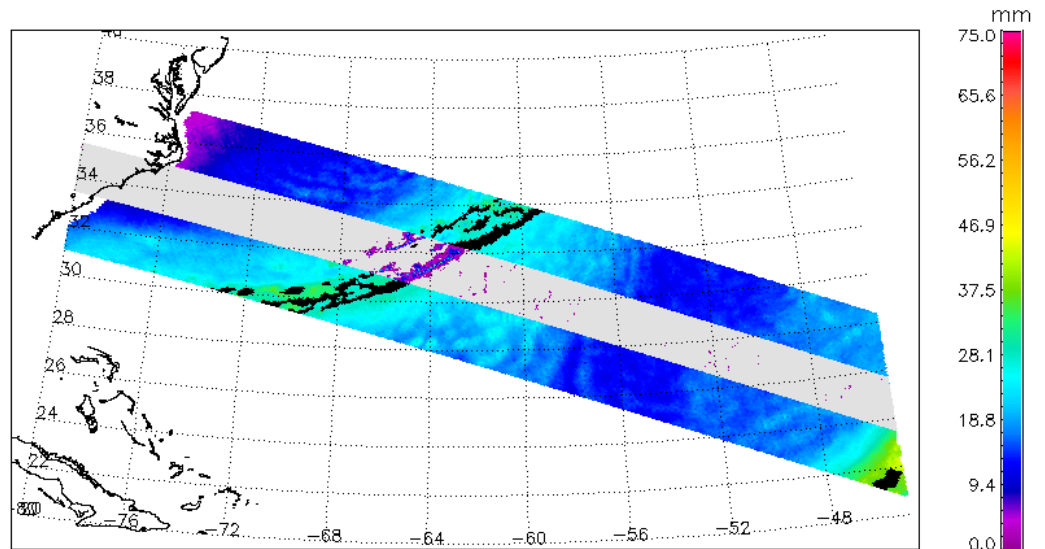
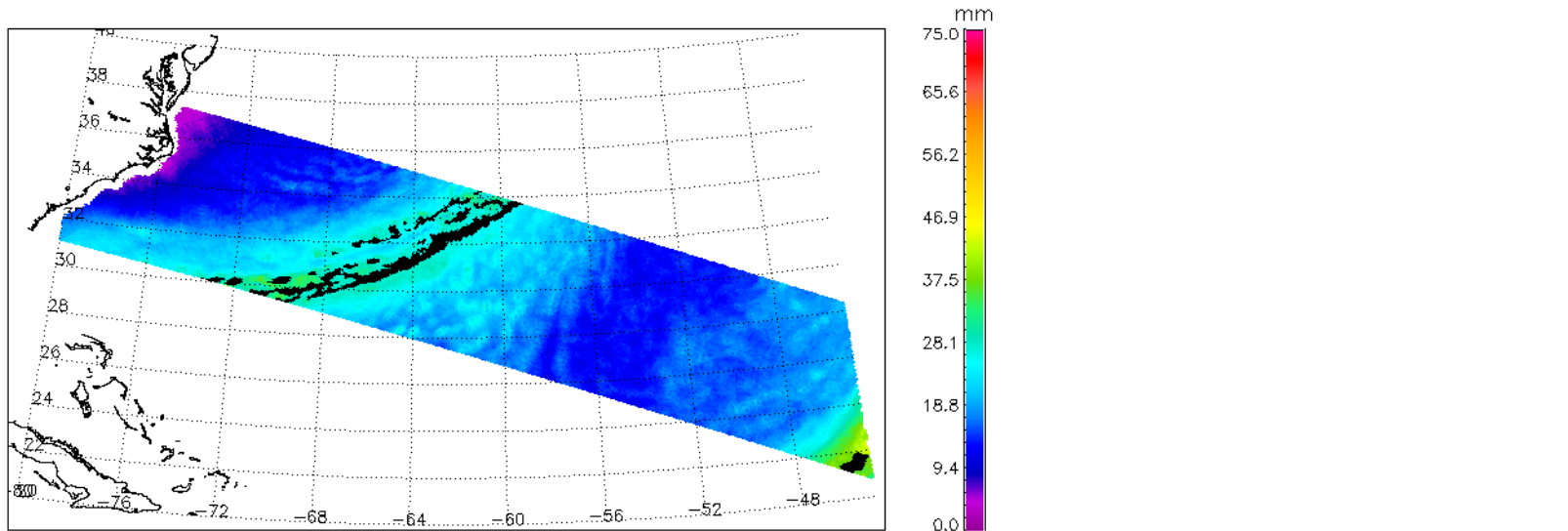
January 2005 Monthly Rainfall from SSM/I F13  
(Mean= 2.60, 38°N-38°S)



