



Microwave Integrated Retrieval System (MiRS) Version 11.1

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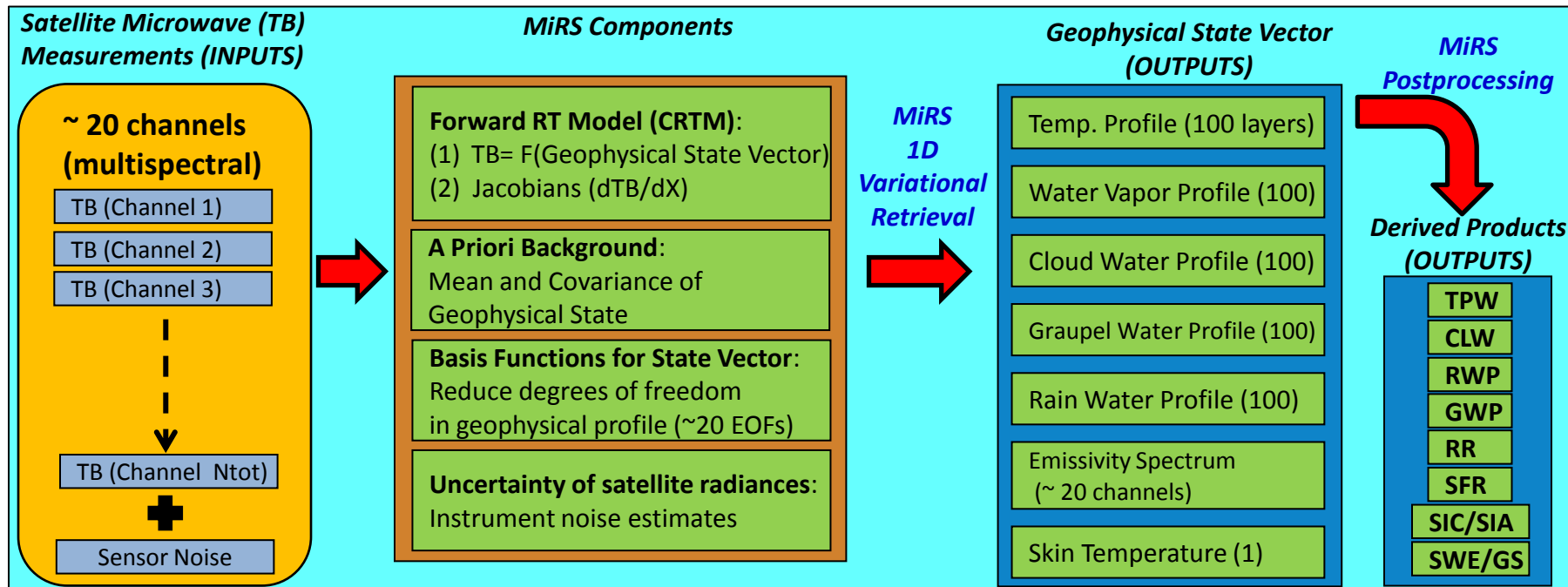
STAR JPSS Enterprise Algorithms Workshop
30-31 March 2016



