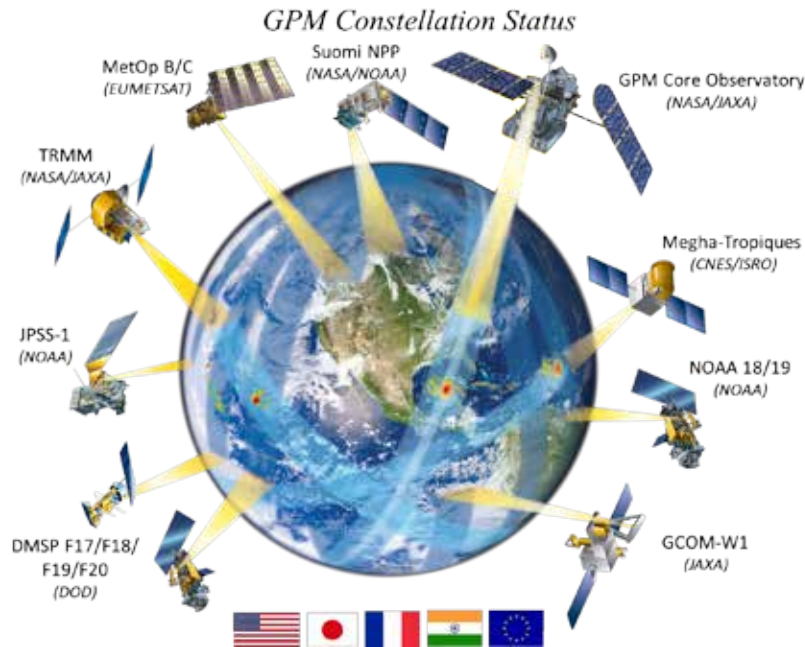


Initial GPROF GPM results

using a GPM derived database

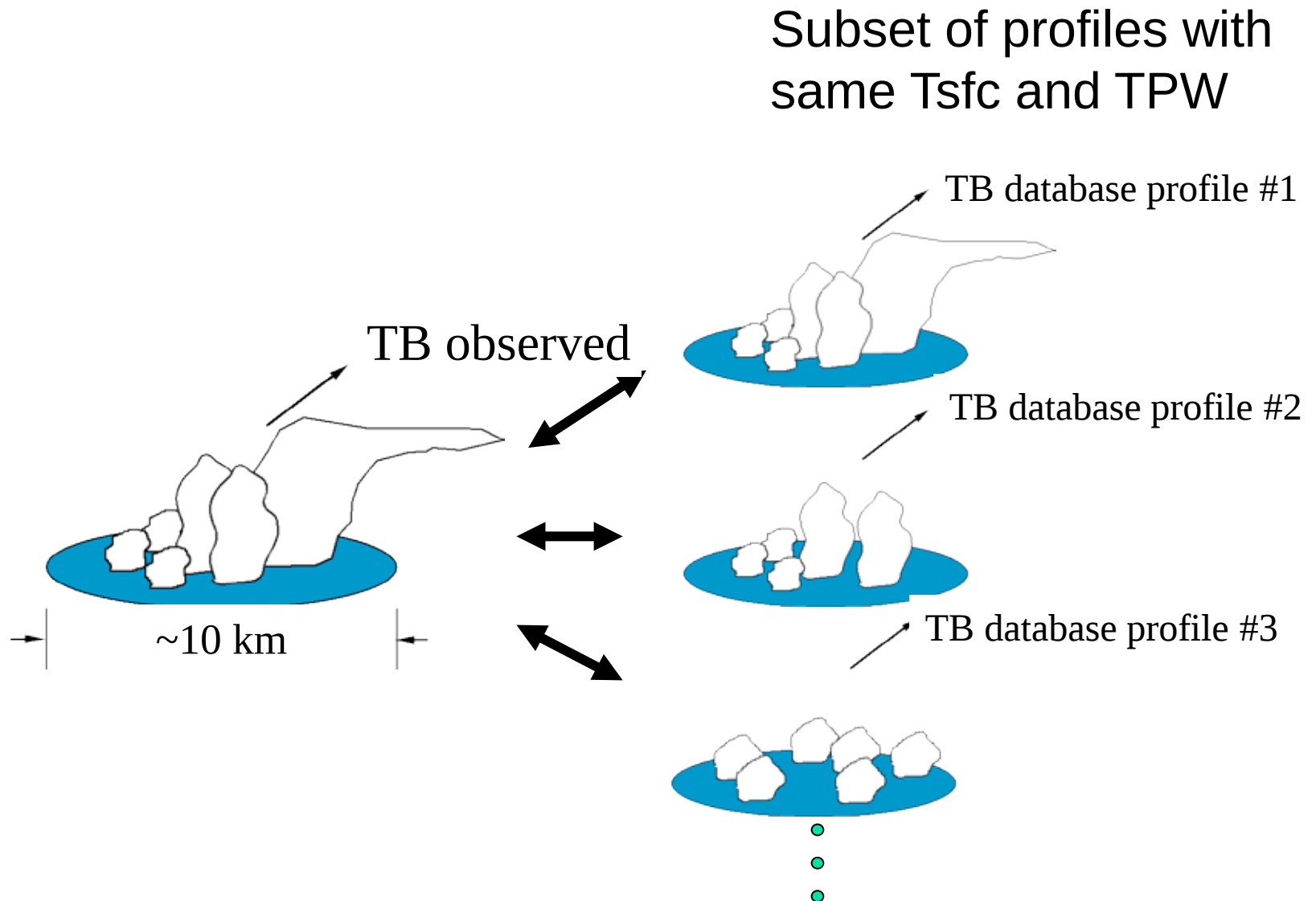


Christian Kummerow
Colorado State University

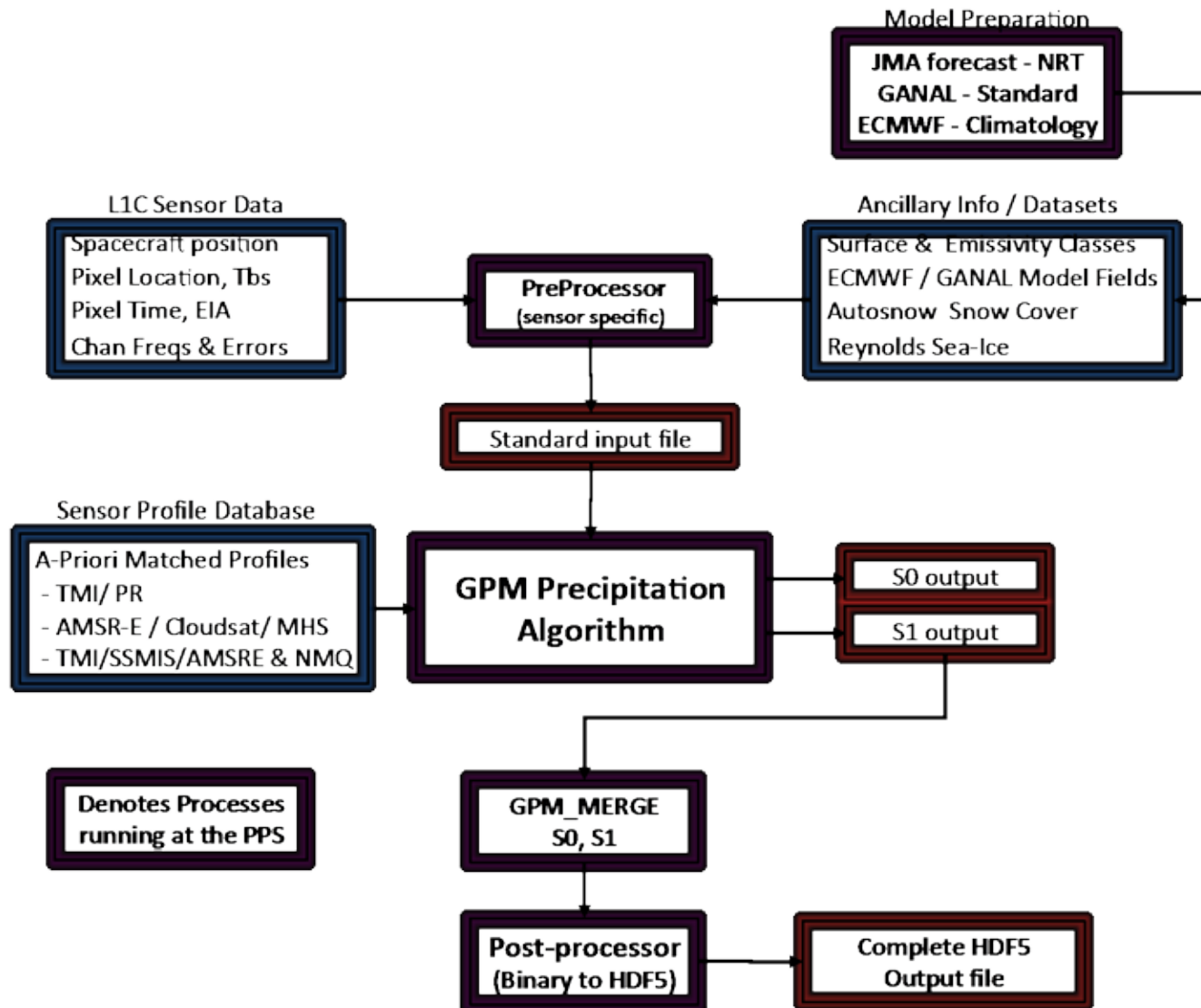
PMWG

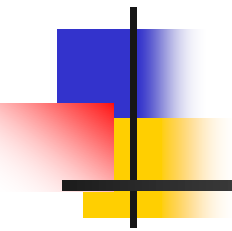
David Randel, Pierre Kirstetter, Nai-Yu Wang,
Veljko Petkovic, Mark Kulie, Ralph Ferraro

GPROF2014 – A Bayesian Algorithm



GPROF 2014 Algorithm Structure

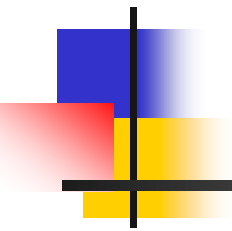




GPROF 2014 Evolution

*GPROF V1.4 = Prelaunch database. GPM data from core satellite in **not yet** used to create a-priori databases. Small version updates fix software issues.*

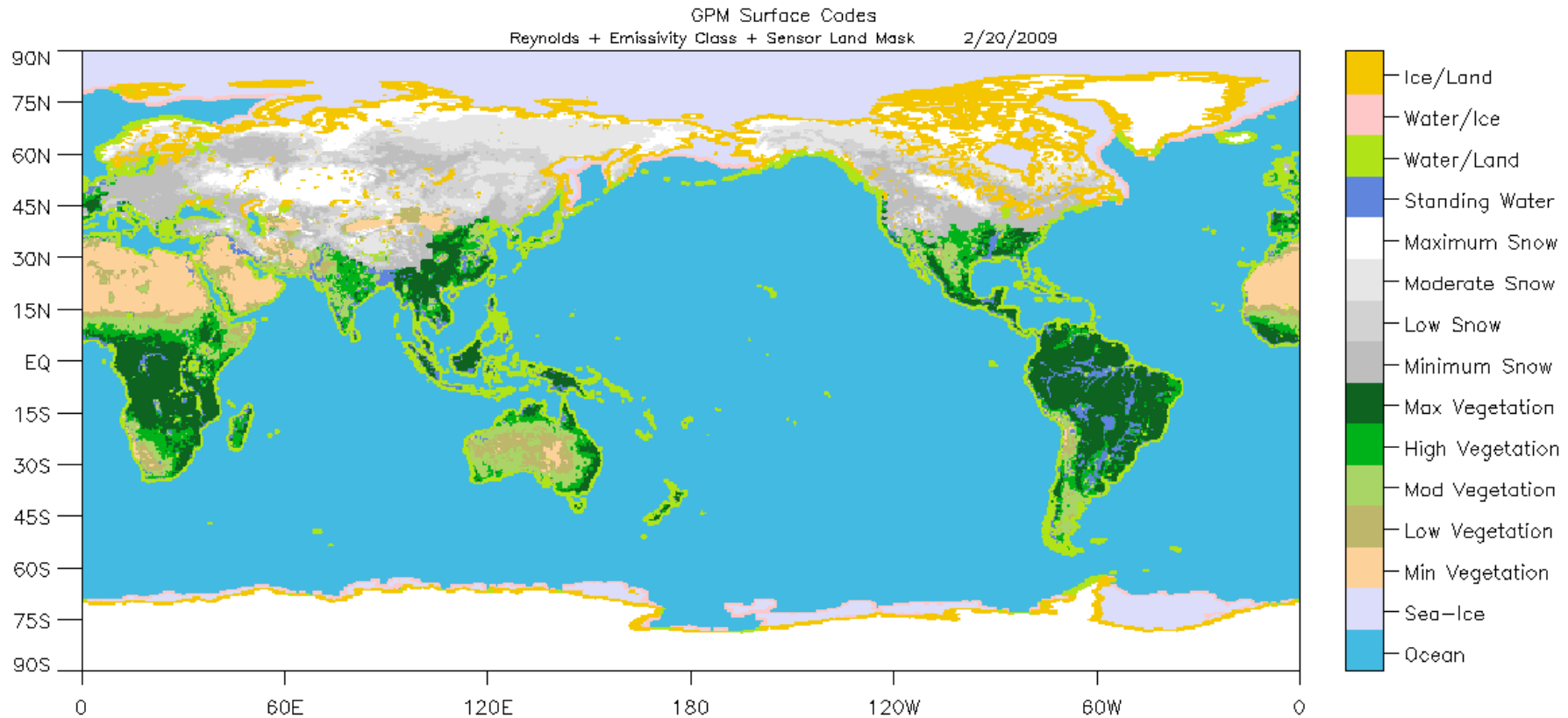
GPROF V2.n = being constructed now. Will be available after one year of GPM core satellite's combined algorithm is available to create consistent a-priori databases.



GPROF 2014 V1- V4

- Ocean – Same as TRMM. GMI and other sensor databases were computed from physically consistent database of TRMM PR and TMI. Colder regions extended by artificially lowering the freezing level of TRMM observed profiles. Tested for SSMI and AMSR-E before GMI. (Sarah Ringerud, Dave Randel)
- Land – Fundamentally changed algorithms from TRMM. Used surface radar over US (NMQ) to construct databases of observed surface rain and sensor Tb for each radiometer. GMI currently running with SSMIS database. (Pierre Kirstetter, Nai-Yu Wang/Ralph Ferraro)
- Cold Sfc – Used AMSR2/MHS with CloudSat rain & MMF for physically consistent database. All sensors use AMSR2+MHS channels (Mark Kulie, Karen Mohr, Toshio Matsui)