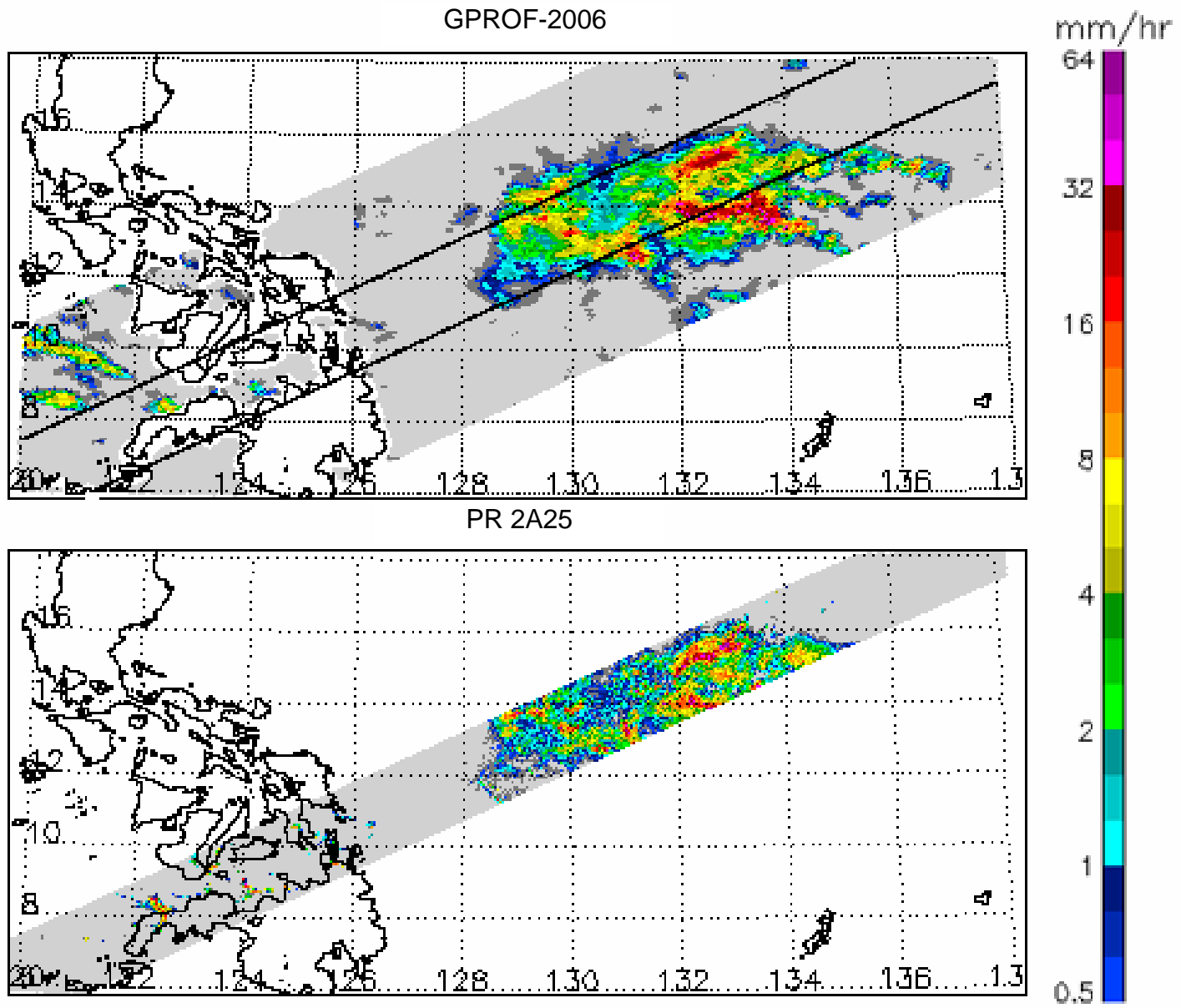




# *Optimal Estimation - Rain Scene Identification*

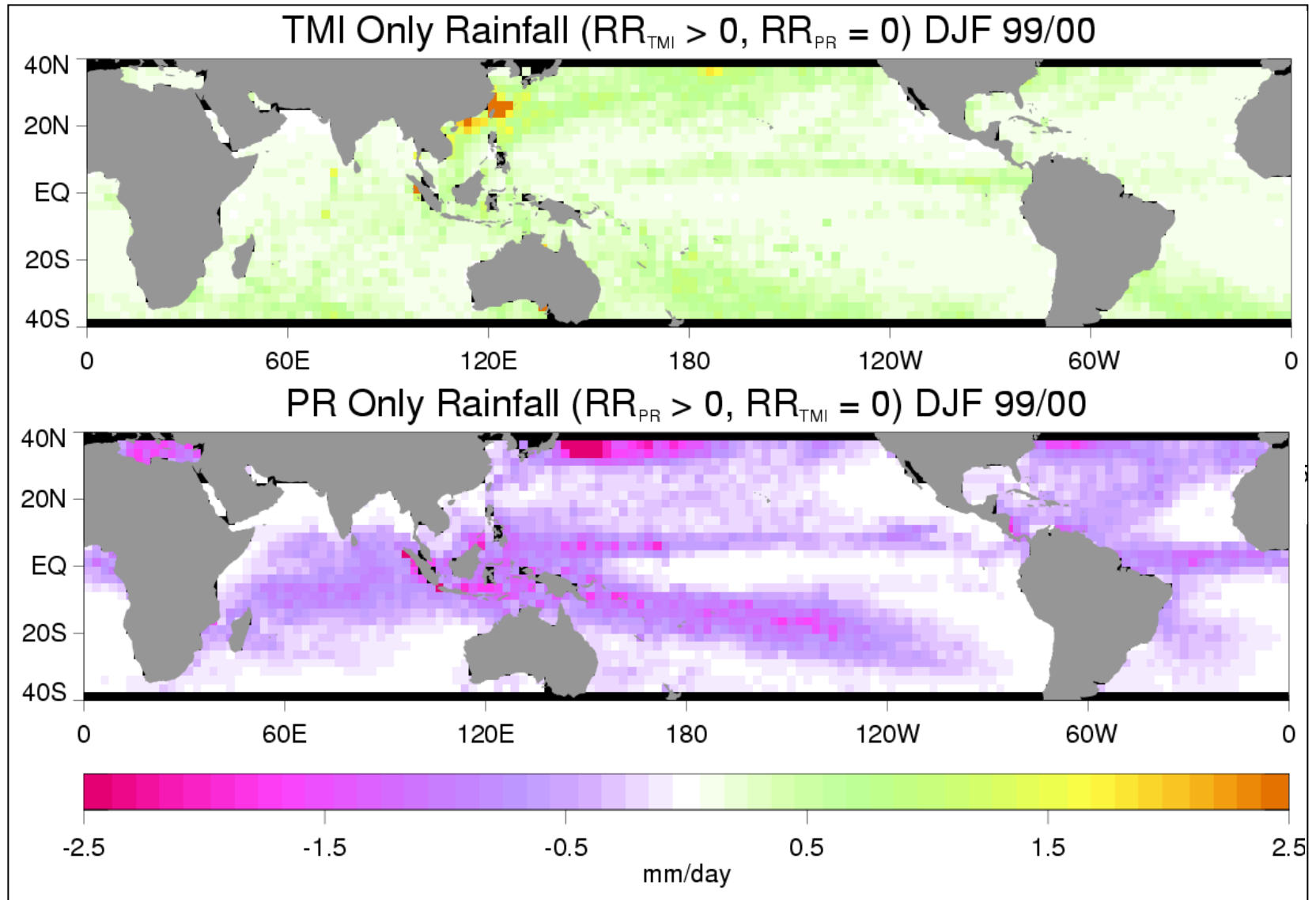


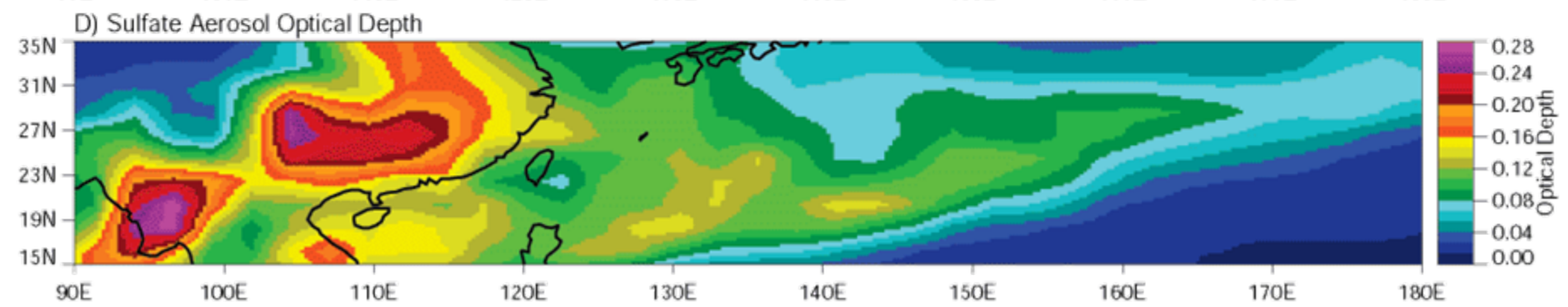
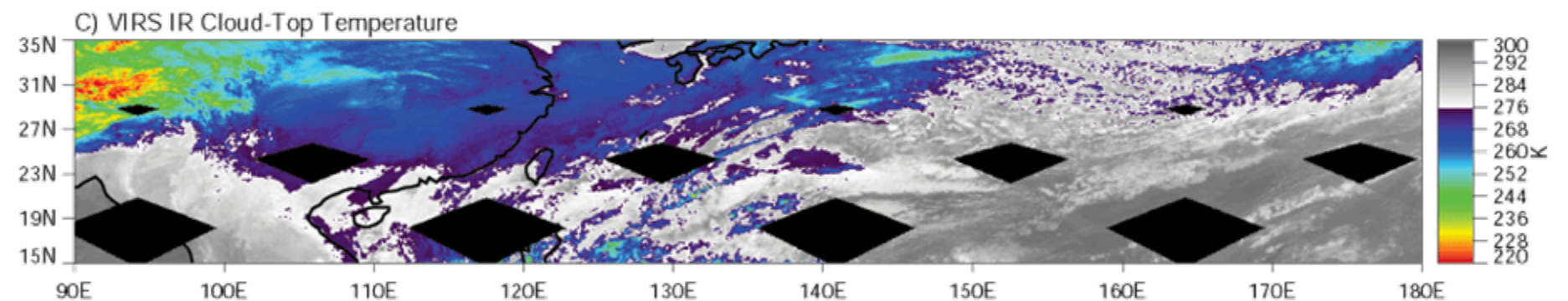
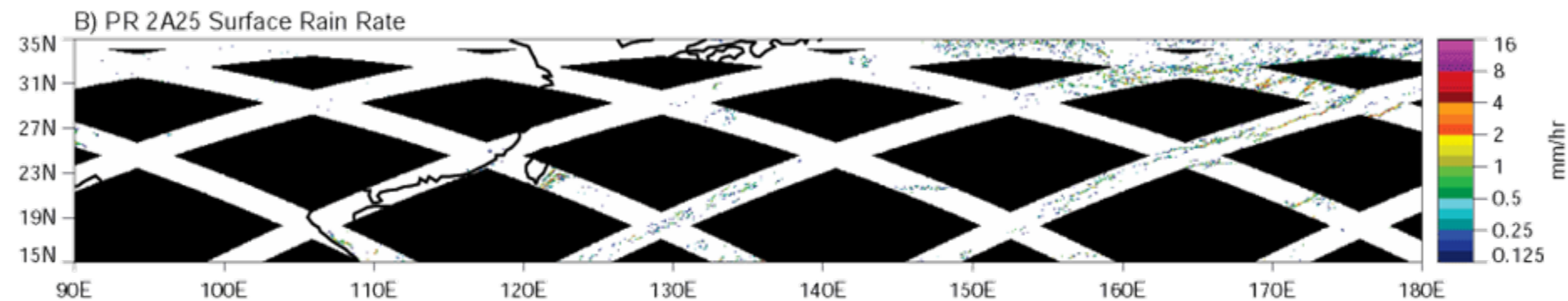
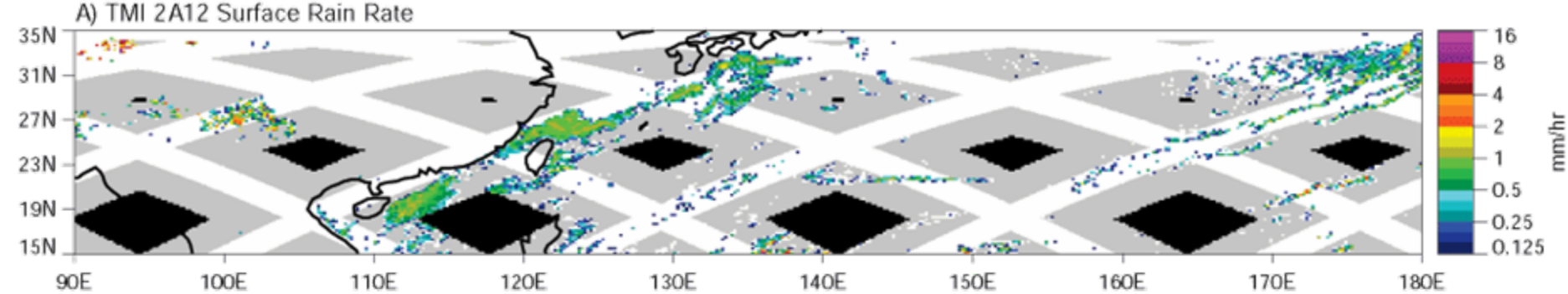
# GPROF-2006