Microwave Integrated Retrieval System - MiRS

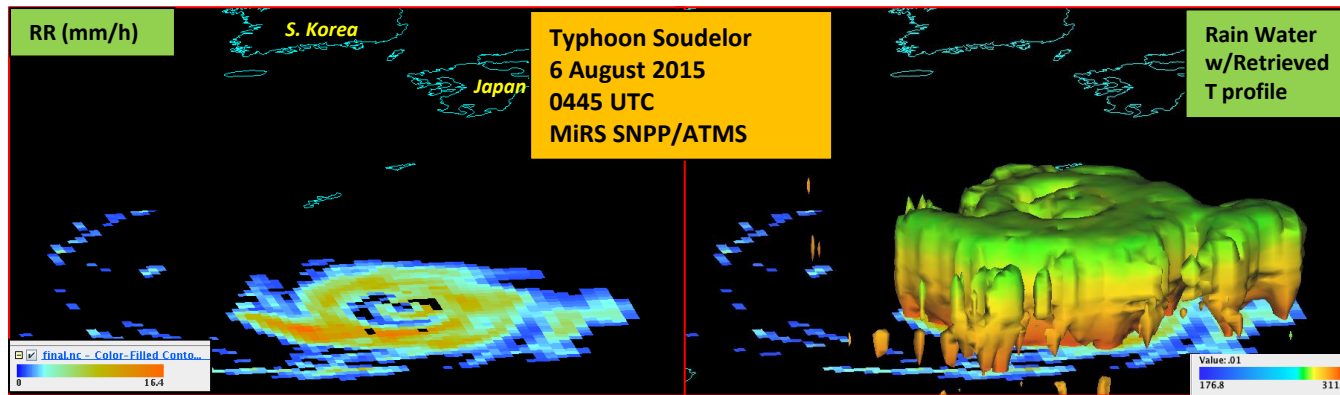


- MiRS Products Summary
 - Simultaneous 1DVAR retrieval of **T, WV, Hydrometeor profiles (ice, rain, cloud), T_{skin}, Sfc Emissivity, and derived RR, snow water, sea ice concentration and sea ice age, snowfall rate.**
 - Variational physical retrieval assures final EDRs are consistent to within uncertainty of measurements/fwd model and a priori climatologies.
- Team members
 - C. Grassotti, Shuyan Liu, Junye Chen, Quanhua Liu (TM)
- Users
 - Operational and research users (e.g. CSPP/Direct Broadcast, CPC-Precipitation, Blended TPW, **CIRA Hurricane Intensity Analyses/Forecasts**)

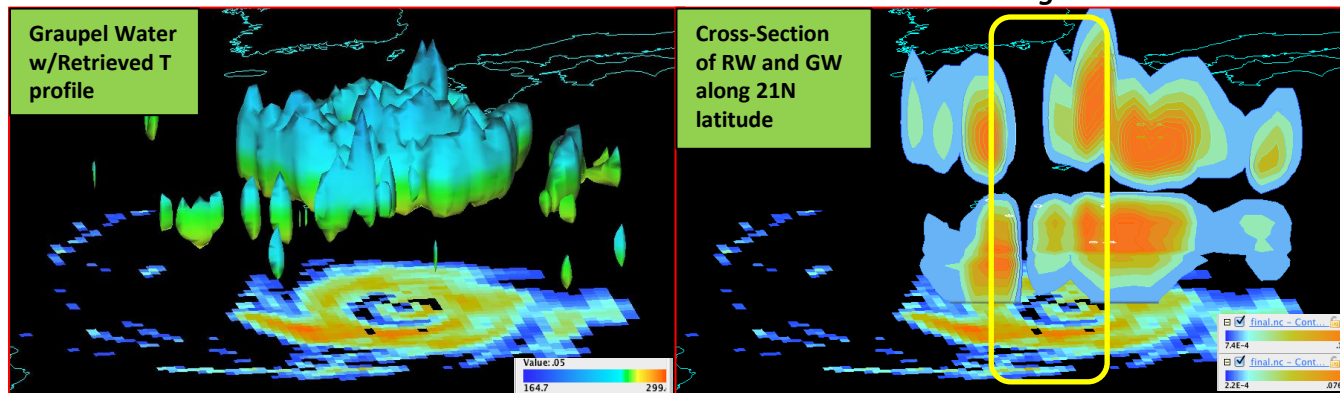


- At NDE: Currently running on SNPP/ATMS data, and will run on J1/ATMS in 2017.
- At OSPO: Running on N18, N19, MetopA, MetopB, F17, F18, Megha-Tropiques/SAPHIR (initial capability delivered in 2007).
- Currently being extended to GPM/GMI and F19
- Experimental versions for: TRMM/TMI, Aqua/AMSRE, GCOM-W1/AMSR2

- **MiRS simultaneous retrieval of temperature profile and hydrometeors allows depiction of storm structure**