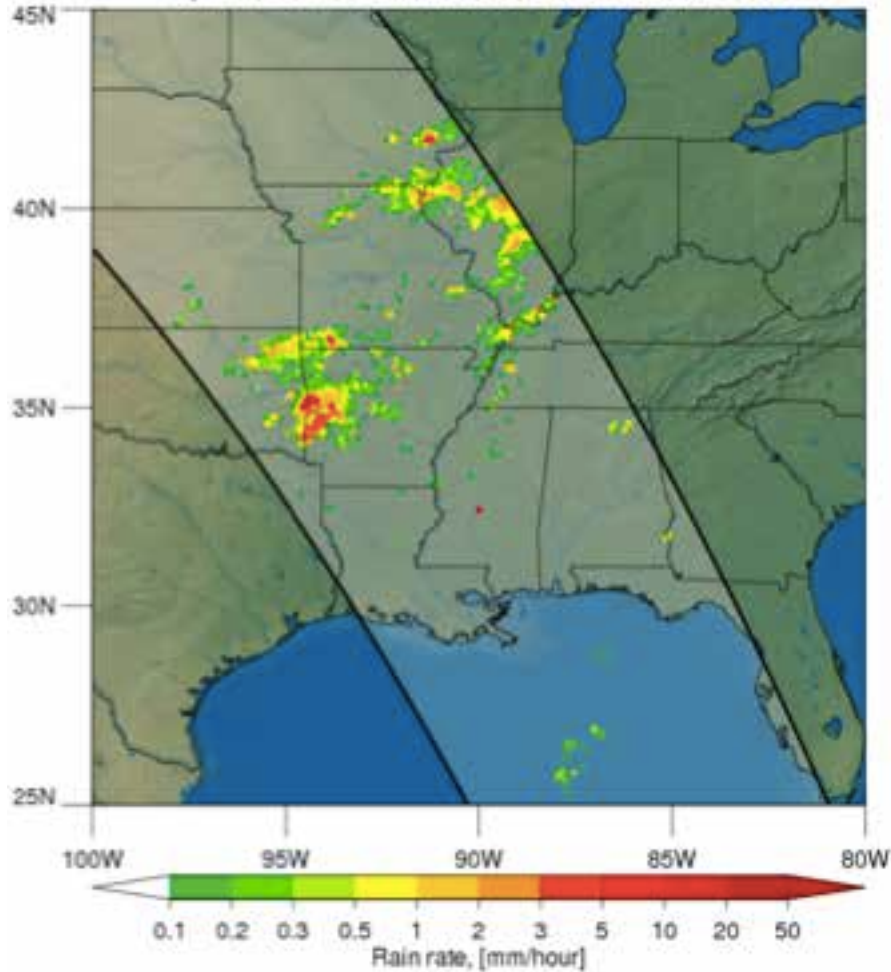
Surface types



GMI Rainfall

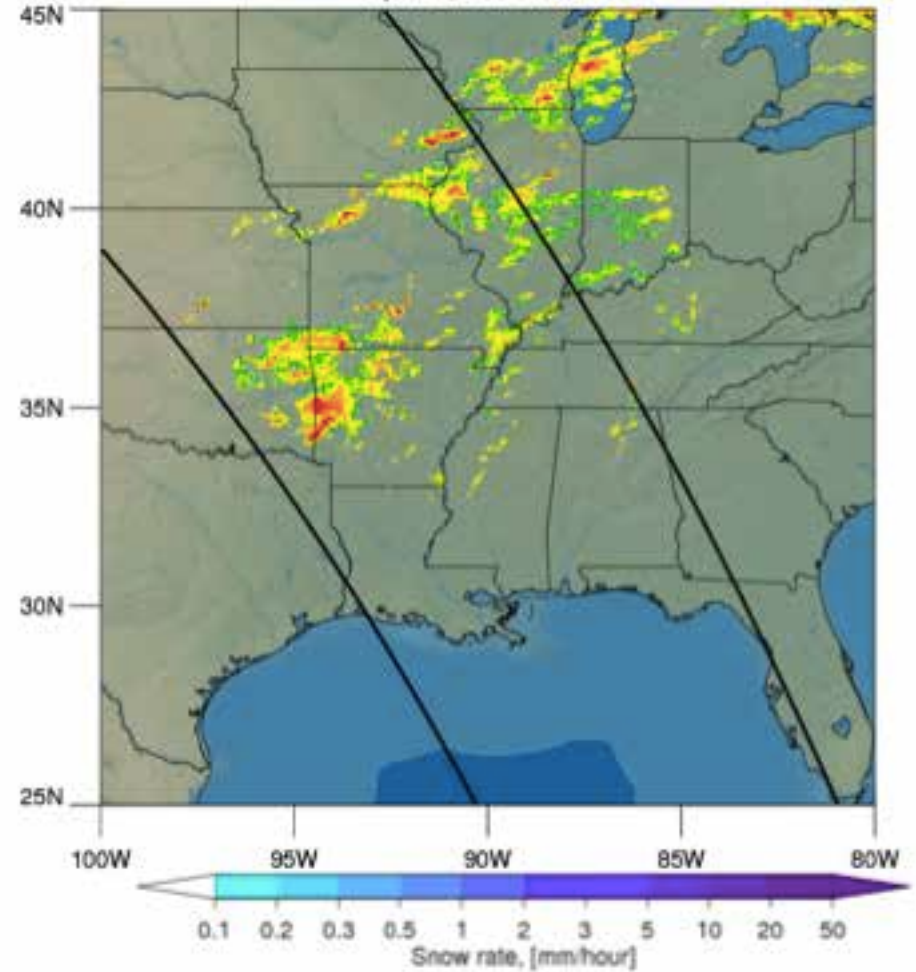
GMI GPROF precipitation

April 21, 2014 - 18:44Z, orbit 826, GPROF version = V01D