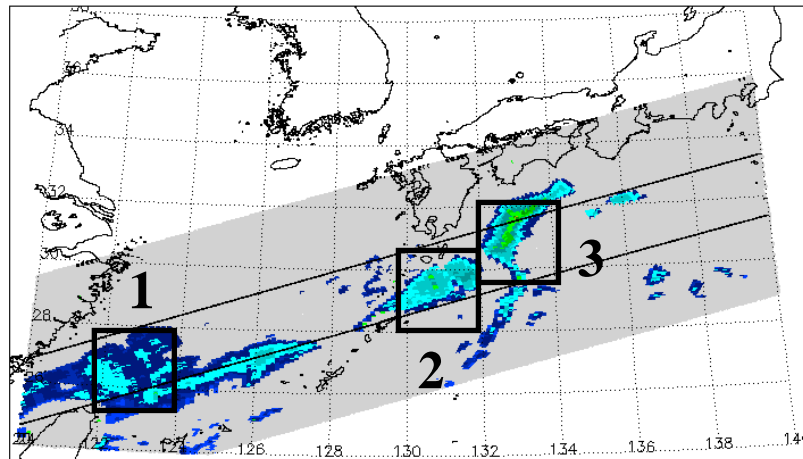
Experimental application of a preliminary version of GPROF-2006 compared to TRMM radar results (PR-2A25 V6).

# Rainfall Detection

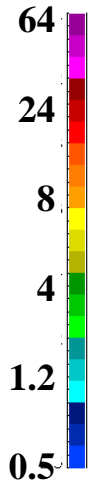




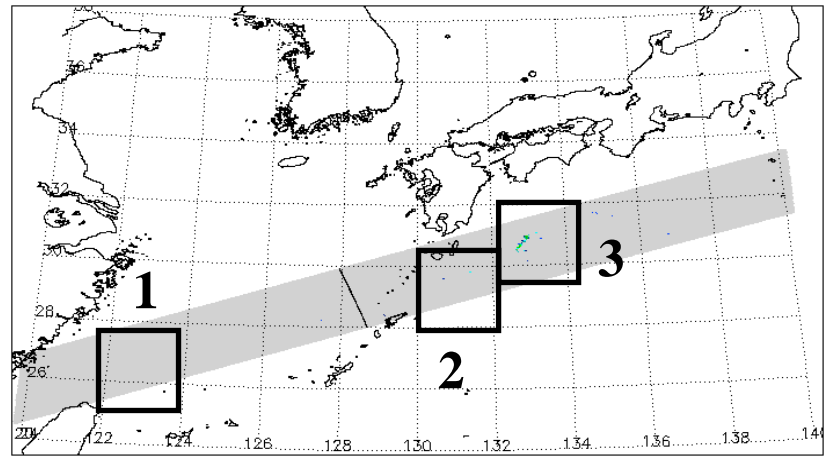
## Passive Microwave Rainrate Retrieval (GPROF)



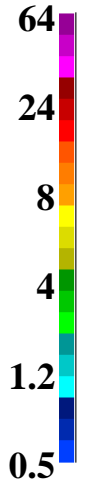
mm/hr



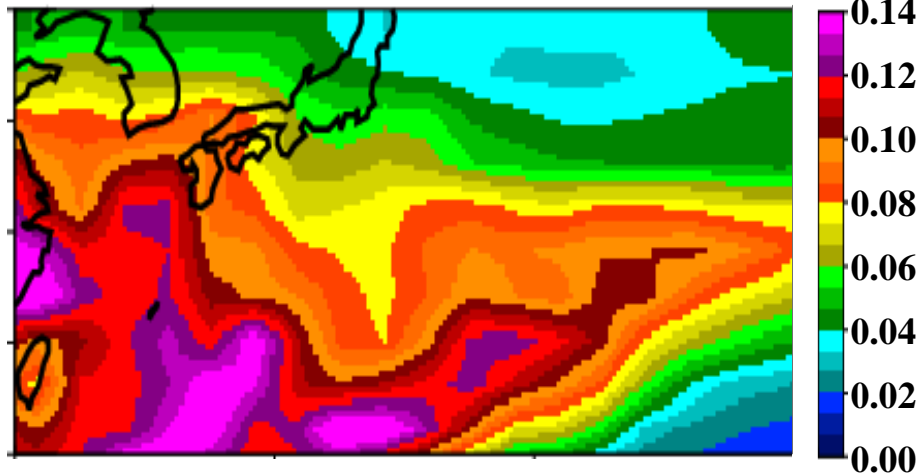
## Active Microwave (TRMM PR) Rainrate Retrieval



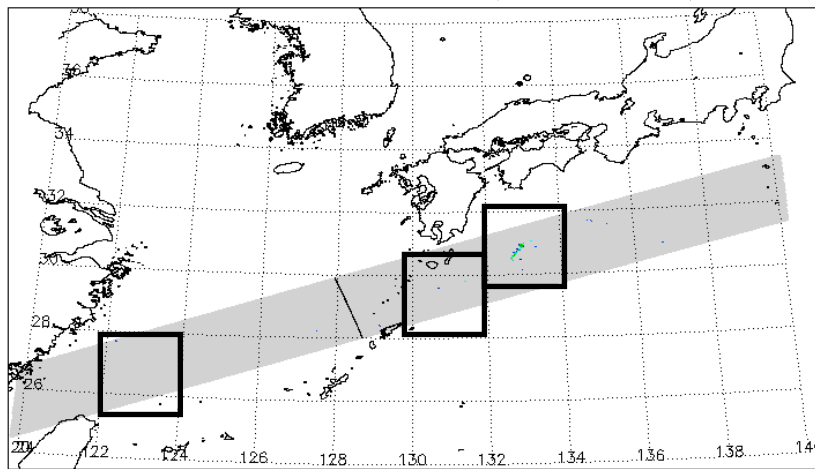
mm/hr



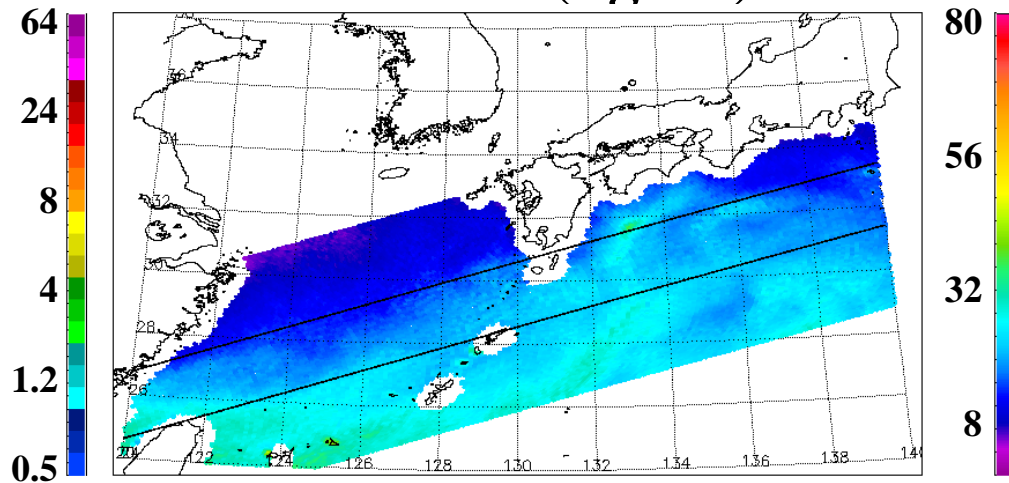
## Sulfate Aerosol Optical Depth [Berg et al. 2006]



