

Summary of Cold Season Validation Datasets for Radiometer Estimates

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Acknowledgements to Pierre Kirstetter (OU), Dave
Marks (WFF), Walt Peterson (MSFC)

Cold Season Validation

With nearly 5 yrs of GPM data, there have been a number of improvements to existing passive MW precipitation estimation methods that incorporate the surface in one way or another, utilize the HF channels on GMI, ATMS etc, other uses of sensors like CloudSat, etc.

A number of independent validation datasets have been prepared during this time that encompass enough cold season events to make meaningful statistics

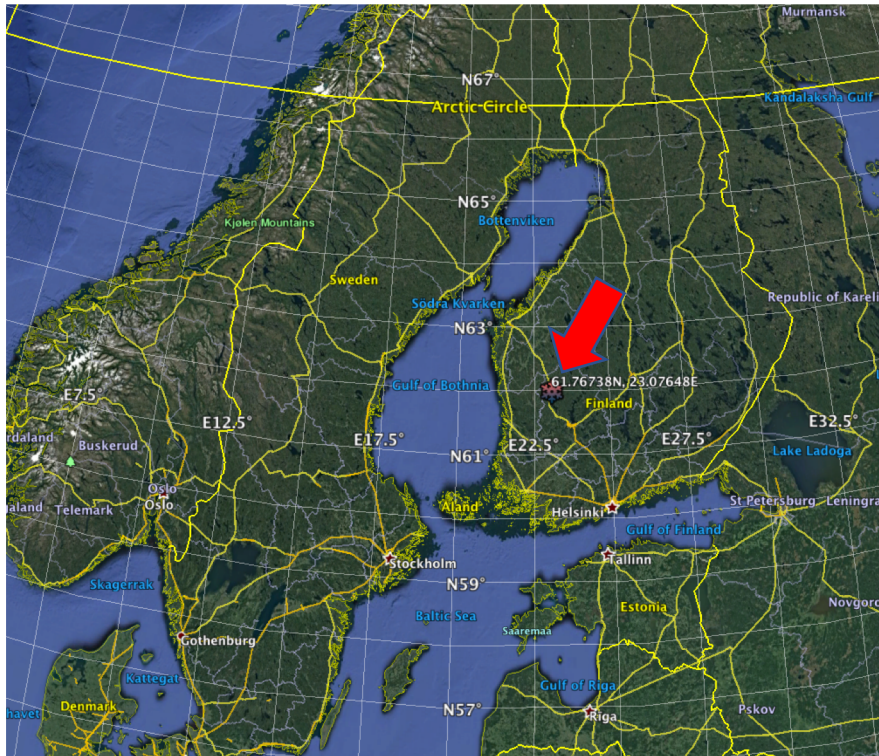
Use two GV reference sources (GMI-footprint matched reference estimates derived from MRMS, and FMI radar network).

Participants would be responsible for running their algorithm(s) for the orbit rev and sensor (PPS 1C XCAL radiometer) provided

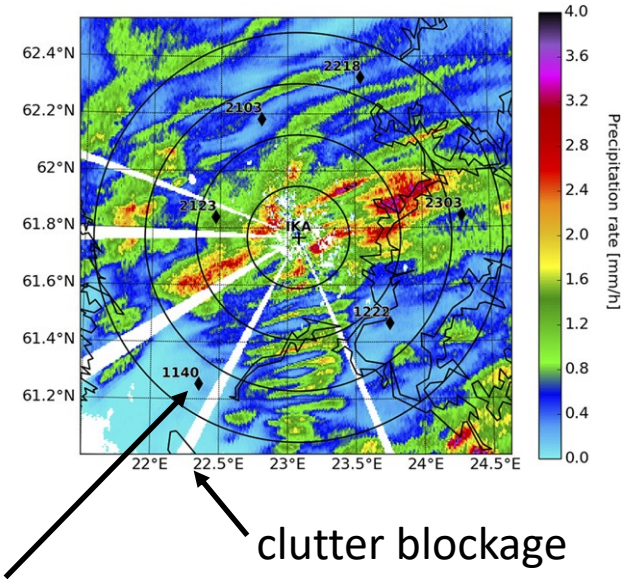
A common set of comparison metrics will be run against the GV data, to be decided (break up the analysis by 2-m air temperature, etc.), and the spread amongst the methods over averaging intervals

Reanalysis data used for environmental conditions, propose MERRA2 since we all have easy access to it (I can provide interpolated datasets if needed).