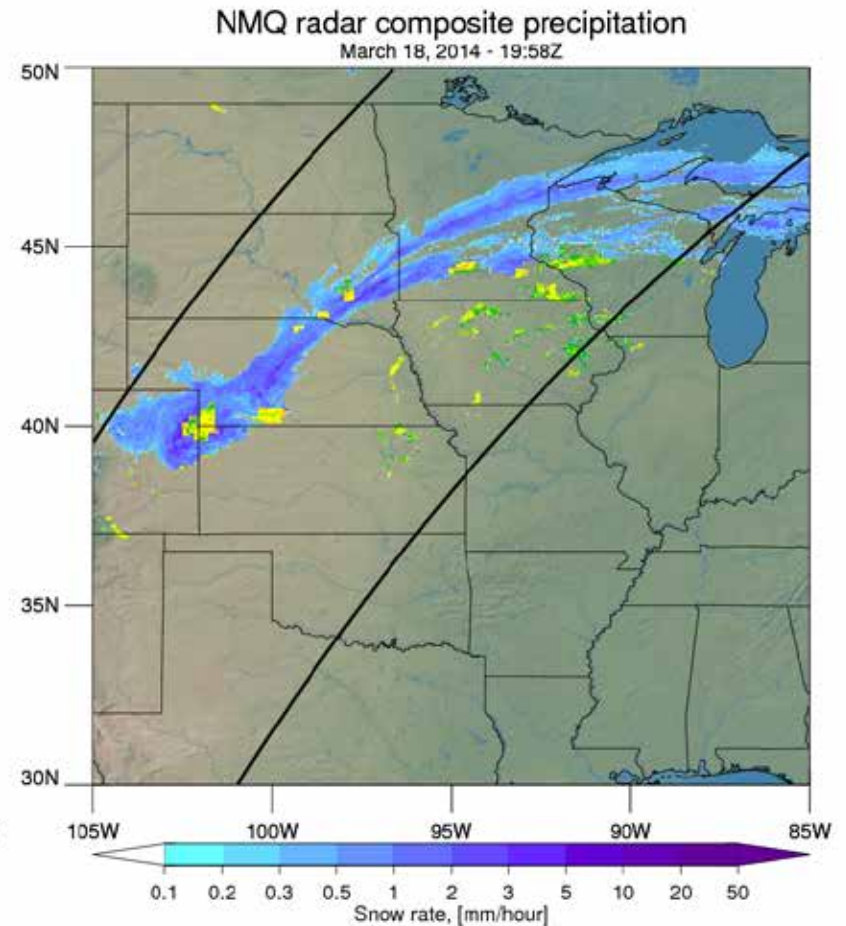
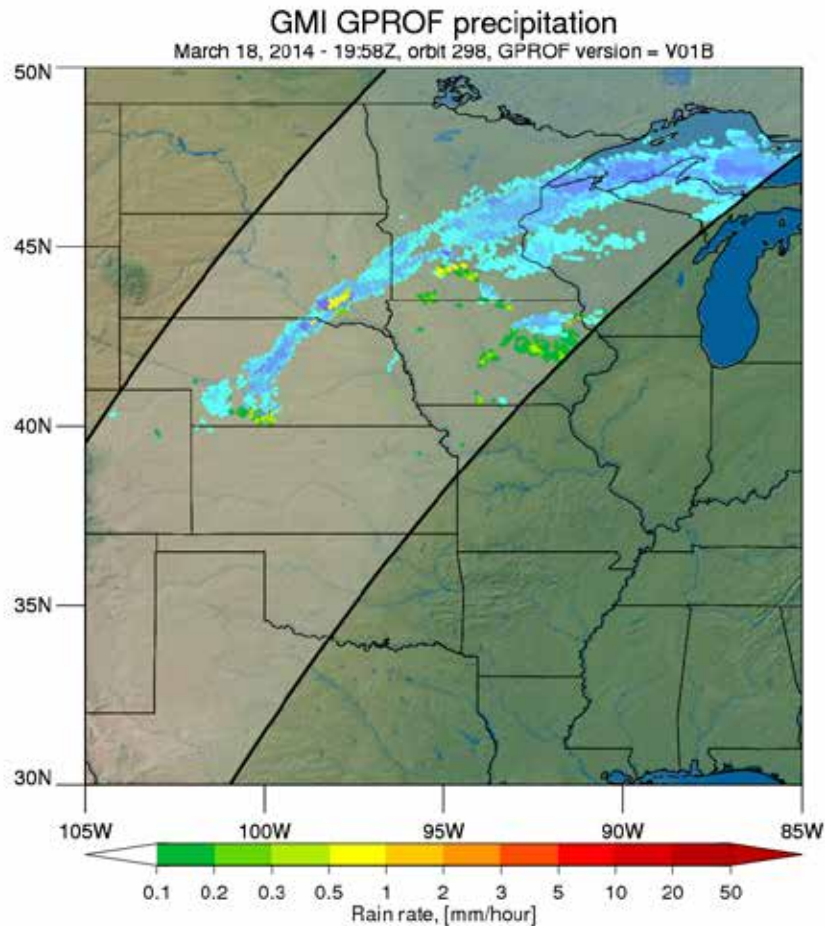


NMQ radar composite precipitation

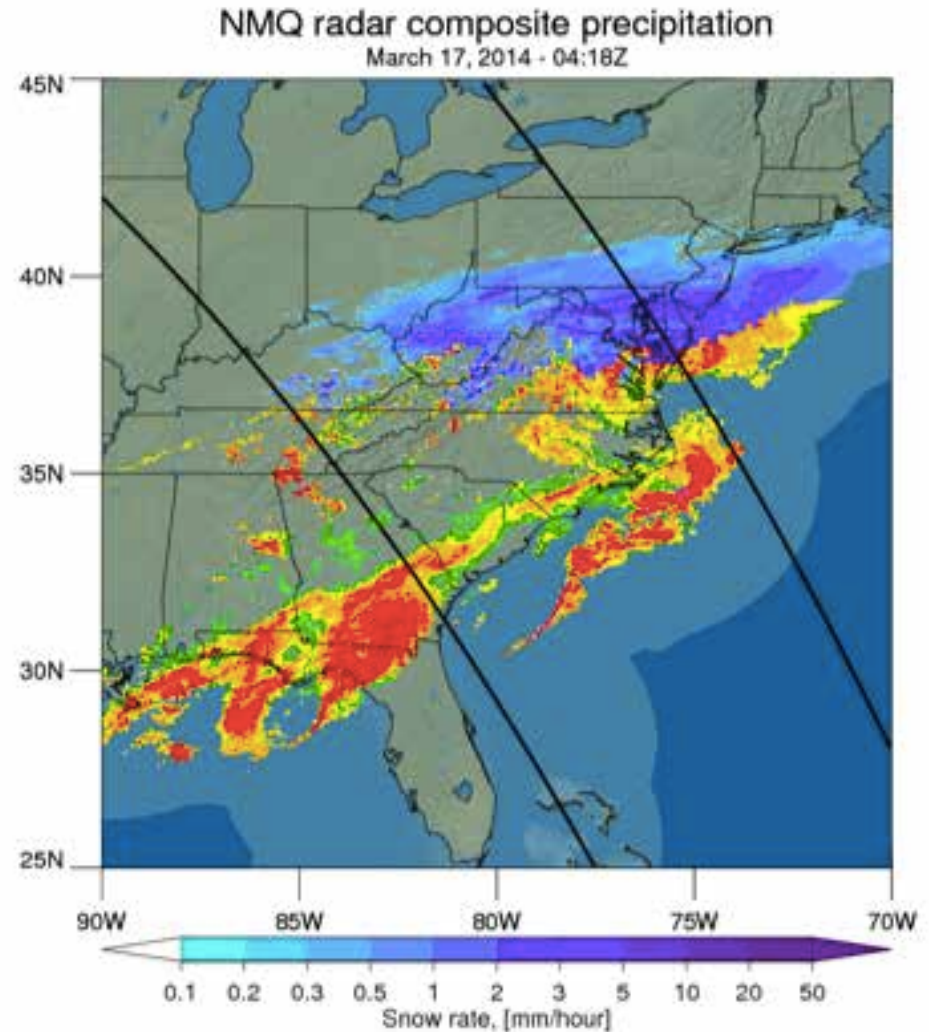
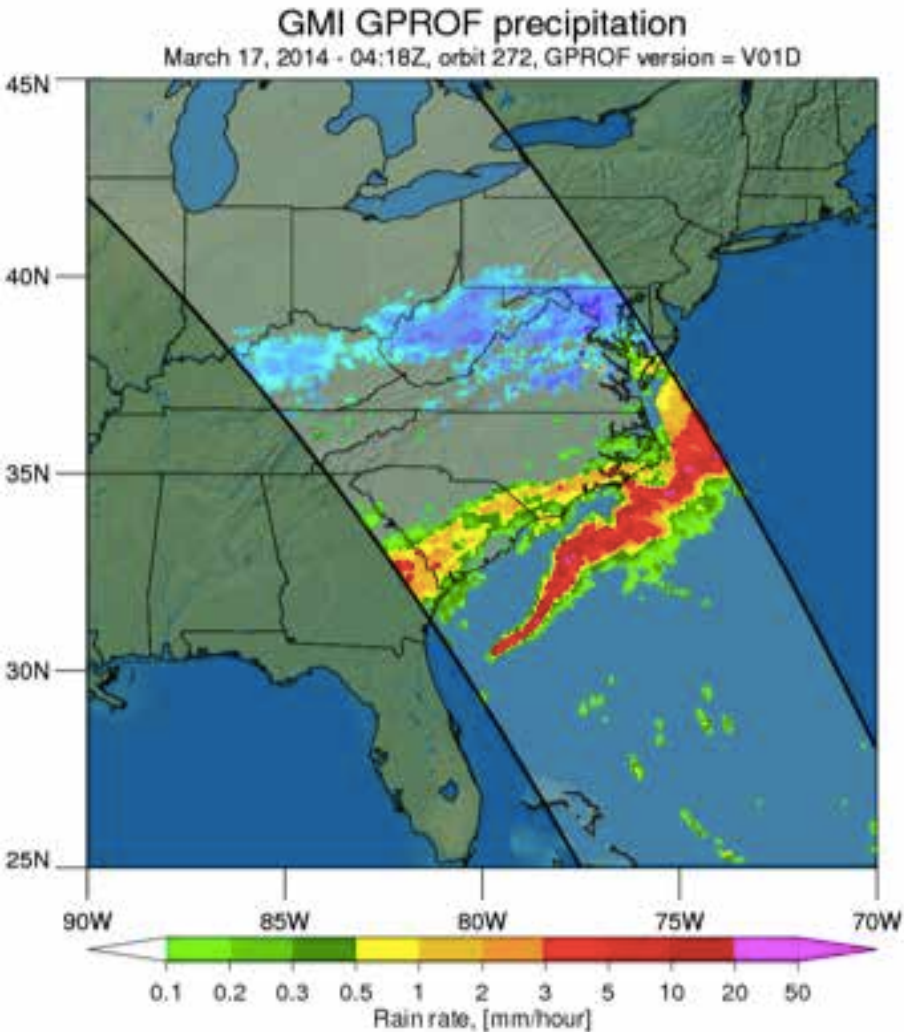
April 21, 2014 - 18:44Z