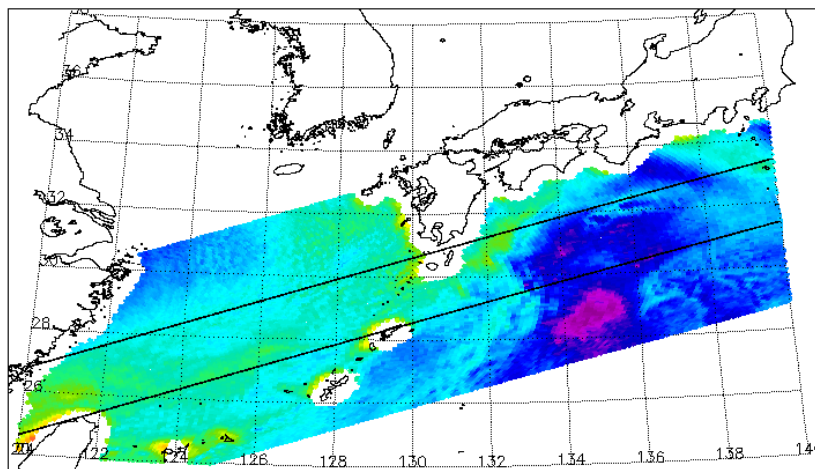
### PR Rainrate (mm/hr)



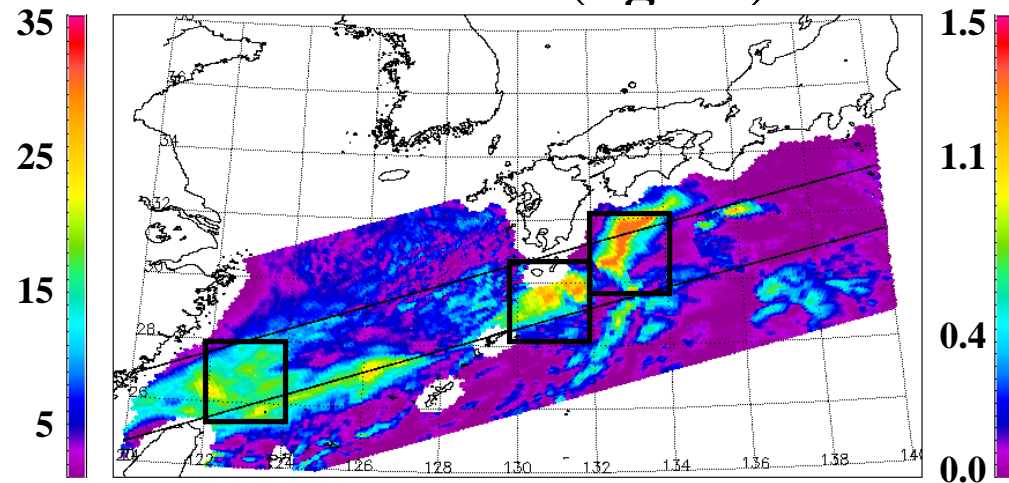
### TPW (kg/m<sup>2</sup>)



### WIND (m/s)



### LWP (kg/m<sup>2</sup>)



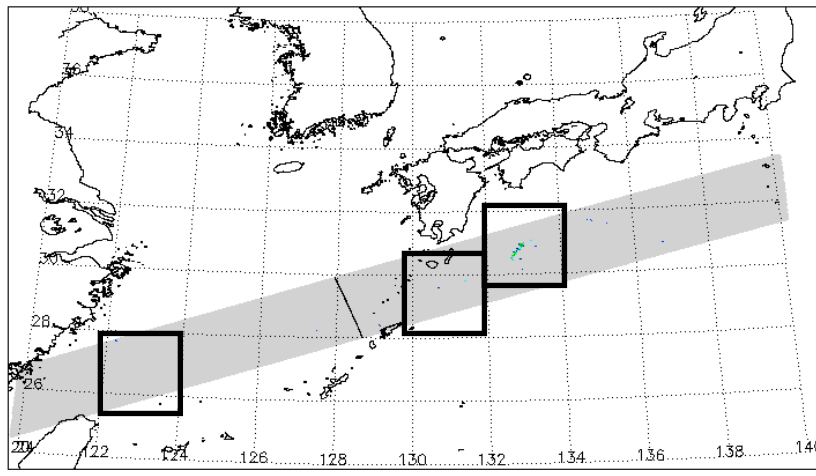
# Projects in development

- Experimenting with Surface emissivity for improved land databases  
*(need geophysical parameters well enough to account for non-raining Tb as well as predict other sensors)*
- Considering changes in output to add profile information  
*(vertical structure from radiometer ~ 100 unique profiles that can be written into file header while pixels contain only profile reference number and scale factor)*
- Considering changes in output to assign rainfall probability  
*(Tb simply not unique indicator of rainfall. A probability based upon a-priori database is more transparent but introduces complexities for users)*

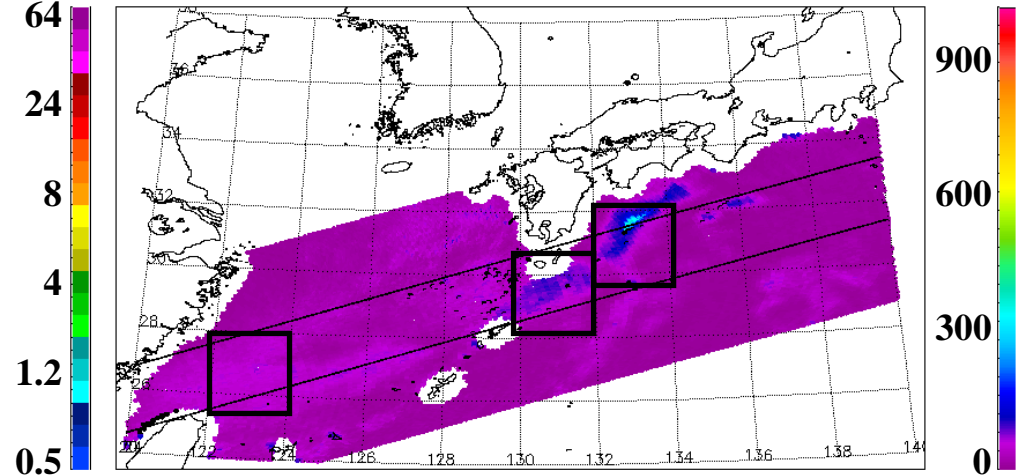




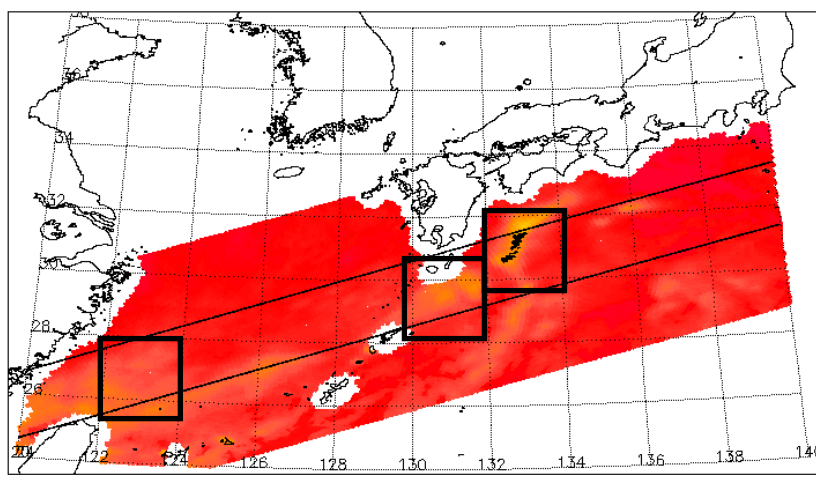
# PR Rainrate (mm/hr)



