Research Radiometer Database for GPM

What it is:
One-year collection of files of pixel-matched DPR profile and surface retrievals
”Light” version of what is used by GPROF

Format:
One file per month, collection of binary record structures
Ntotal records= 80834641 N > 1 mm/hr=1286847 (1.6%)

Contents:
Inner 12 pixels of DPR swath
(where it matches GMI)

Nrecords per surface class

sfc= 1 N=0
sfc= 2 N=0
sfc= 3 N=20513744
sfc= 4 N=10015459
sfc= 5 N=8034818
sfc= 6 N=4352753
sfc= 7 N=6256709
sfc= 8 N=3100966
sfc= 9 N=7410945
sfc=10 N=5738984
sfc=11 N=7183977
sfc=12 N=8226286
sfc=13 N=0
sfc=14 N=0

decreasing vegetation

decreasing snow

inland water

classes 1,2,13,14 not included

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Format (C-like shown, but pick your code flavor):

```
typedef struct {
  int nx,ny;
  float lat, lon;
  int scntime[6];
  int sfccode;
  float t2m, tcwv,skint,sfcprcp,cnvprcp;
  float rwc[28],cwc[28],cic[28],swc[28],gwc[28];
  float tbs[13], emiss[13];
} db_record;
```

DPR beam, scan indices

DPR latitude, longitude

year, month, day, hour, minute, second

surface class index

2-m temp, total vapor column, skin temp (from JMA model), surface precip, convective precip

28-layer profiles of rain, cloud, cloud ice, snow, graupel (but I think graupel and snow were switched…)

13-channel GMI TB and emissivity from TELSEM

anonymous ftp to:

rain.atmos.colostate.edu
cd pub/drandel/LSWG/
bin
get CSU_LSWG_prfdbase.tar.gz

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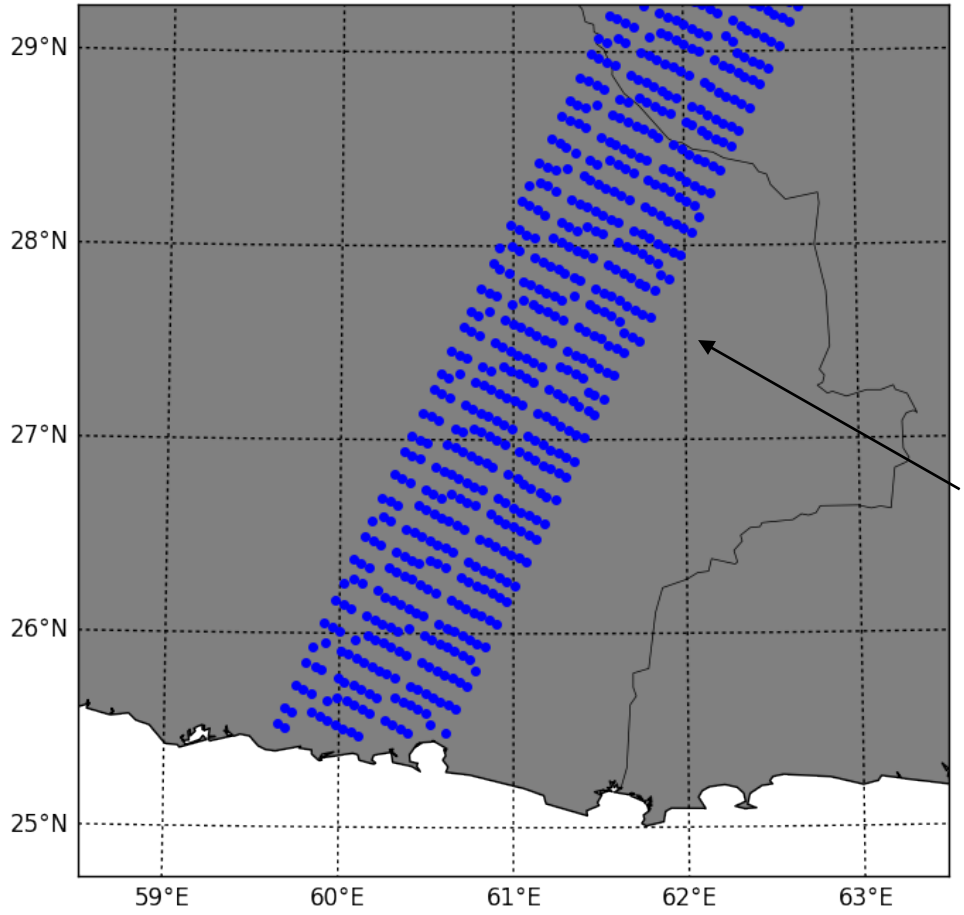

Locations of database points

Only DPR profiles are used that lie at the “center” of GMI pixels…not equally spaced throughout.