Snow over the United States



GPROF - GMI V01D (PPS)



Hurricane Arthur

GMI GPROF precipitation

Date = 140703 - orbit # 001957, GPROF version = V03A



TMI GPROF precipitation

Date = 140703 - orbit # 094729, GPROF version = V02A



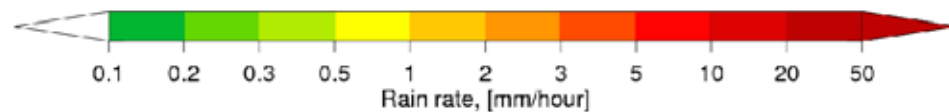
AMS2 GPROF precipitation

Date = 140703 - orbit # 011311, GPROF version = V02A

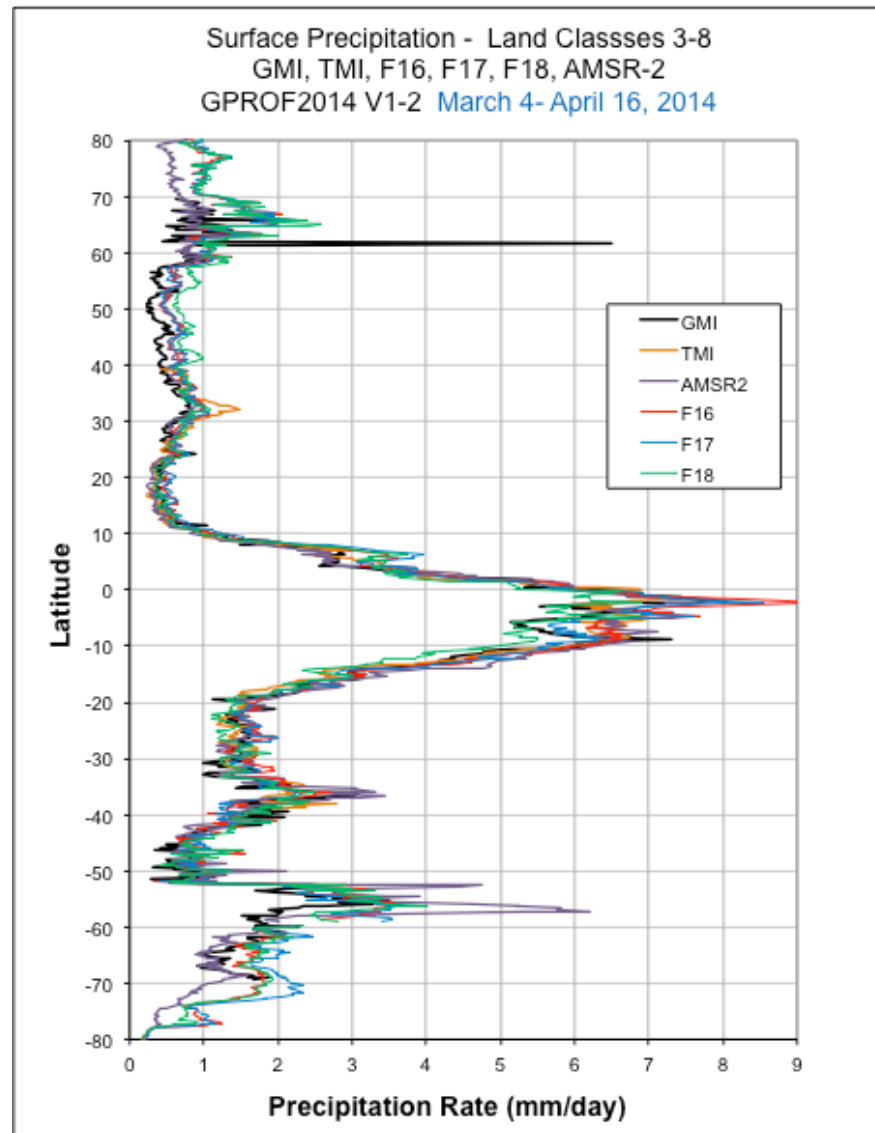


F16 GPROF precipitation

Date = 140703 - orbit # 055242, GPROF version = V02A