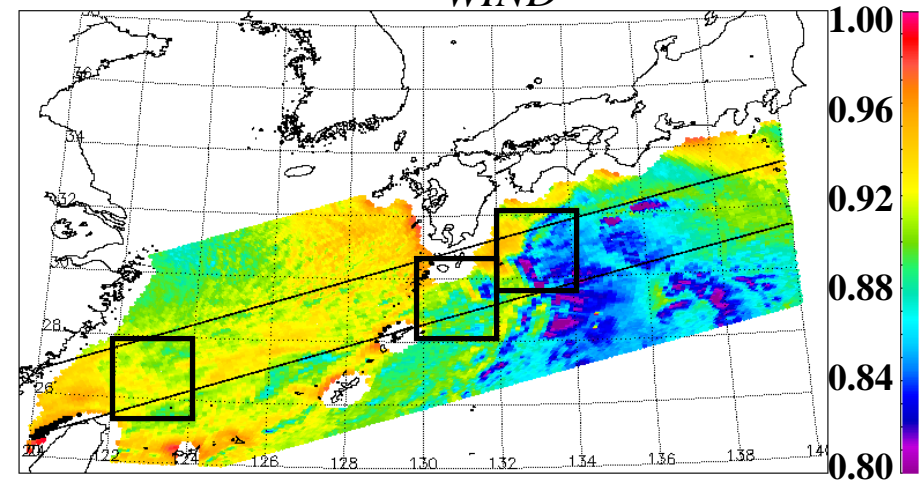
# $\chi^2$



# $A_{TPW}$

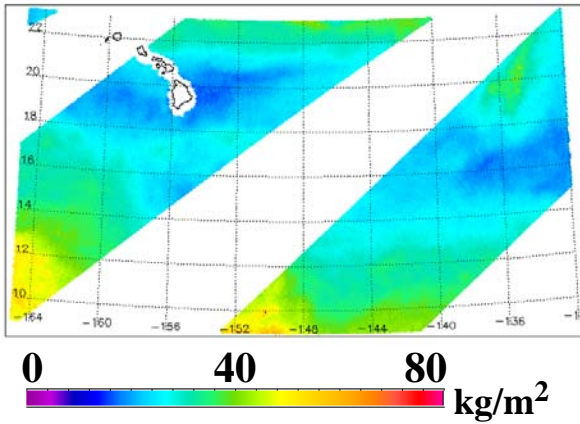


# $A_{WIND}$

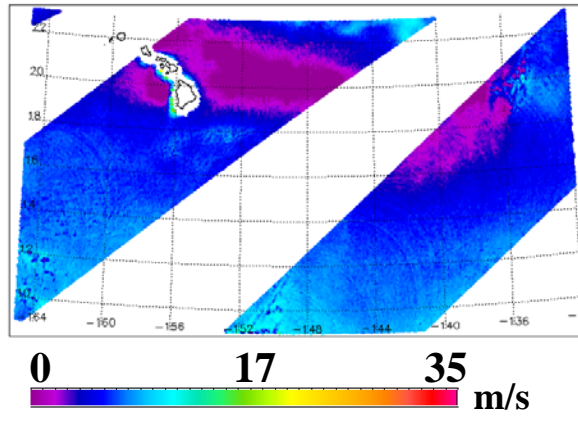


# *Optimal Estimation (OE) vs Remote Sensing Systems (RSS)*

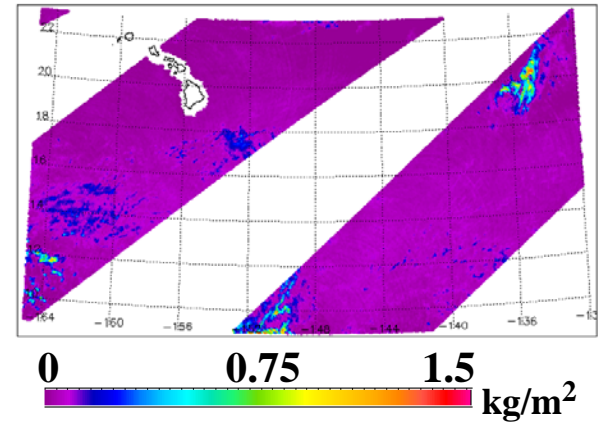
## OE TPW



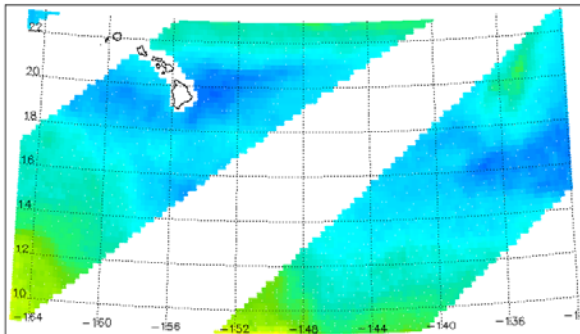
## OE WIND



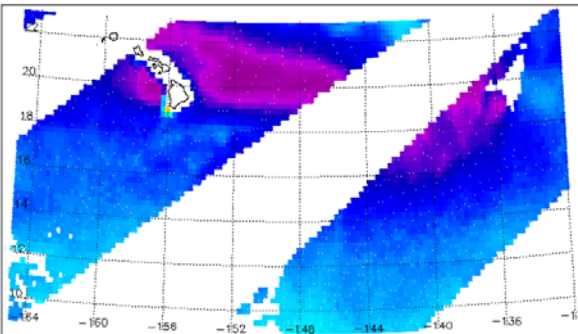
## OE LWP



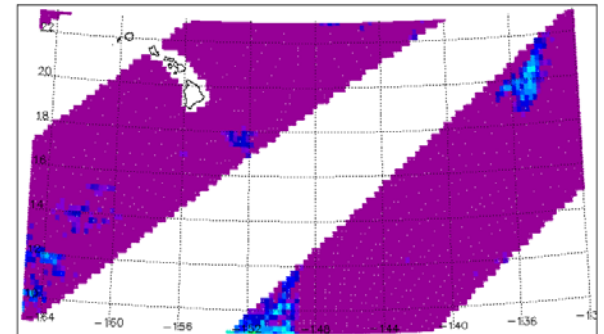
## RSS TPW



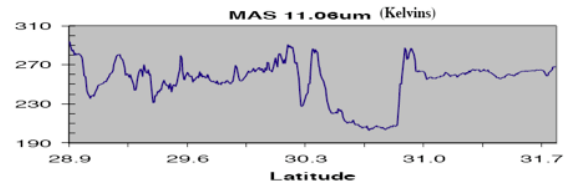
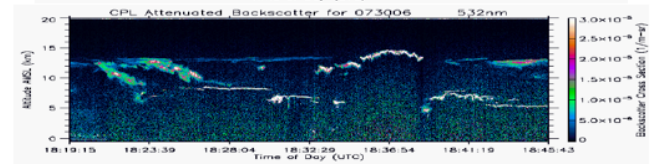
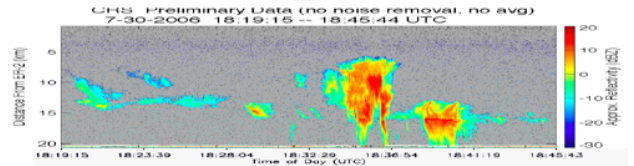
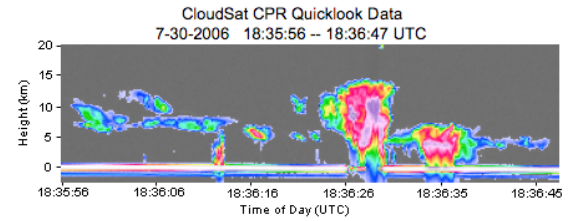
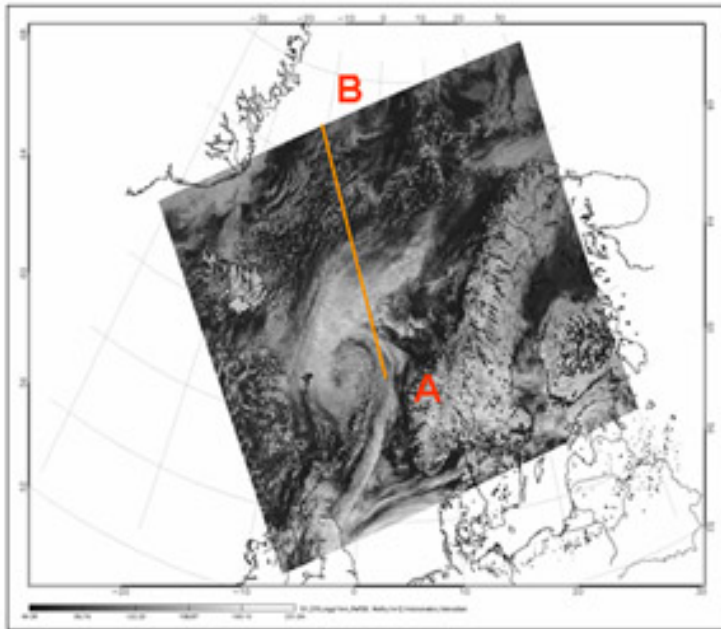
## RSS WIND



