

# JPSS STAR Science Team Annual Meeting Cryosphere EDR Team Report

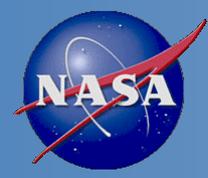


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May 16, 2014





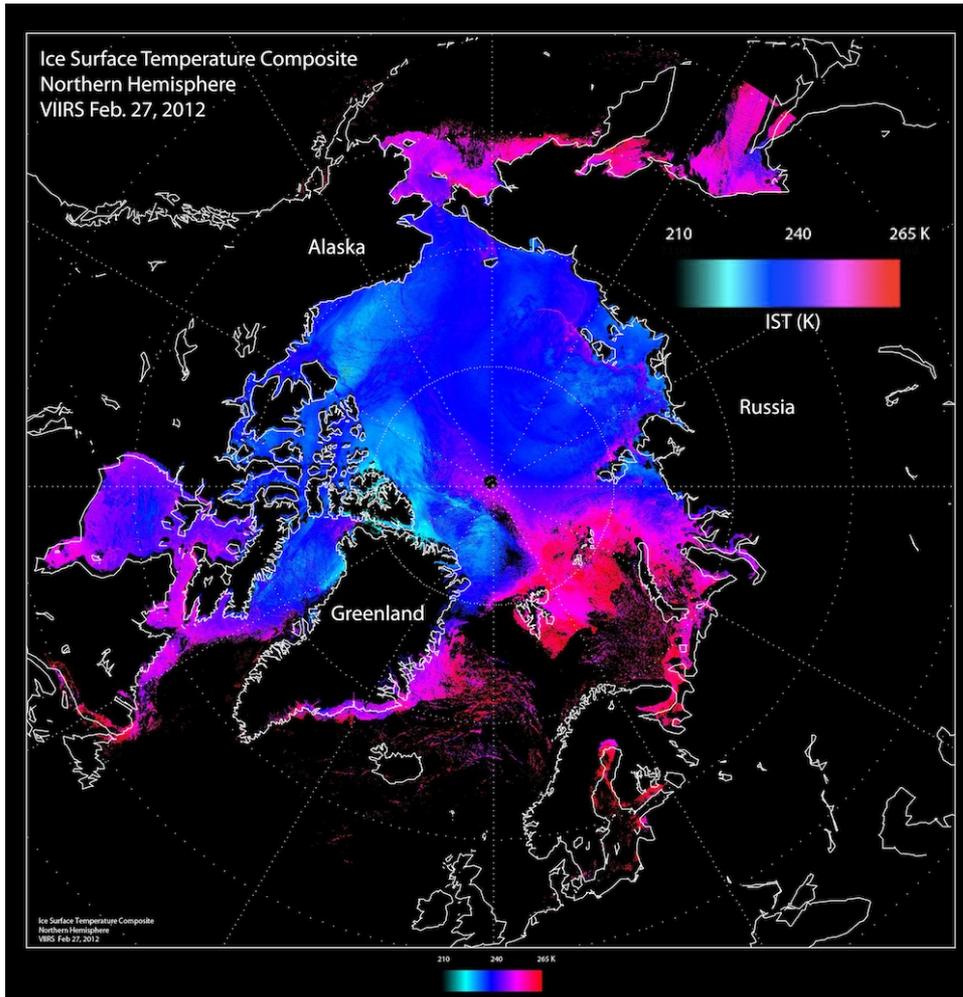
# Cryosphere Accomplishments for FY14



- Completed new, comprehensive **validation** studies for:
  - *Ice Surface Temperature* EDR
  - *Sea Ice Concentration* IP
  - *Sea Ice Characterization* EDR
  - *Snow Cover* EDR:
    - *Binary snow cover*
    - *Snow fraction*
- **Maturity** reviews: Provisional to Validated Stage 1, depending on the EDR
- **Code** and LUT changes
- CCRs: 10
- Improved **gridding** significantly.
- Implemented and began testing **new fractional snow cover algorithm**.