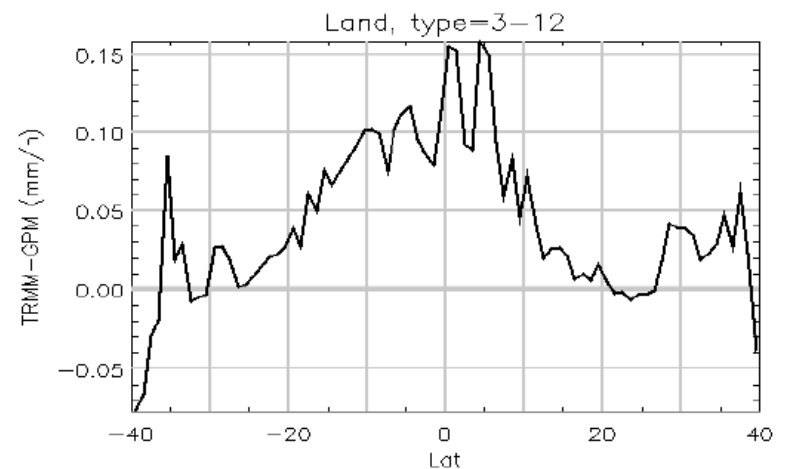
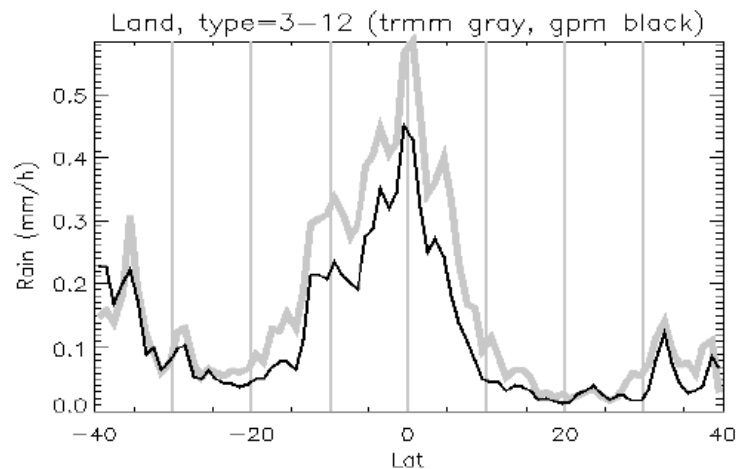
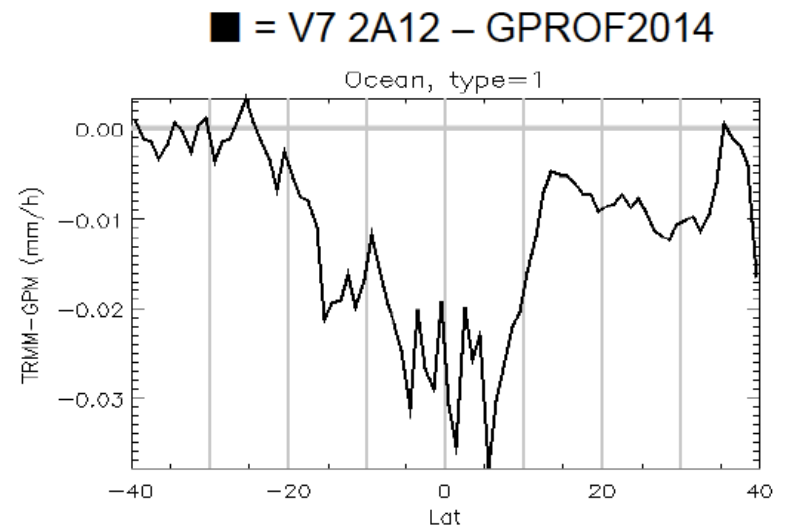
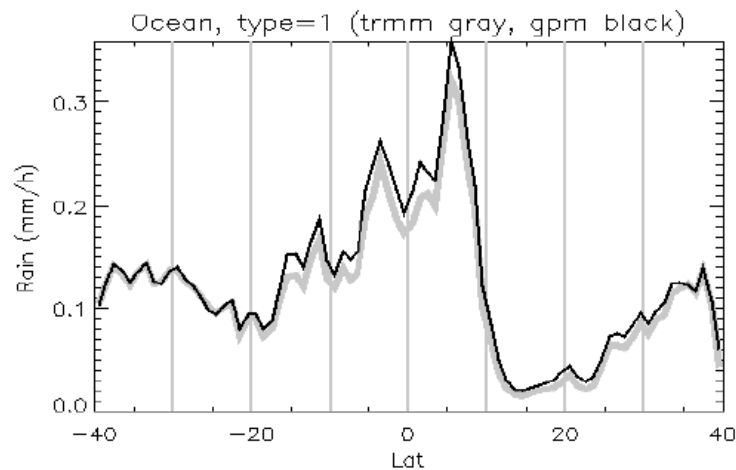
Zonal mean Precipitation – Vegetated land classes GMI calibrated to TMI



Changes between TRMMv7 and GPMv1

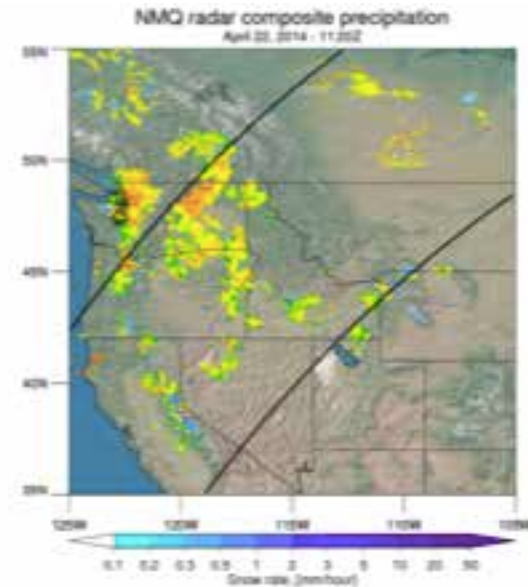
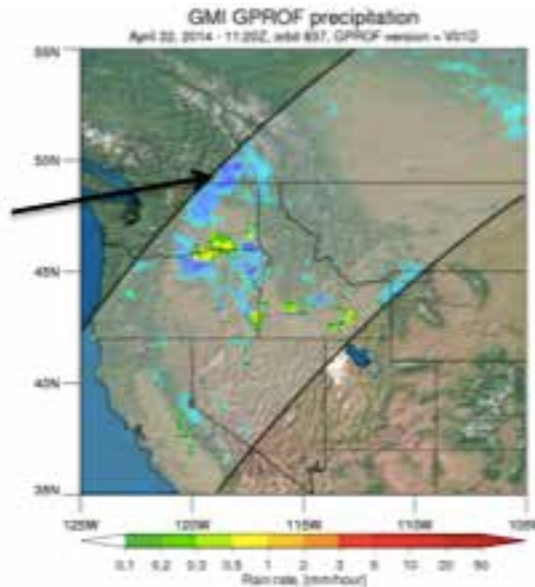
TMI Ocean / Land Zonals for 1-7 April 2014 V7 2A12 vs. GPROF2014

■ = GPROF2014 ■ = V7 2A12

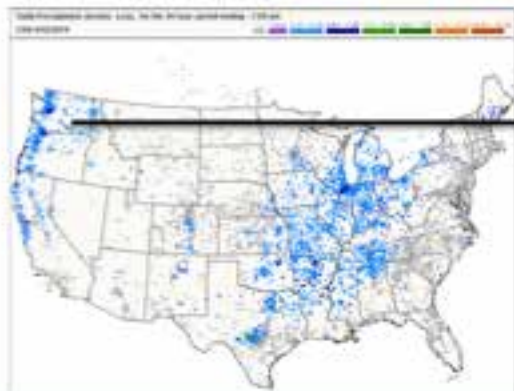


GPROF - GMI V01D (PPS)