## RSS LWP

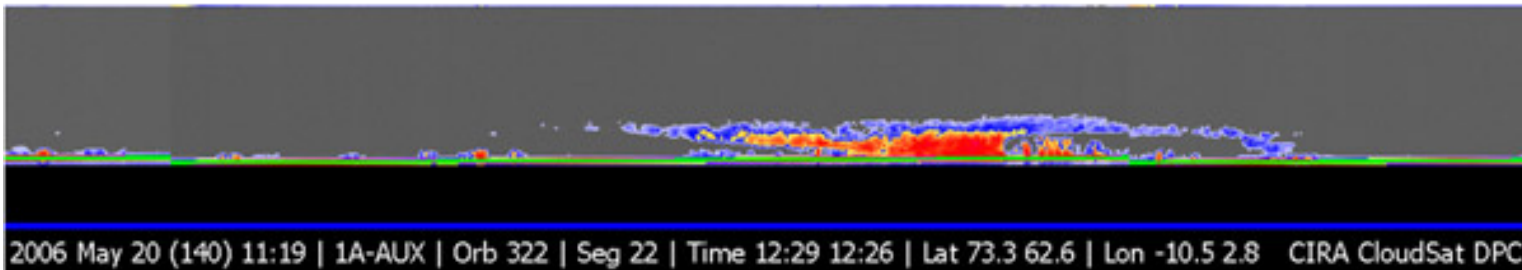


# CloudSat and high latitude precipitation

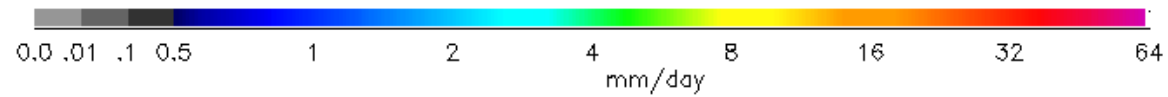
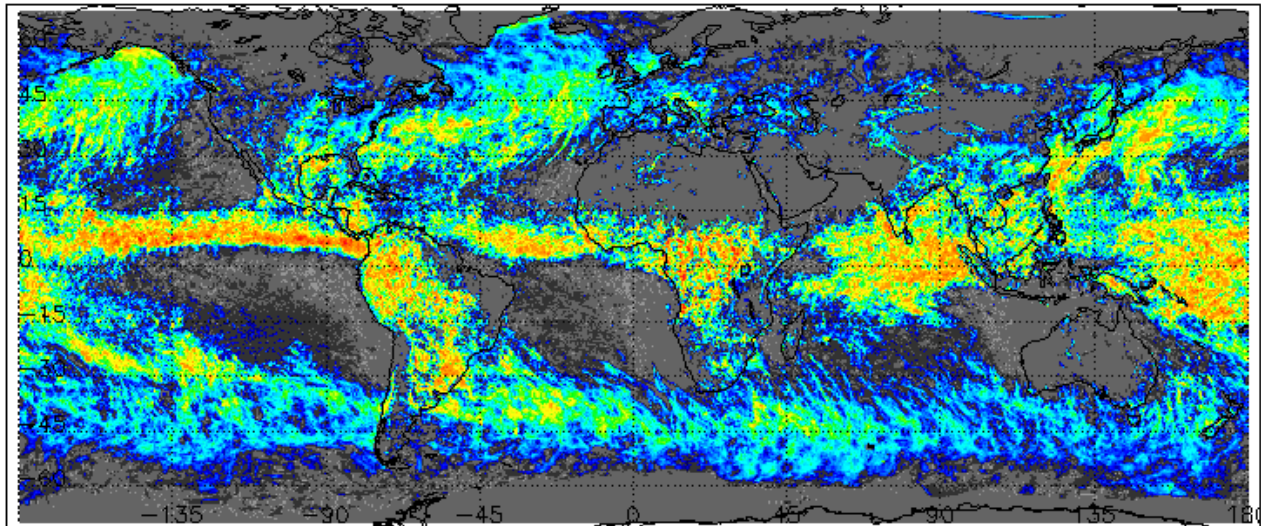


**B**

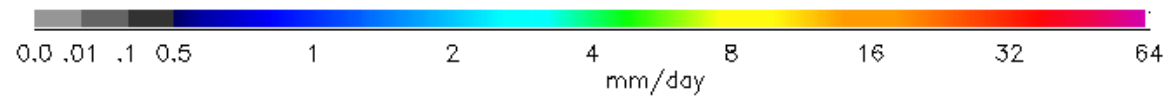
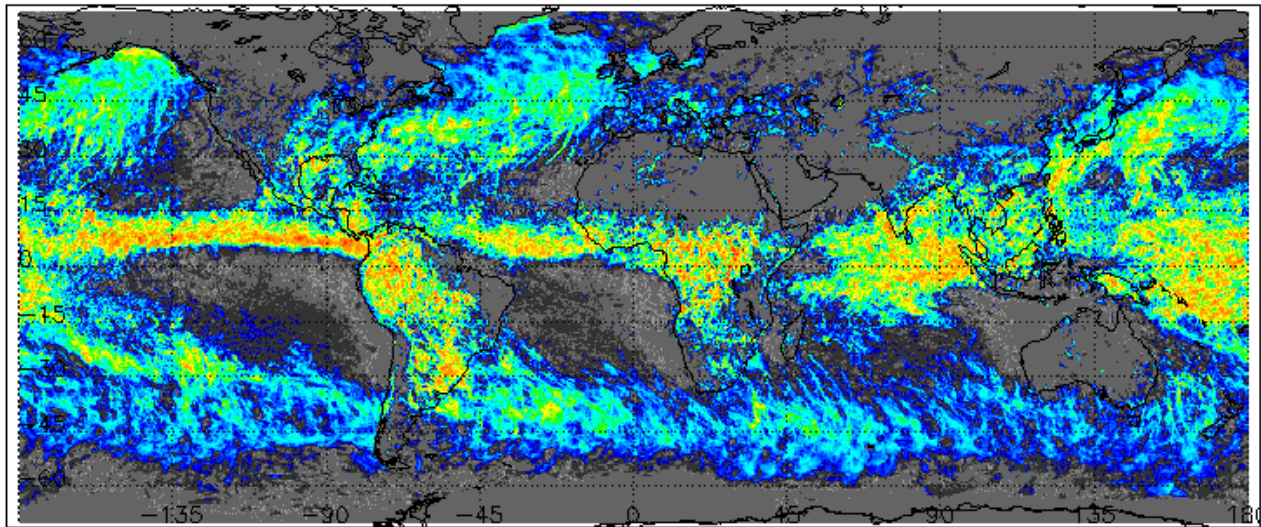
**A**