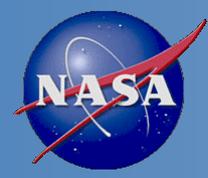
# Status: Ice Surface Temperature



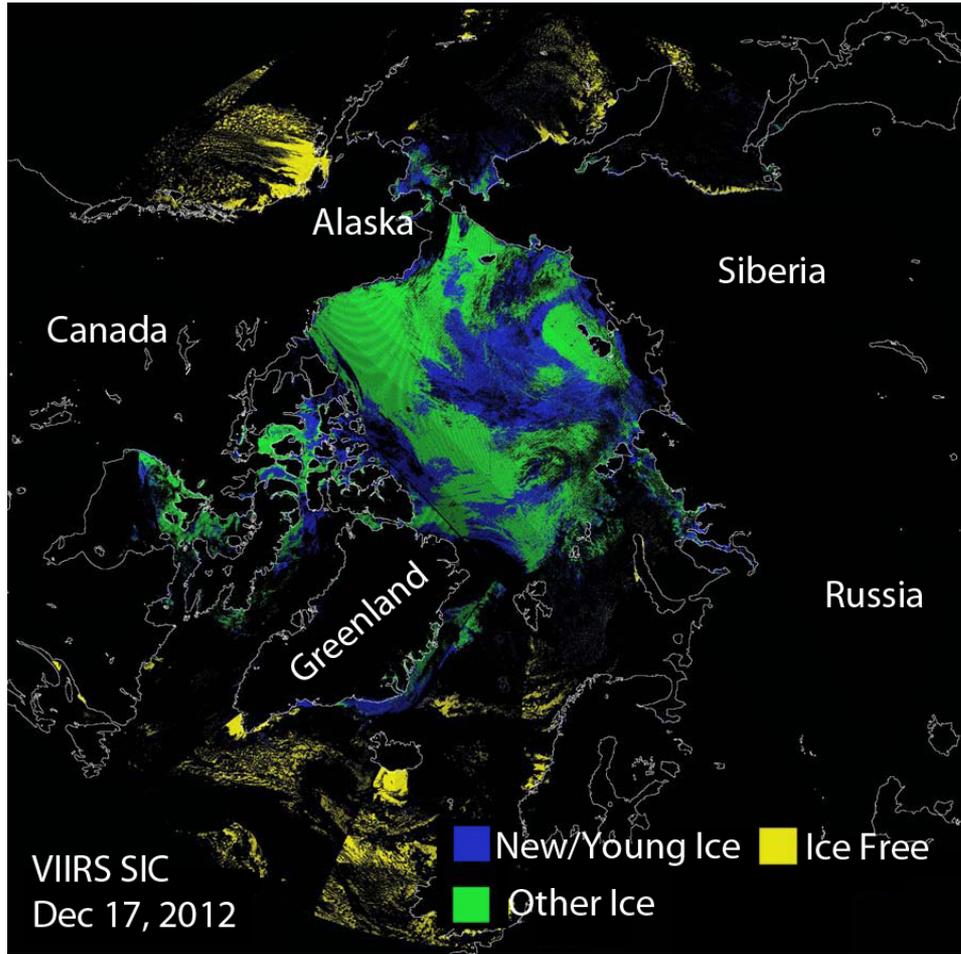
In most cases IST meets the 1.0K uncertainty requirement.

There is a cold bias compared to MODIS and IceBridge KT19, typically  $<1\text{K}$ , and a warm bias compared to NCEP.

Maturity: Validated Stage 1



# Status: Sea Ice Concentration and Characterization



**Concentration IP:** Performs well (there are no requirements for IPs).

**Characterization EDR:** There are times when performance is good, and other times (too many) when performance is not good. Overall, it does not appear to be meeting the accuracy requirements.

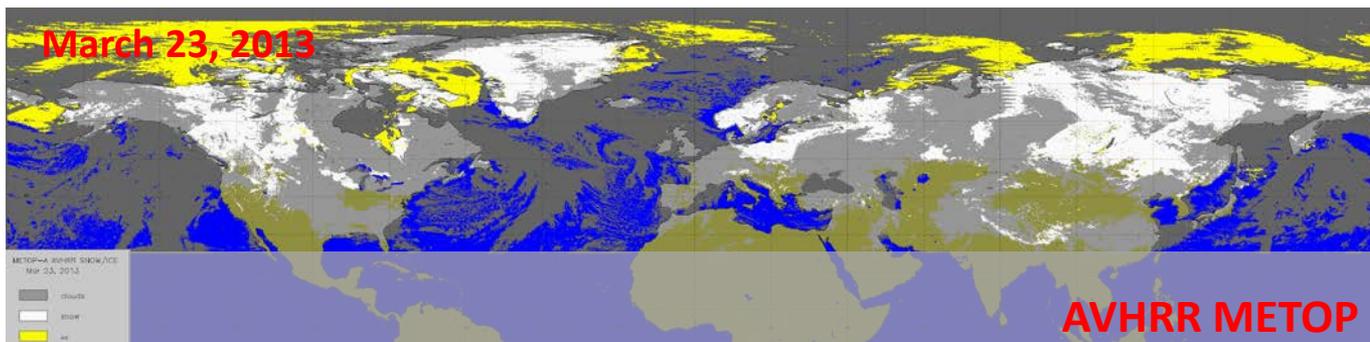
Solutions are elusive. Alternate algorithms are being investigated.