(1) Finland Ikaalinen (IKA) Weather Radar Data



C-band dual-pol operational radar



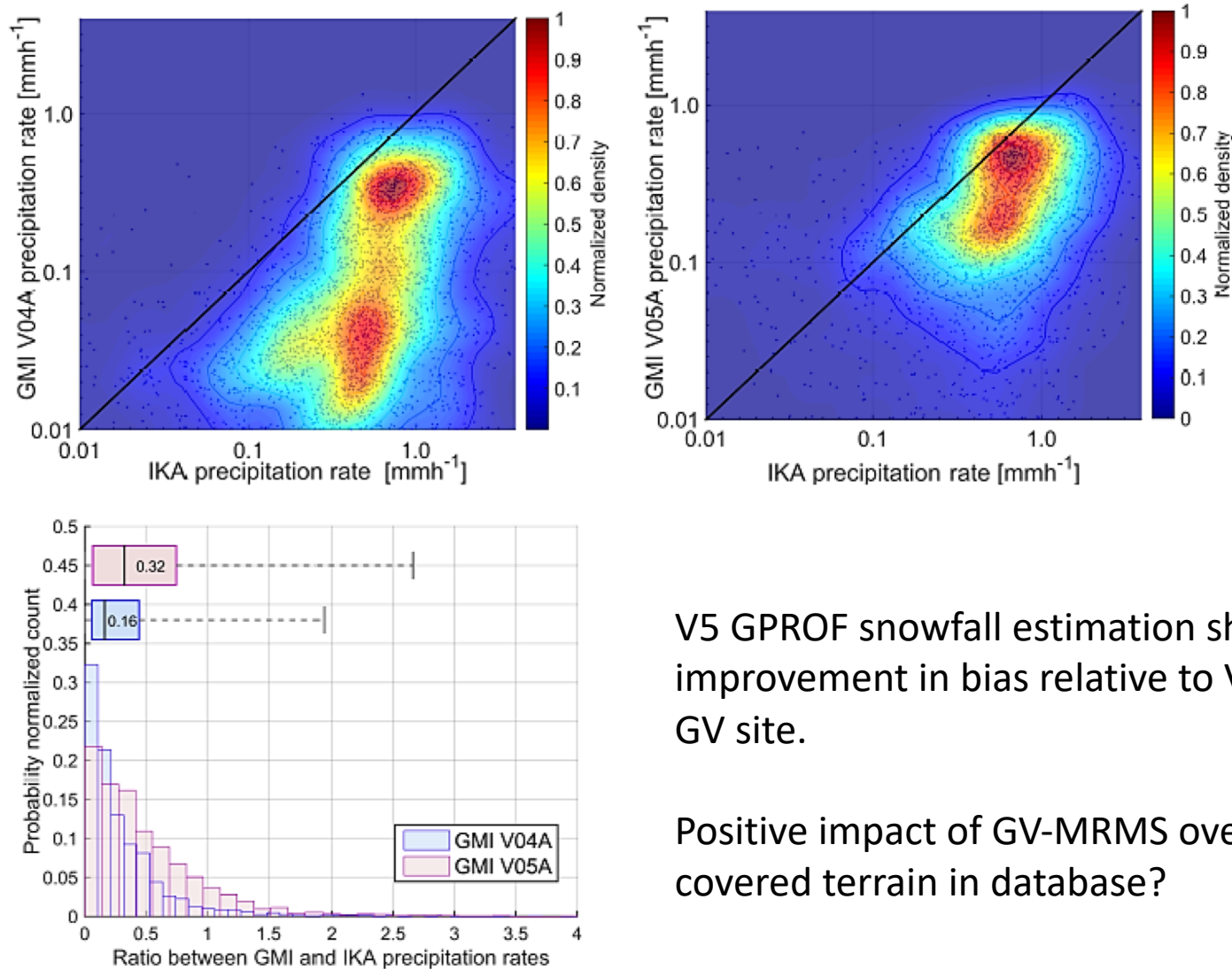
locations of AWS gauges

Very sensitive (0.01 mm/hr at 80-km)
5-min scan update to match with
satellite overpasses

Datasets already in netCDF, gridded constant-altitude levels (up to 5-km), centered at the radar location. Event-derived SR provided. (Courtesy Dave Marks, WFF).