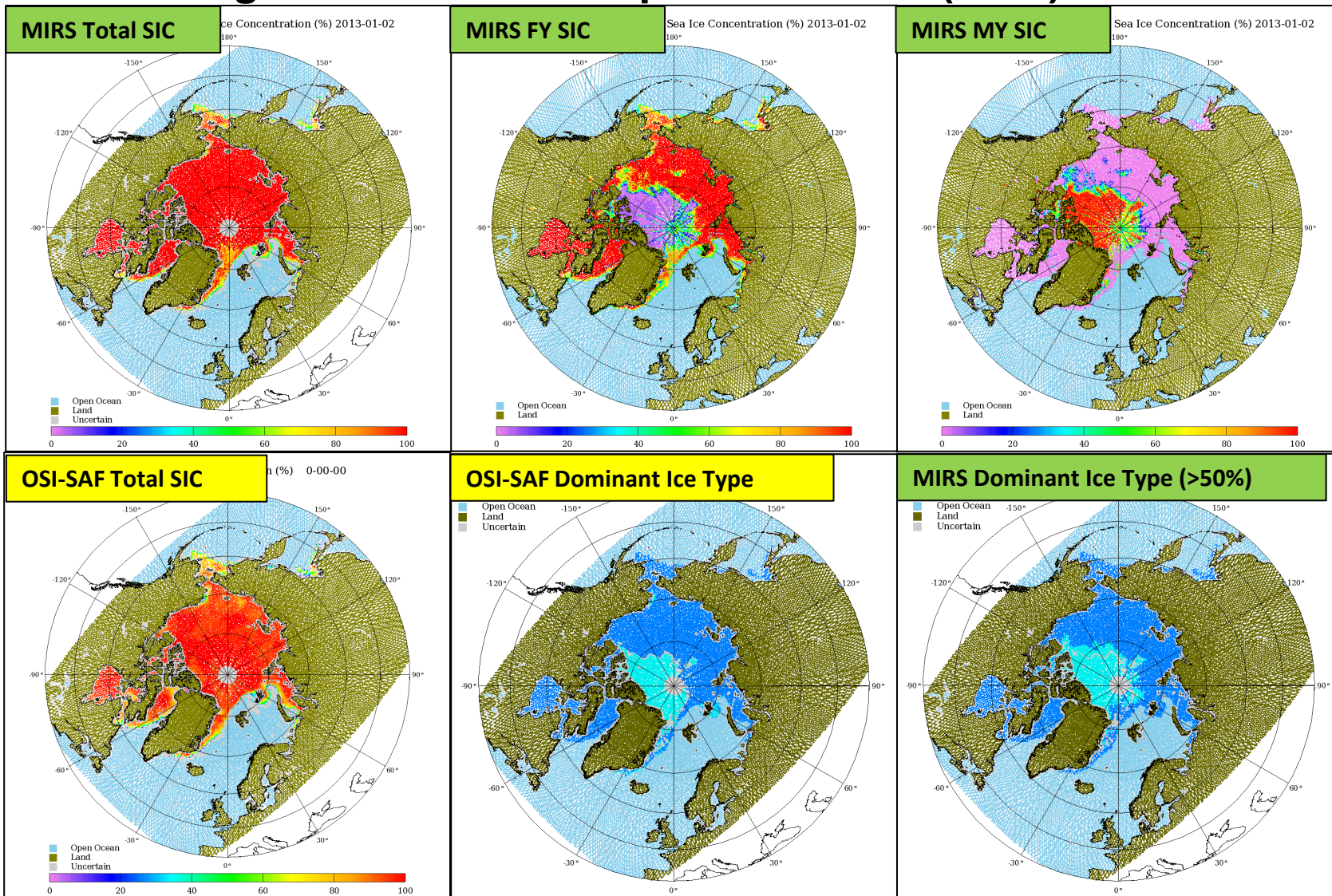


Isosurfaces: GW=0.05 mm, RW=0.01 mm



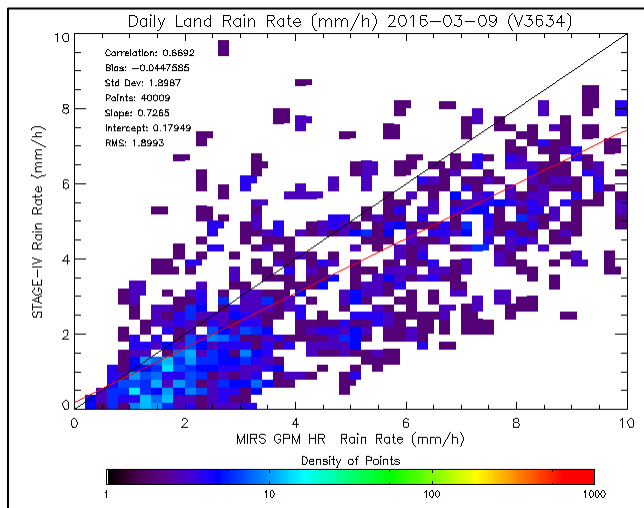
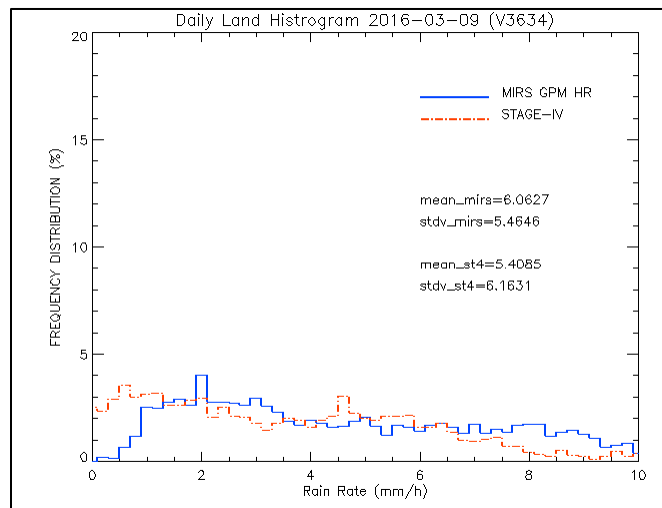