Maturity: Provisional

Binary snow cover meets the accuracy requirement. Remaining issues are related to cloud masking. Some potential exists to improve the algorithm. Maturity: Validated Stage 1



snow     land     cloud     No data





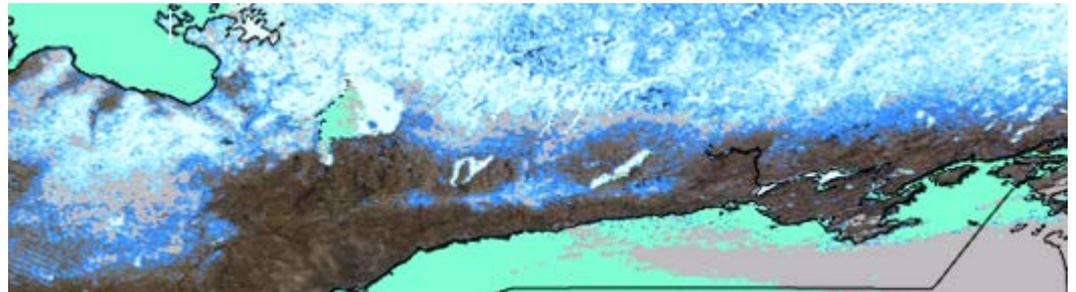
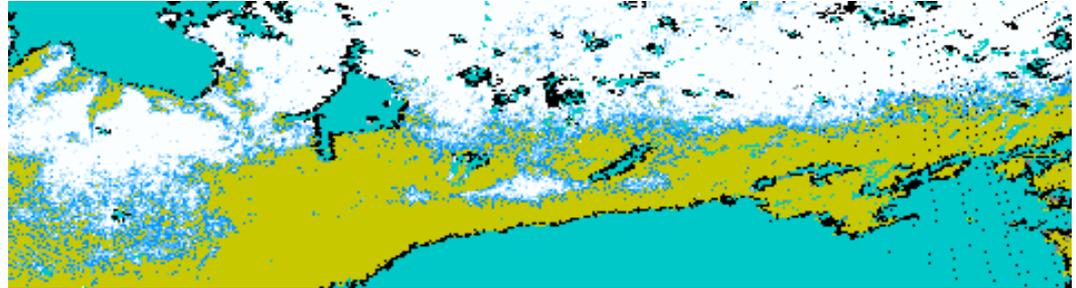
# Status: Fractional Snow Cover

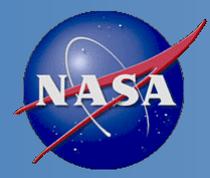


The current product is of little value. The 2x2 pixel aggregation scheme can only provide a small set of values and cannot meet the 10% accuracy requirement.