375 volume scan datasets, during winter 2014-2105 and 2018

GMI-GV comparisons Hyytiälä Finland Research Site and IKA Radar 2014-15



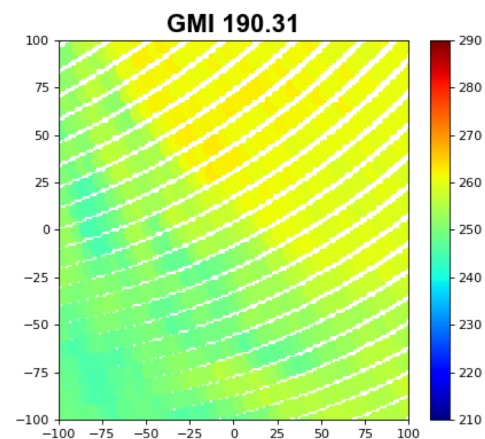
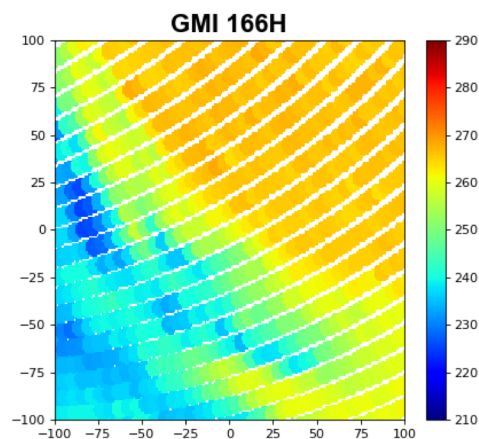
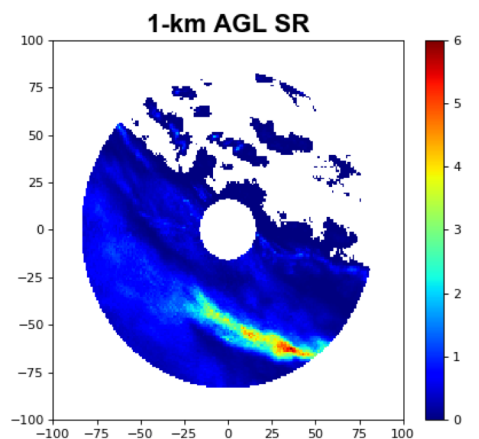
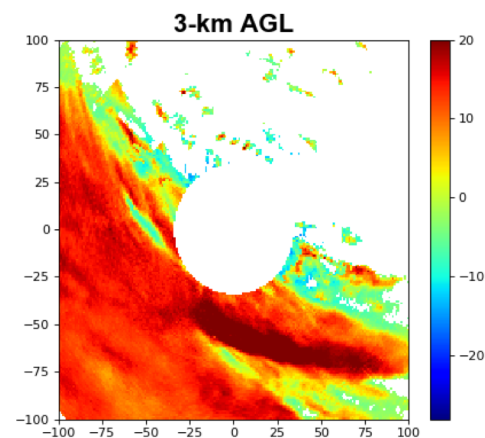
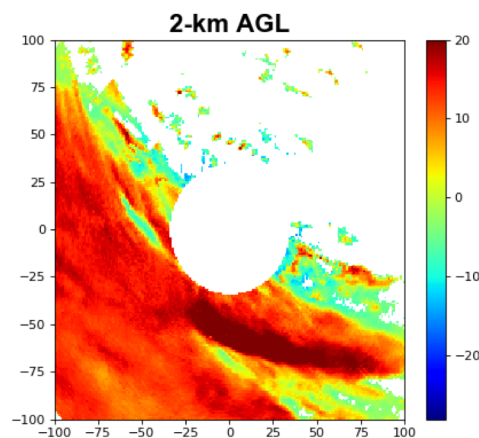
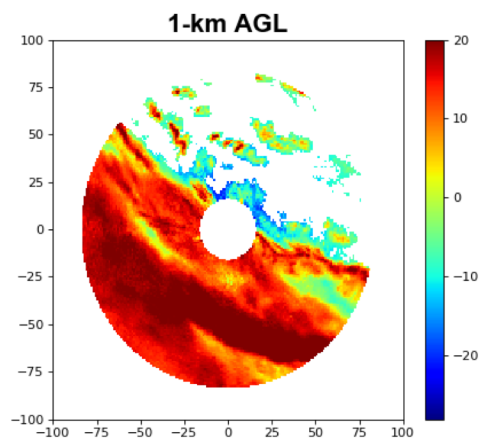
V5 GPROF snowfall estimation shows a marked improvement in bias relative to V4 over Finland GV site.