Classifying
this precip
as snow



CoCoRaHS rain 04/22

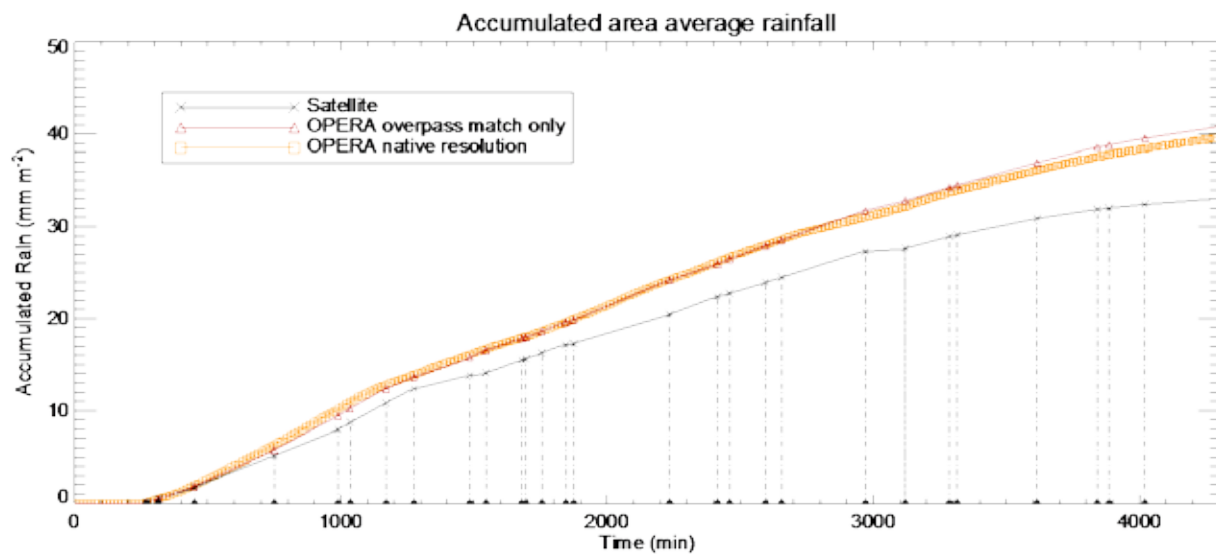
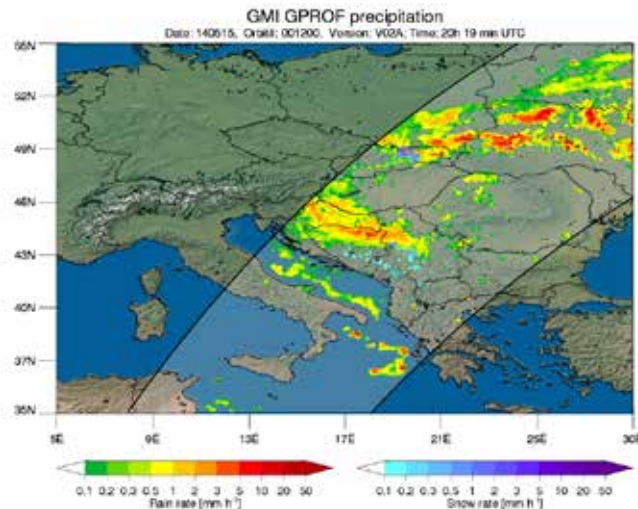
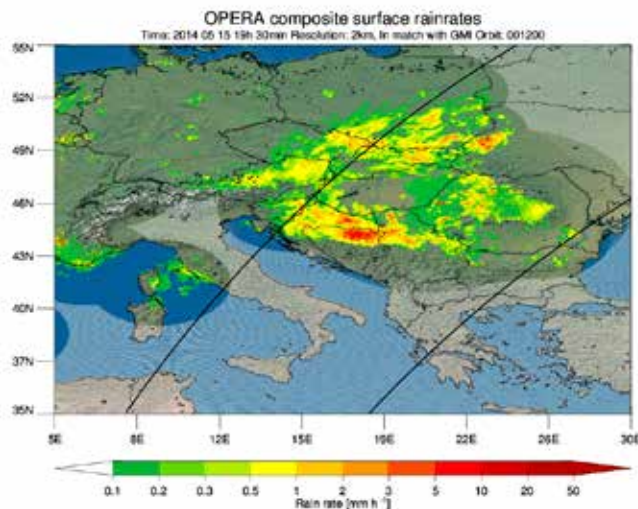


Light rain reports,
little/no snow.
Same on 04/23

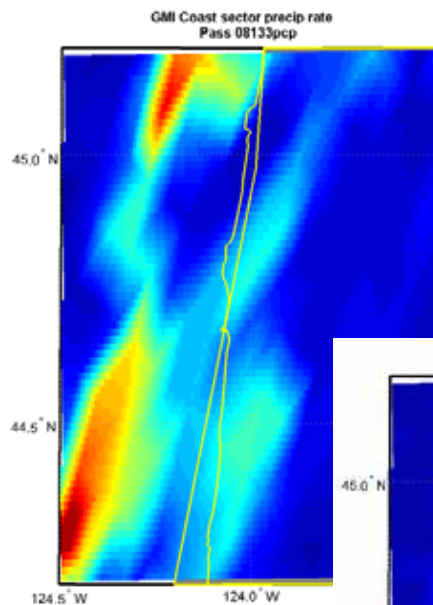
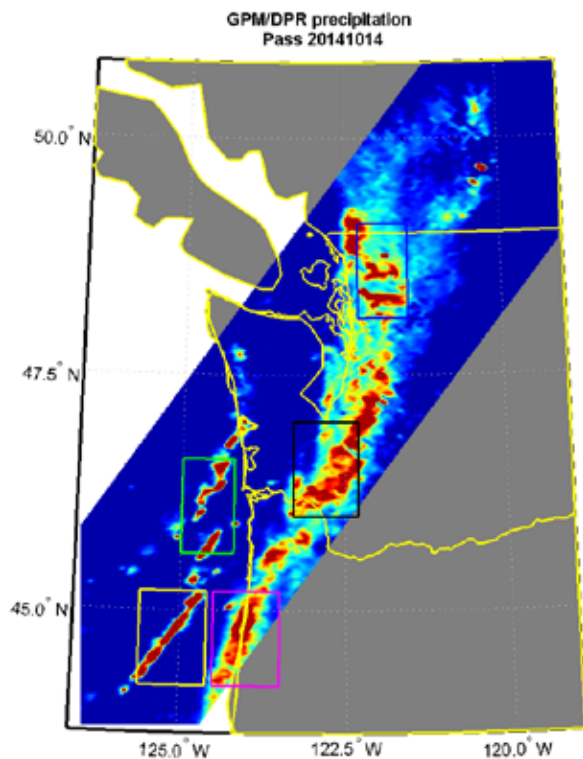
CoCoRaHS snow 04/22