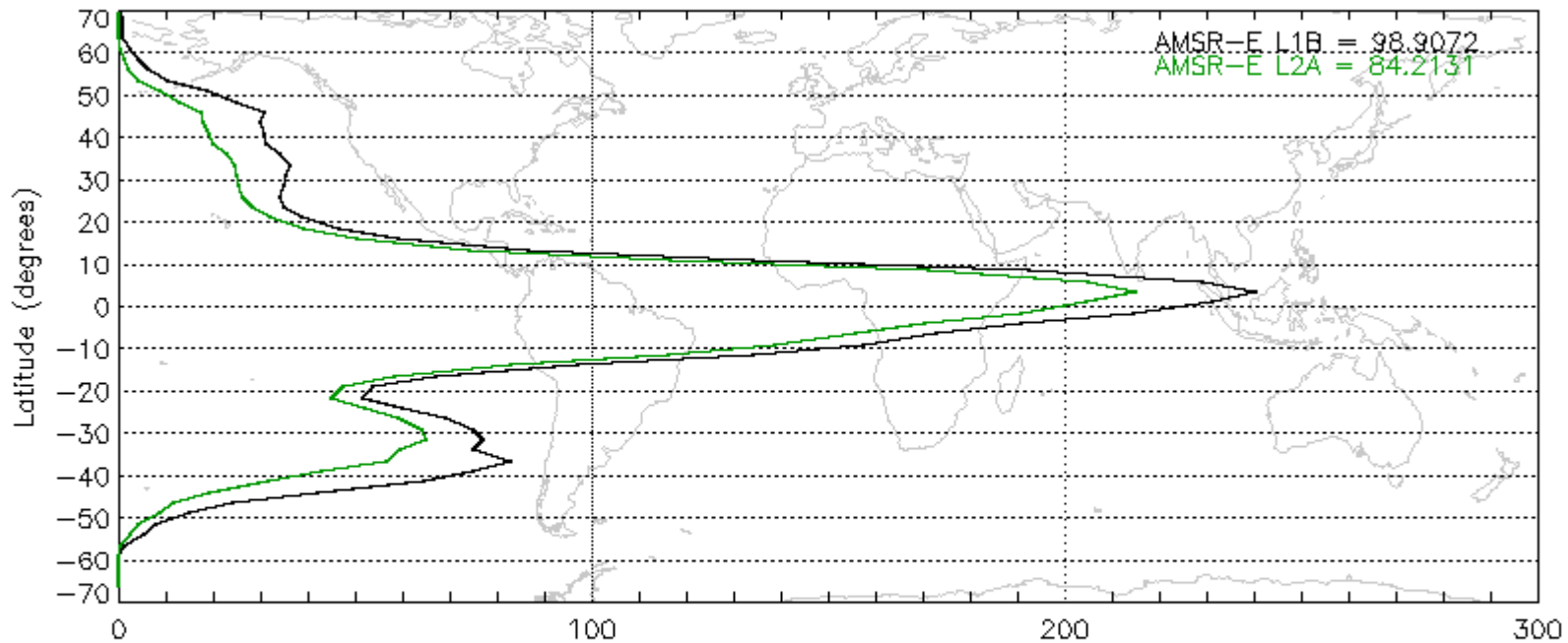
AMSR-E from L1B October 2002



AMSR-E B08 October 2002

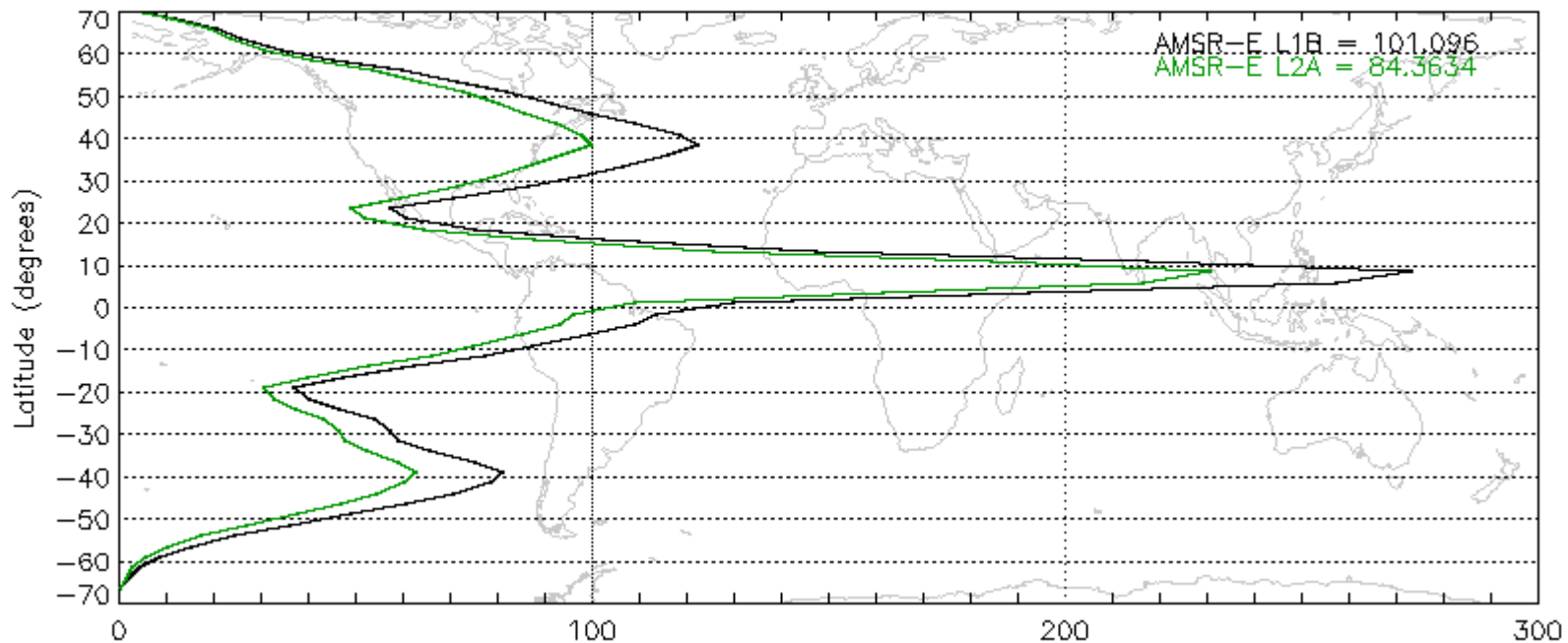


October 2002

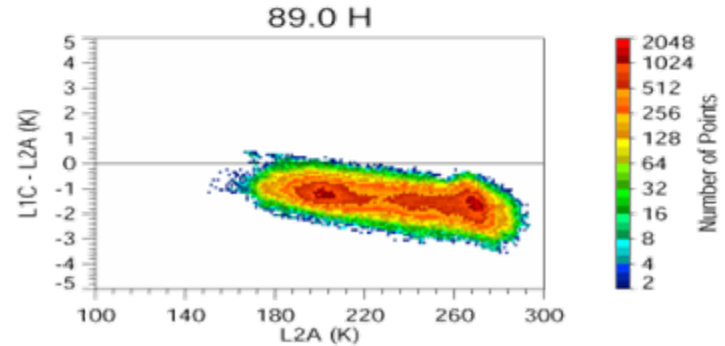
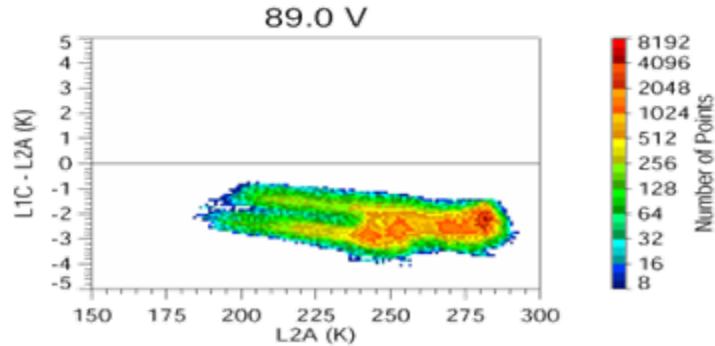
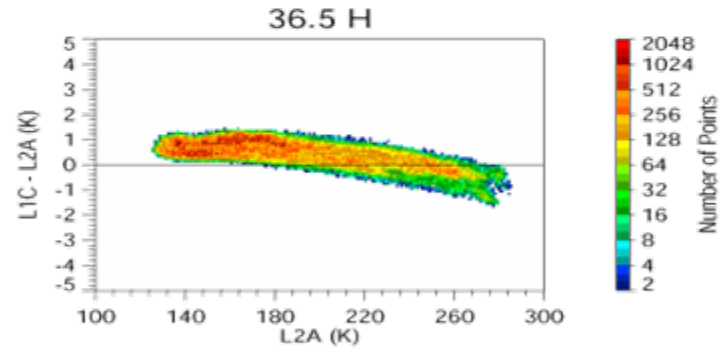
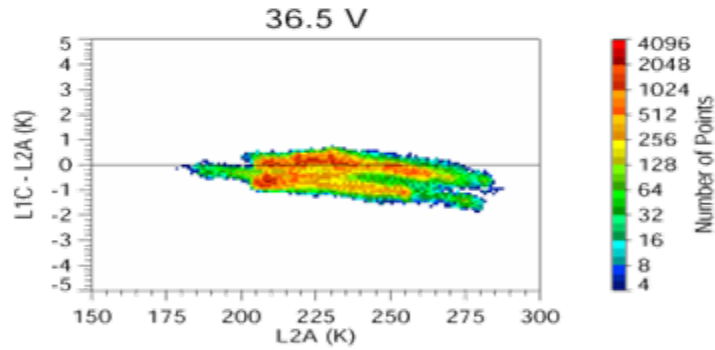
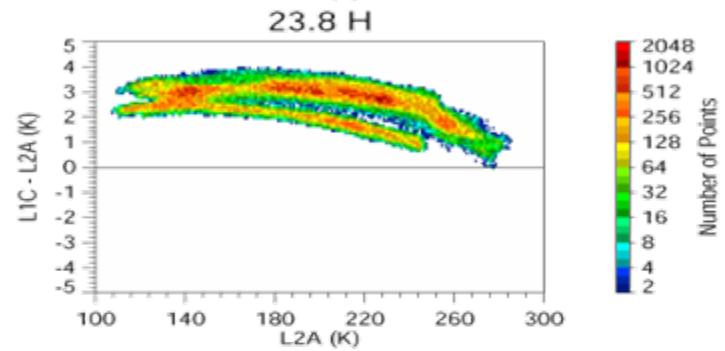
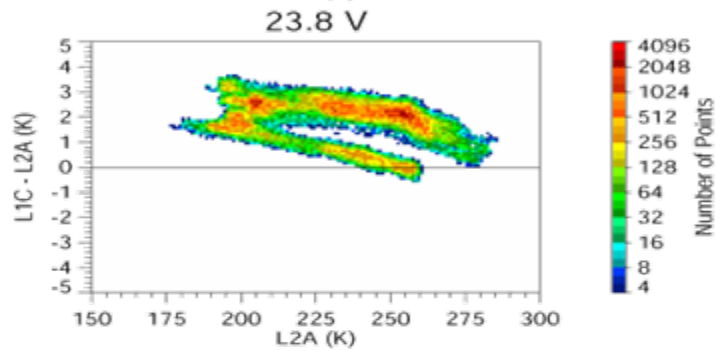
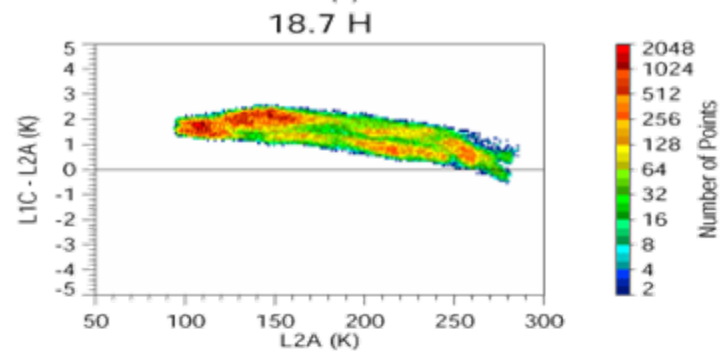
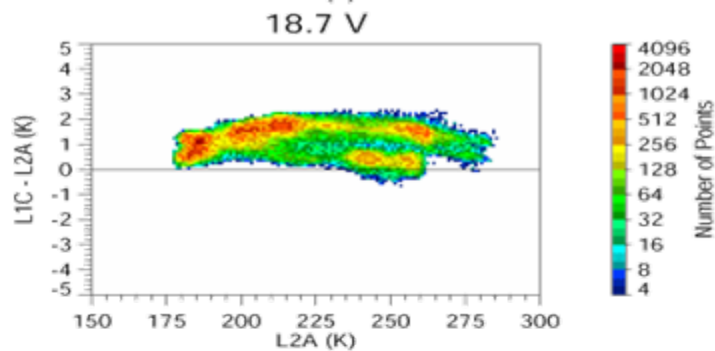