Positive impact of GV-MRMS over snow-covered terrain in database?

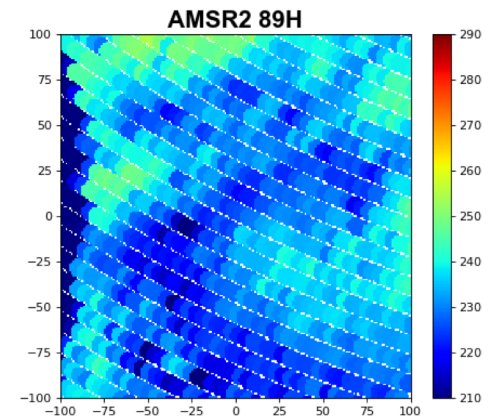
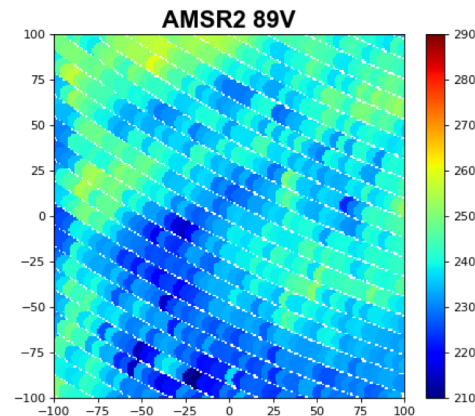
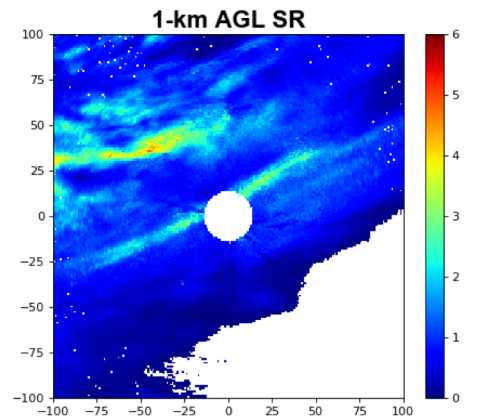
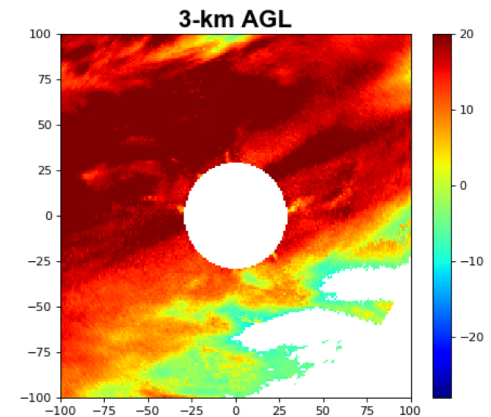
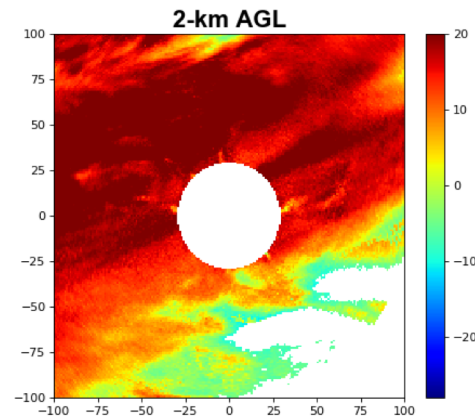
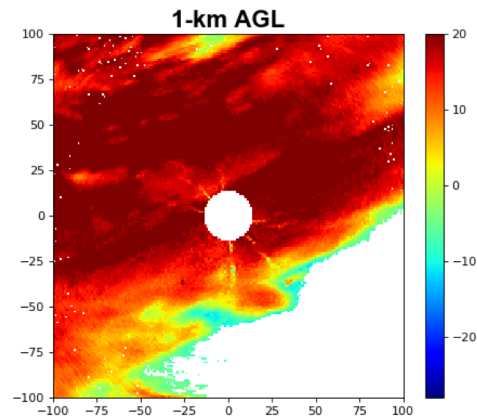
von Lerber, A., Moisseev, D., Marks, D.A., Petersen, W., Harri, A.-M., and Chandrasekar, V. (2017). Validation of GMI Snowfall Observations by Using a Combination of Weather Radar and Surface Measurements. *J. Appl. Meteor. Climatol.* 57, 797–820.