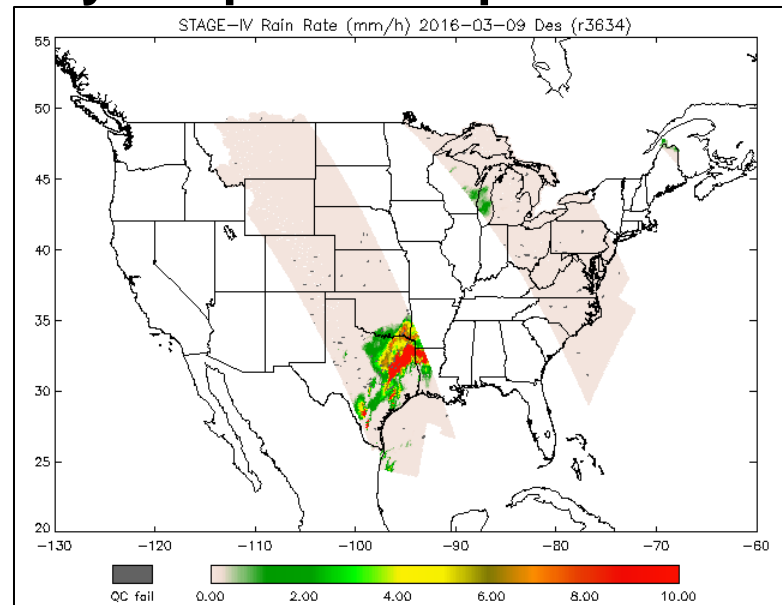
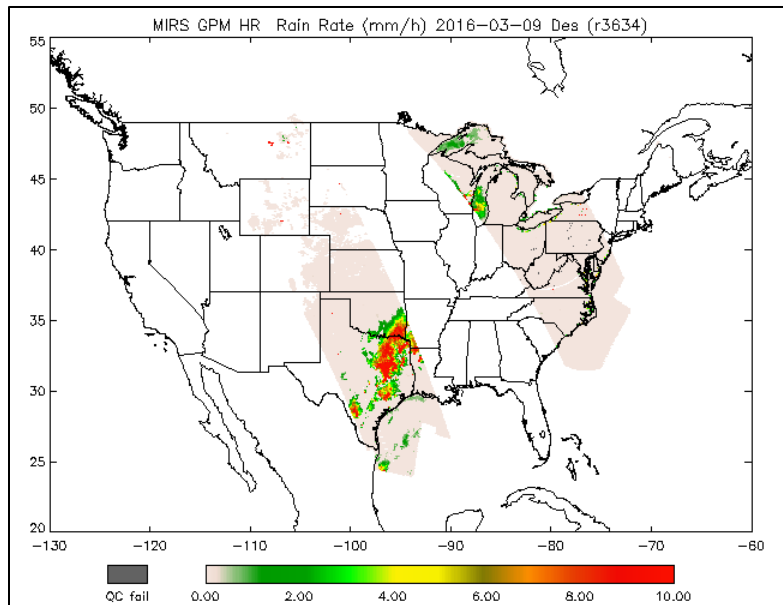
Sea Ice Concentration and Ice Age: MiRS Compared with European (OSI-SAF) analysis