Ocean

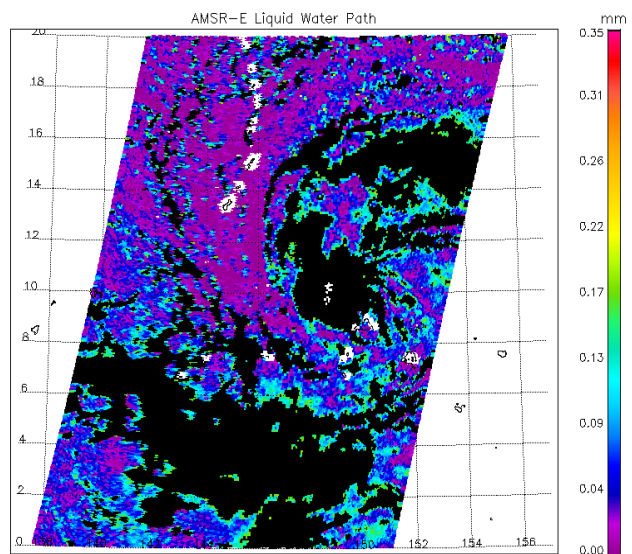
October 2002



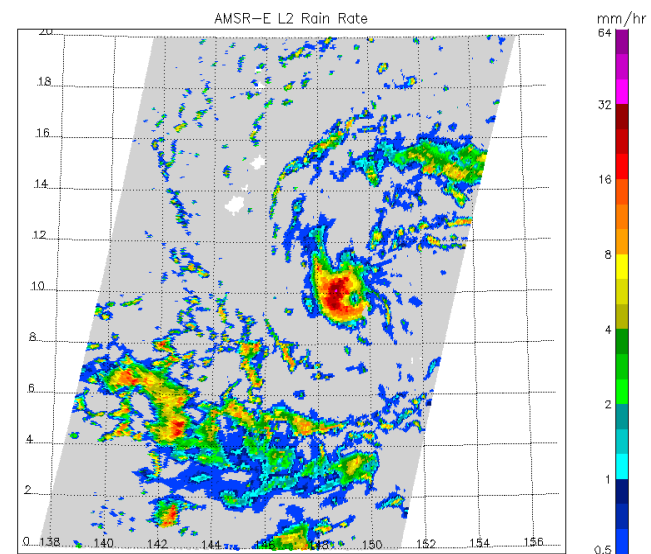
Land



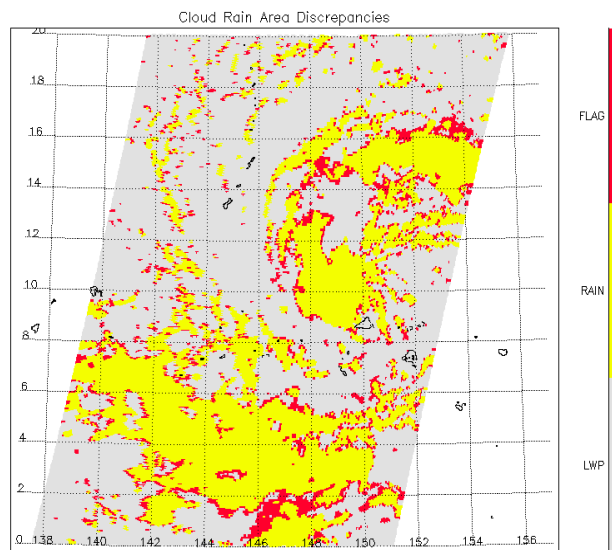
(a)



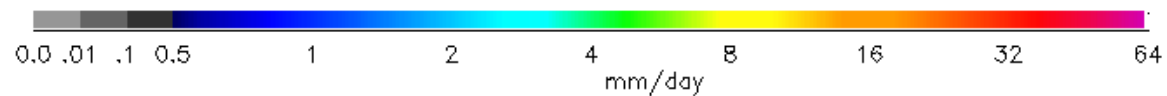
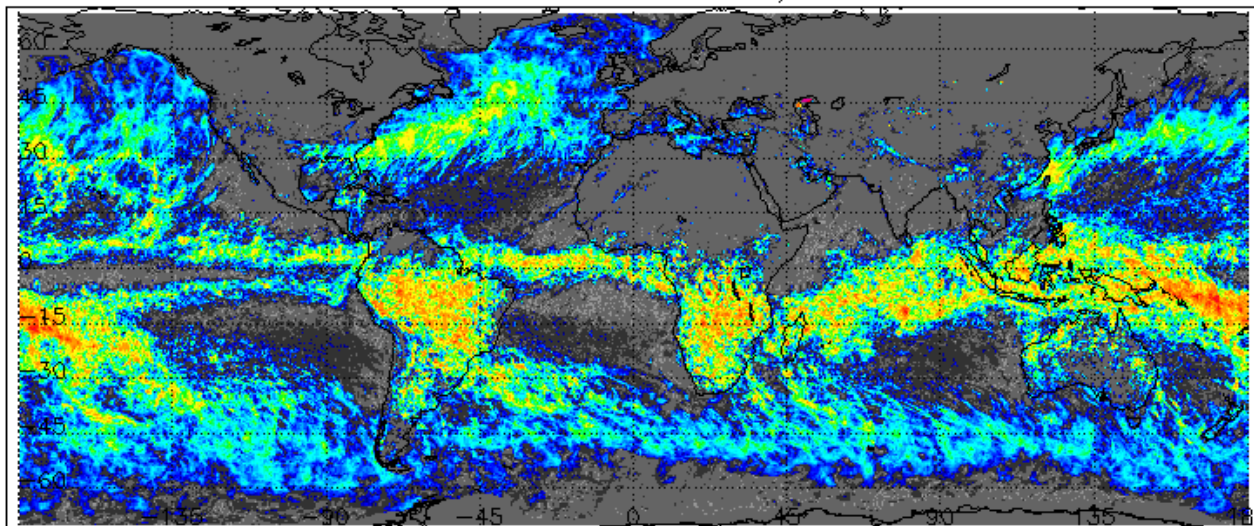
(b)



(c)



AMSR-E from B06 February 2006



AMSR-E BU8 February 2006