IKA DZ 2015/03/30 23:25:27 UTC
(nearest-to-overpass time)

GPM rev=6166

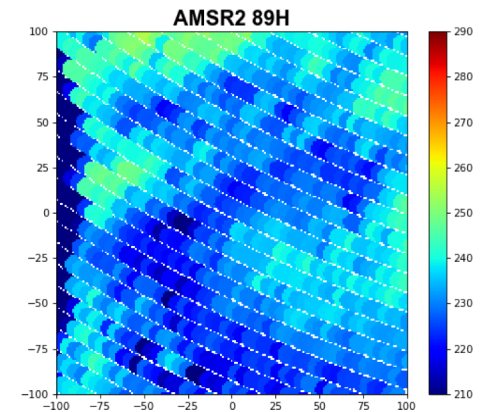
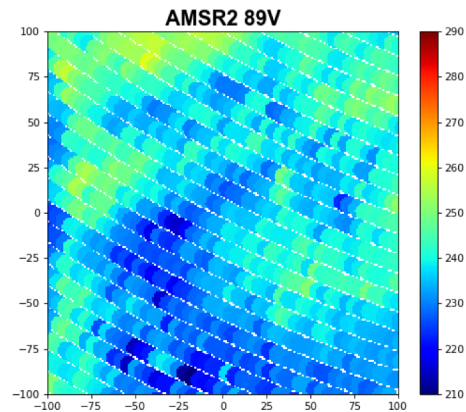
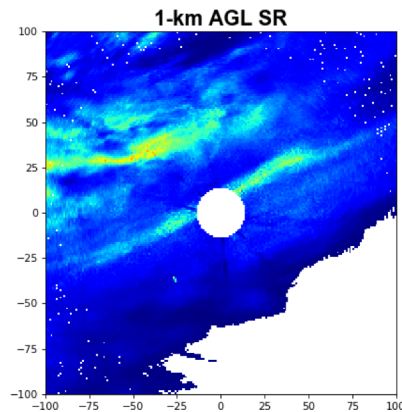
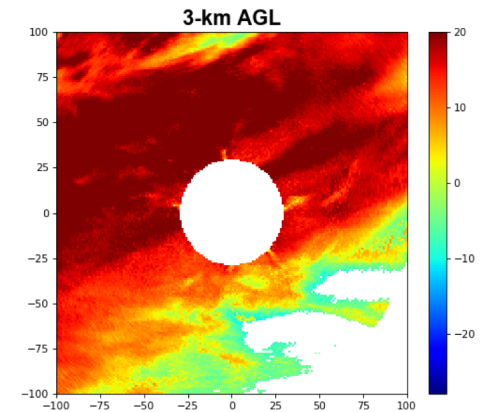
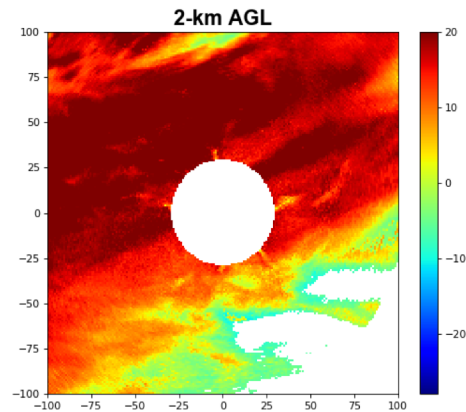
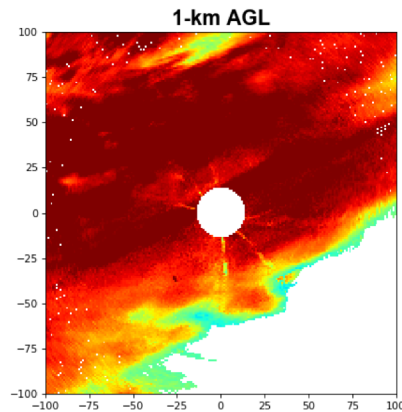


IKA DZ 2018/02/01 10:45:05 UTC GCOMW rev=30376
(5-min scan before nearest-to-overpass time)