● Sea Ice Age added as official product in v11 (2015)



MiRS GPM/GMI Rainfall Retrieval: Comparison with Ground-based Validation

● MiRS Extension to GPM/GMI. Delivery to operations planned in 2016.



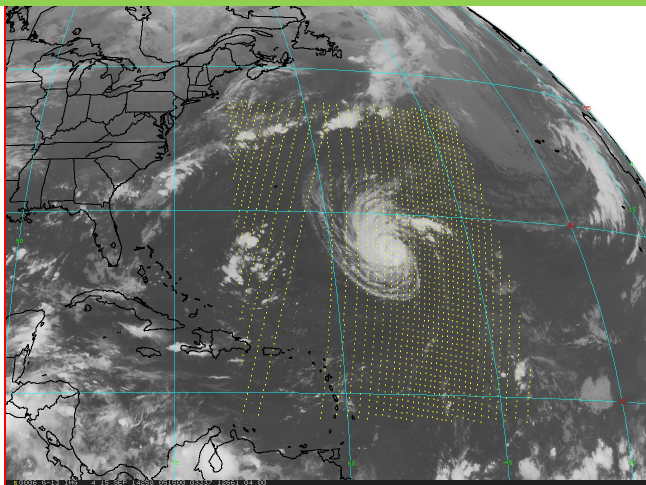


Outside User: U. Colorado/CIRA Hurricane Analyses/Forecasts

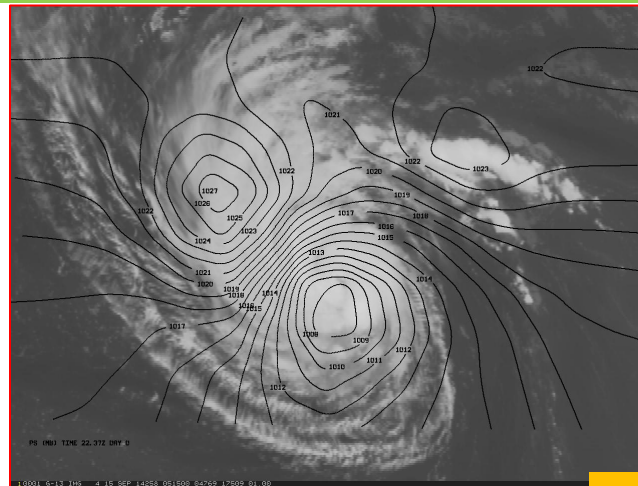


- Use of MiRS N19 AMSU/MHS Rainy T soundings to analyze TC MSLP.