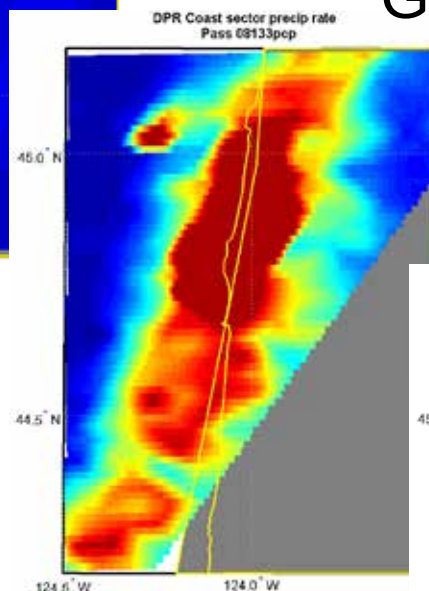
GPM GMI Rainfall Retrieval



Shallow Orographic Precipitation

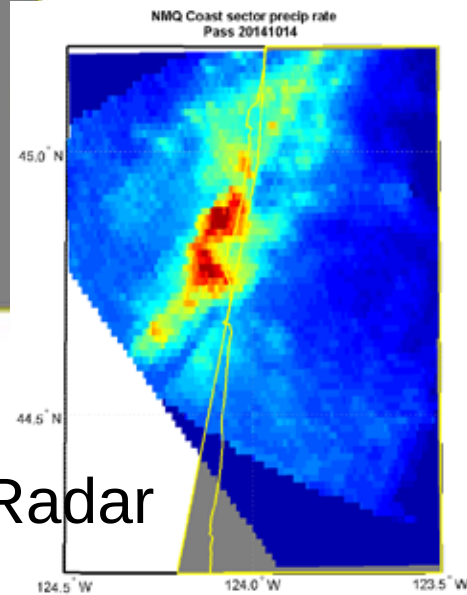


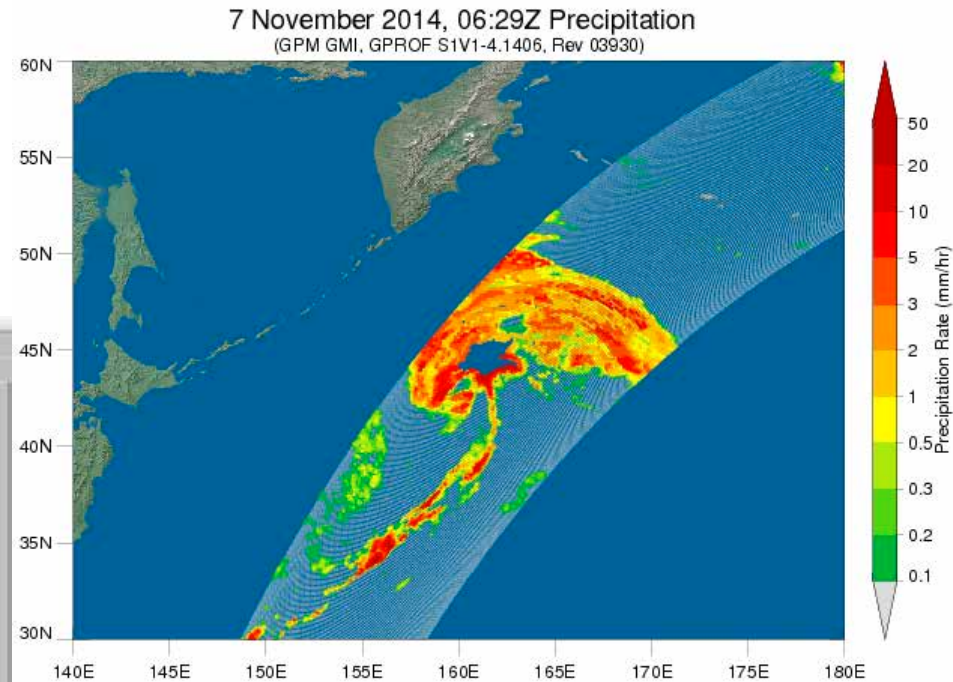
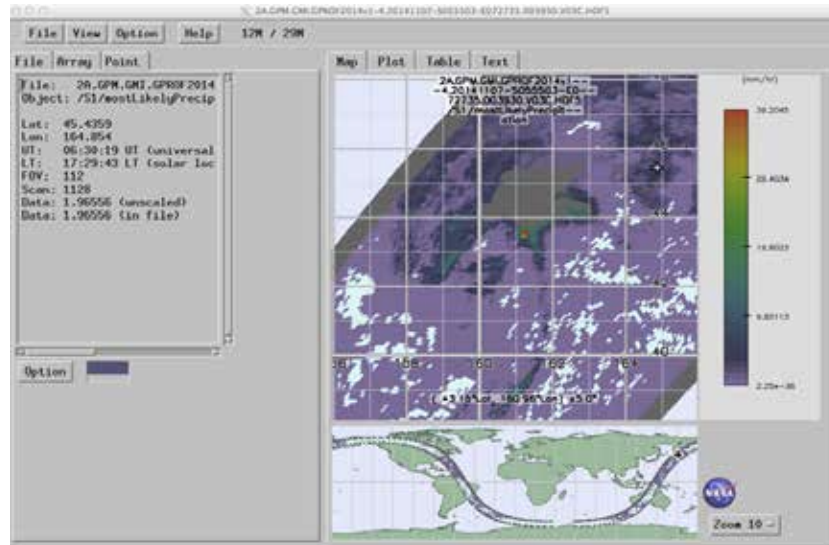
GPM Radiometer

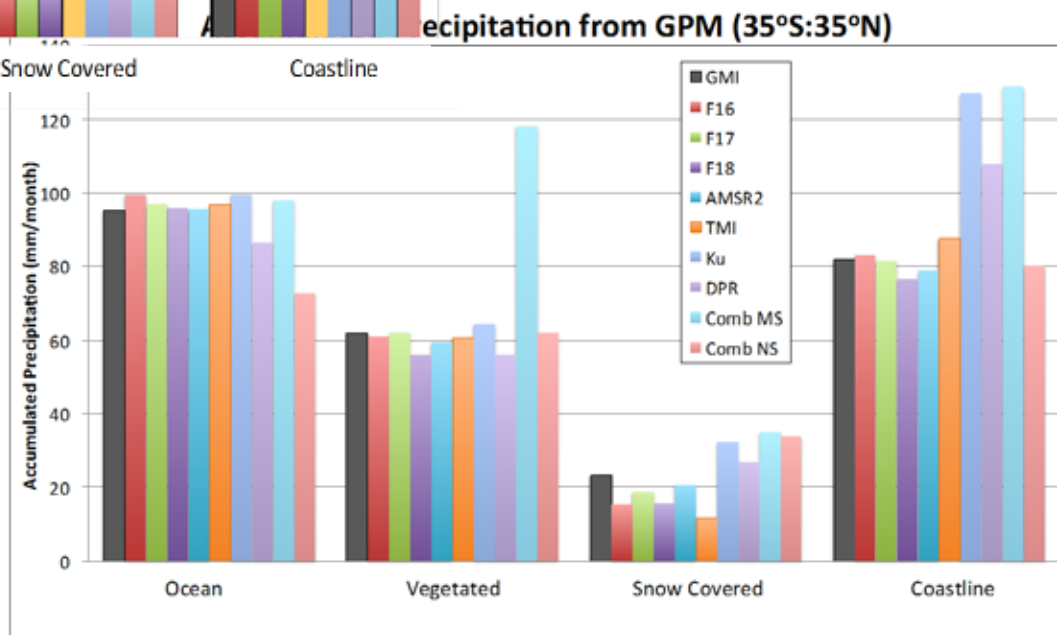
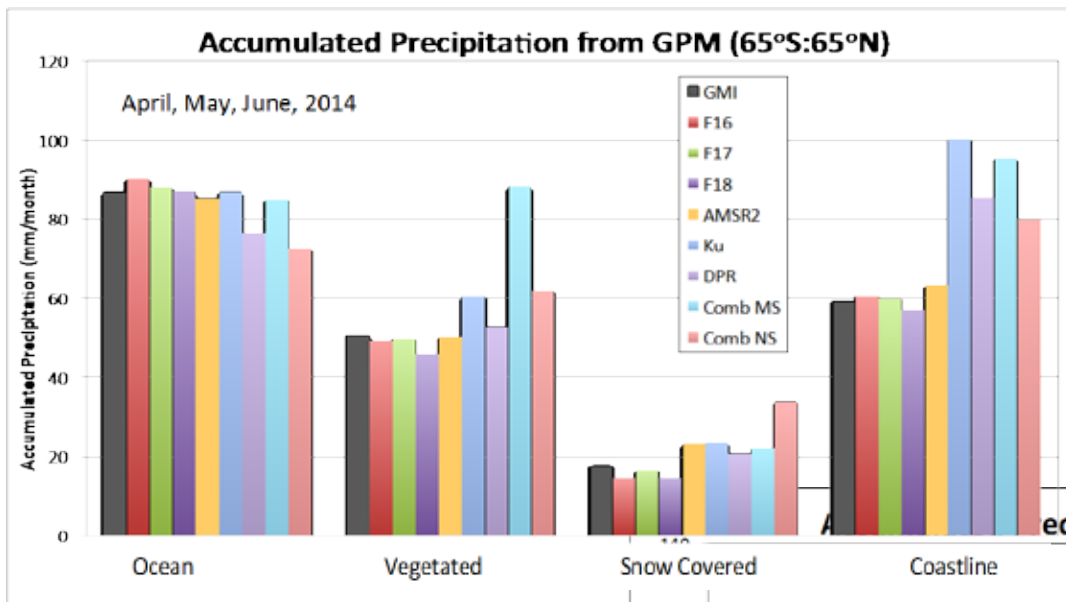


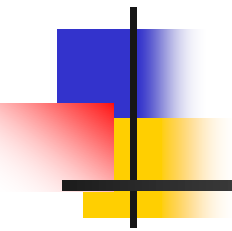
GPM DPR

Surface Radar









Summary of needed work

- ² Look at T_{sfc} inconsistencies between ECMWF and GANAL. 2m Temperature instead of Tsfc?.
- ² Focus on making GPROF less sensitive to errors in numerical weather product errors (i.e. search over larger 2m temp and TPW space)
- ² Create GMI database over all surfaces using Ku & DPR to assess algorithm's basic information content.
- ² Start developing software for GPROF 2014, V2.
- ² Focus more on product availability and uncertainty