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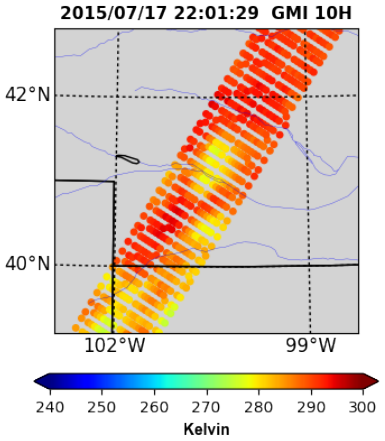
To test this out I put together a couple short C programs (anyone can have them) to:

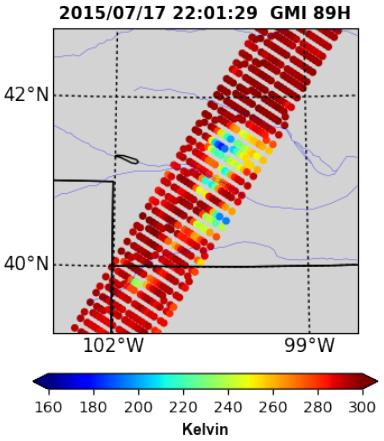
Bin the database by the conventional indices: TCWV, skin temp and surface class. That is, separates the 12 files into about 5000 files, each corresponding to a small interval of TCWV, skin temp and for each surface class.

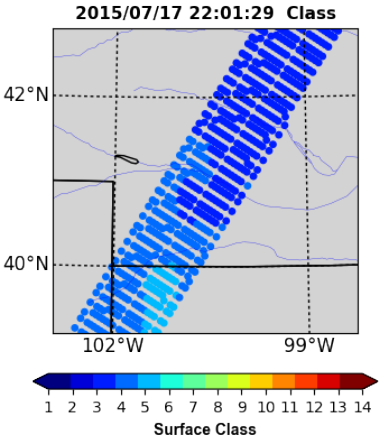
Perform synthetic retrievals: Read a particular overpass from one of the monthly files (exclude these from the database), carry out Bayesian-weighting retrieval similar to GPROF

Example overpass shown on next pages

Of course you will want to test your own ways of binning, weighting, use other variables, etc (this was done quickly for proof of concept …..and I claim no special merit for the results).

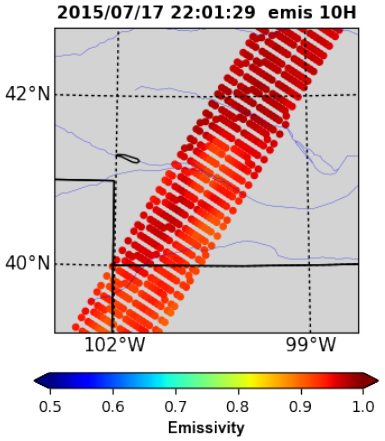


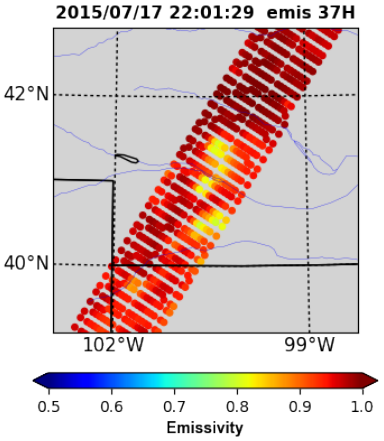


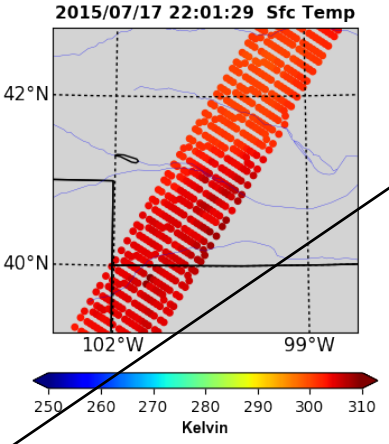


Example:

17 July 2015
2201 UTC
Kansas-Oklahoma

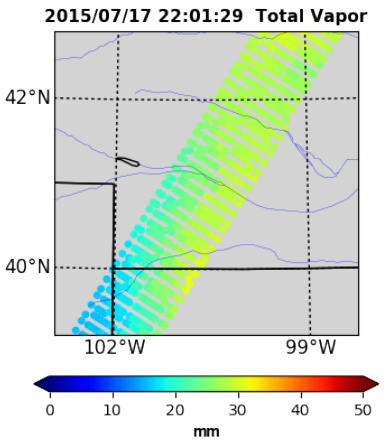


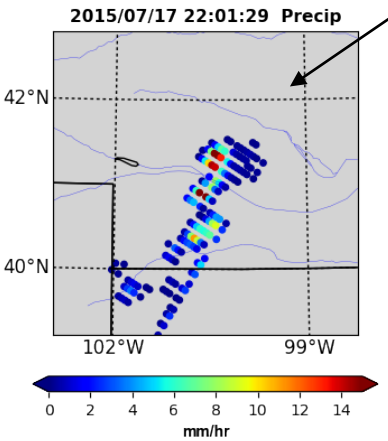


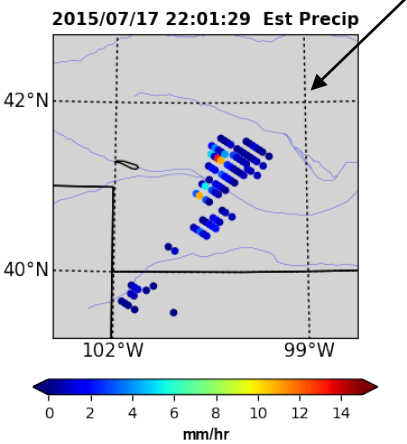


”Actual precip”

Estimated precip







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Example:

17 July 2015
2201 UTC
Kansas-Oklahoma

Pixel with the maximum surface rainrate (about 20 mm/hr)

”Actual” rain and graupel profiles (**thick line**)

Mean estimated rain and graupel profiles (thin line)