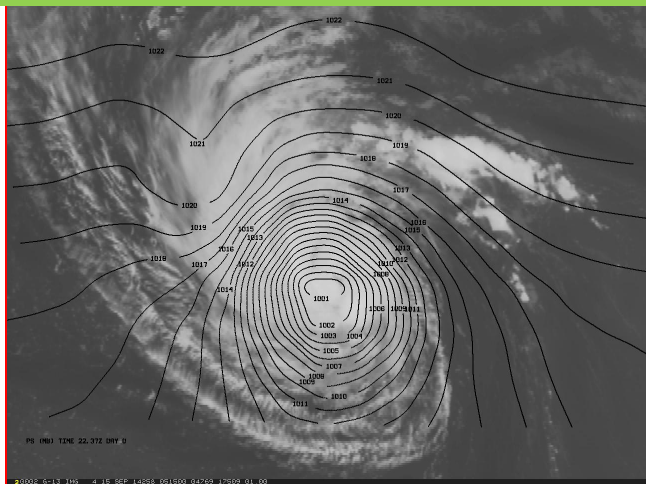
H. Edouard (15 Sept 2014): N19 FOVs



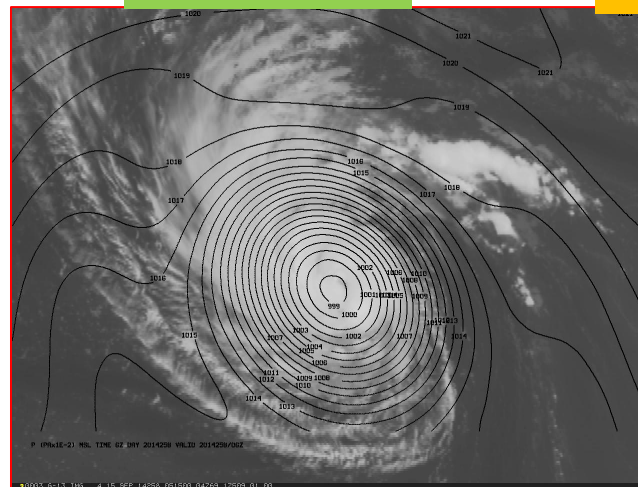
Original Rainy bias corrections (Generic Statistical)



Updated bias corrections (collocated dropsondes)



GFS Analysis



Courtesy of J. Dostalek/CIRA



MiRS: Lessons Learned



- To date: 2 versions of MiRS have been delivered to NDE (originally v9.2 in 2012, and v11.1 in Sept 2015)
 - Plus several intermediate patches (e.g. filename conventions, nc metadata, leap second, miscellaneous bug fixes).
 - D. Powell has helped make updates relatively painless!
 - No interdependence with other products/data sets simplifies integration and testing (but future releases will require GFS - needed for SFR algorithm).
 - Pre-launch availability of proxy data essential.



Path Forward



- (Un)Anticipated developments
 - Integration of OSPO Snowfall Rate Algorithm for SNPP and JPSS-1 ATMS
 - Investigating improvements to snow cover/snow water estimation in vegetated regions (leverage VIIRS forest fraction).
- Upcoming Deliveries/Reviews
 - June 2016: ARR for GPM/GMI and F19/SSMIS
 - Winter 2016/17 CDR for JPSS-1 extension (proxy data)
 - Spring 2017 (pre-launch): possible pre-delivery to NDE of MiRS with JPSS-1 extension (no cal/val done)
 - Summer/Fall 2017 (post-launch): official DAP delivery to NDE with preliminary cal/val (bias corrections, etc.)
- Risks
 - Any anticipated impact of J1 product changes from IDPS inputs? Not yet, but testing with proxy data will help with risk assessment.



Summary



- Outstanding issues
 - Future versions of MiRS will have the operational (OSPO) Snowfall Rate algorithm integrated. This algorithm requires GFS forecast fields. Coordination with NDE to ensure that GFS data are available, unpacked, and placed in the required locations.
- Enterprise algorithm: MiRS architecture/design makes it feasible to run on other MW sensors (e.g. FY-4 with GEO MW?) or in combination with collocated IR measurements (e.g. CrIS)