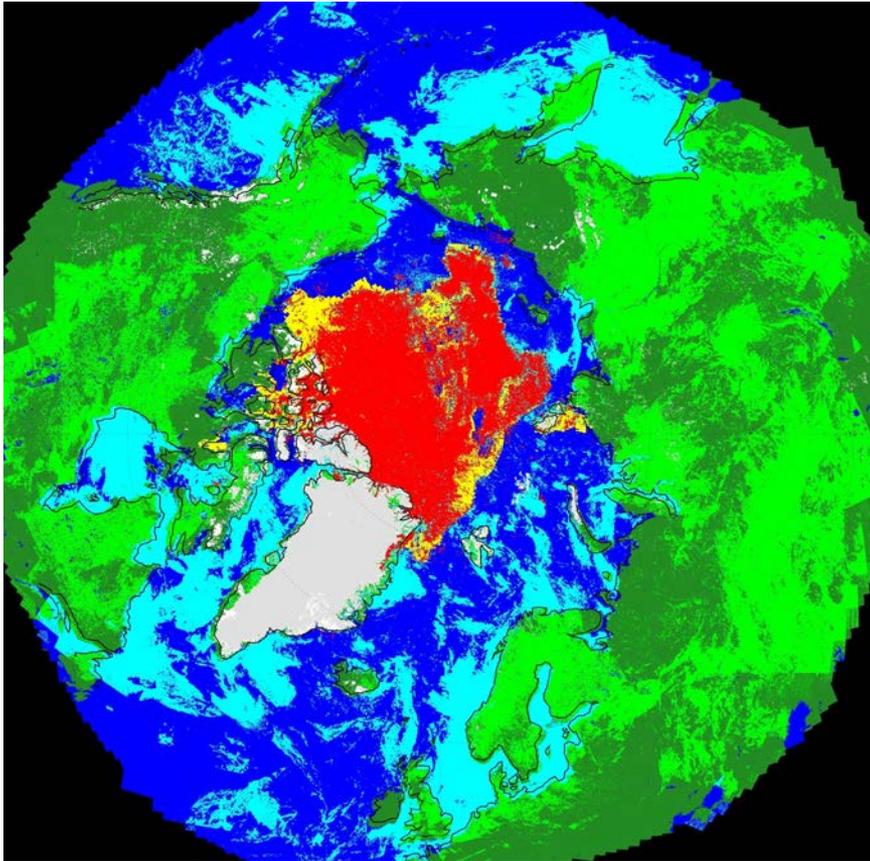
A number of different snow fraction algorithms are available and are being tested.

Maturity: Provisional





# VIIRS Snow/Ice Gridding



Improvements in the gridded Snow/Ice have occurred due to the addition of an ancillary snow/ice product (GMASI), VCM updates, and additional quality control criteria.

GMASI must be automatically updated on a daily basis before gridding is turned on. This may be sufficient for downstream processing.

Further reduction in Snow/Ice gridding errors will require significant effort.

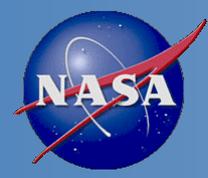




# Cryosphere Issues



- J1 readiness:
  - Snow fraction – The IDPS algorithm will be replaced.
  - Sea ice characterization – It remains unclear how much effort it will take to fix the IDPS algorithm.
  - Gridding – Given the improvements to date, recommendations, and limited resources, additional work will be limited.
- Common algorithms and ground implementation:
  - Similar algorithms, arising from GOES-R development, will be run in NDE.
  - Maturity reviews: What if a product is not meeting requirements? If we replace an algorithm, is there any point in doing maturity reviews for the current IDPS product?



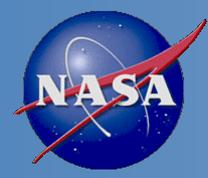
# Algorithm Recommendations



Recommendations for IDPS algorithms:

Product	SNPP	JPSS
Sea Ice Concentration IP	1	1/3
Ice Surface Temperature	1	1/3
Sea Ice Characterization/age	1/2 (TBD)	2/3
Binary Snow Cover	1	1/3
Fractional Snow Cover	2	2

1. NPOESS algorithm has evolved into the NOAA-endorsed JPSS algorithm and any needed improvements should continue.
2. NPOESS (or evolved) algorithm will not meet requirements or effort is too large, replace with NOAA-endorsed JPSS algorithm
3. NOAA-endorsed algorithm should be used even if NPOESS (or evolved) algorithm meets performance because of legacy, enterprise, blended products, and other considerations.



# User Feedback



- **Main users**
  - NIC, National/Naval Ice Center
  - Naval Research Laboratory and NAVO
  - NWS, including the Alaska Ice Desk and NCEP
- **Continuity:** VIIRS, AMSR2, and ATMS products provide continuity with products from heritage imagers such as AVHRR, MODIS, and OLS for some products.
- **What's new?** VIIRS sea ice concentration and ice "age"/thickness, AMSR2 sea ice type, ATMS snow grain size
- **What's missing?** Automated algorithms for ice motion, ice edge, and icebergs.
- **What more can we get?** Snow density over land, snow depth on sea ice, ice motions, iceberg detection, ice edge, uncertainty metrics, ice age (years), freshwater ice concentration and thickness.
- **Other issues:** data formats, quality flags, validation tools