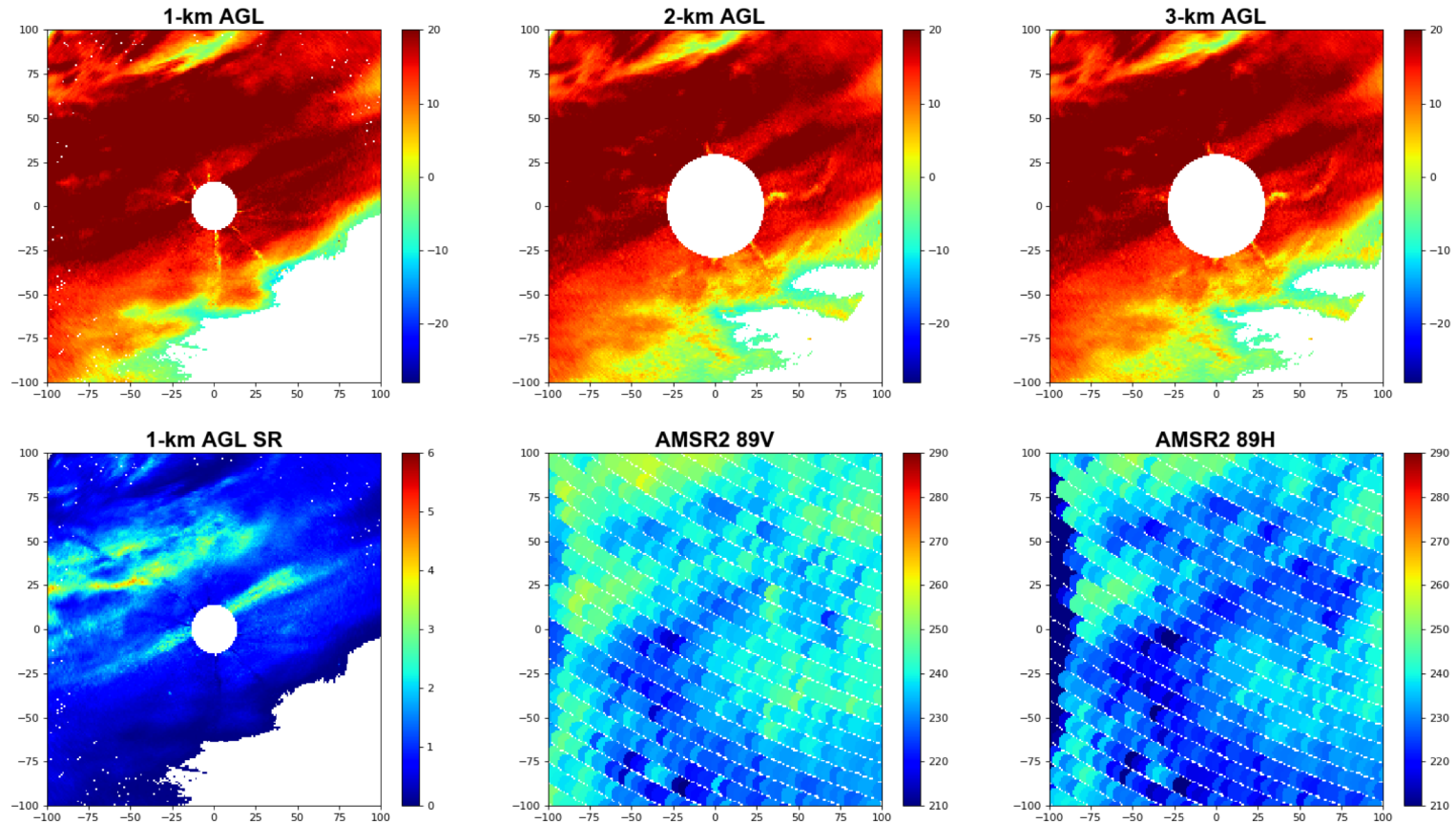


IKA DZ 2018/02/01 10:50:20 UTC
(nearest-to-overpass time)

GCOMW rev=30376



IKA DZ 2018/02/01 10:55:14 UTC GCOMW rev=30376
(5-min scan after nearest-to-overpass time)



(2) MRMS 05/01/2014 – 05/31/2015

Already (scan, pixel) matched to GMI (36 GHz?) for each GPM overpass within MRMS domain

Only QC-passed and non-zero precipitation rates provided

Files are in 2-min sections, as many as needed to cover MRMS domain

Simple ASCII format, 5400 files total

Again propose same reanalysis dataset for environmental conditions

Example for 2015/01/18 overpass:

GMI-5049-V04A.MRMS-20150118.042000.matched-130W_55W_20N_55N.extract.dat.gz

GMI-5049-V04A.MRMS-20150118.042200.matched-130W_55W_20N_55N.extract.dat.gz

GMI-5049-V04A.MRMS-20150118.042400.matched-130W_55W_20N_55N.extract.dat.gz