



JPSS Science Product Evolution

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Environmental Systems*

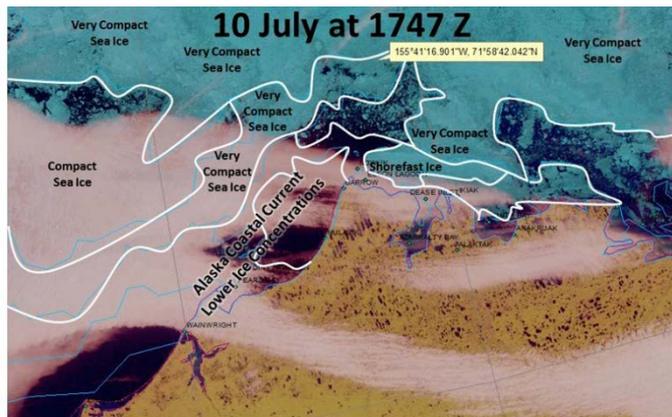
Wednesday, January 7, 2015



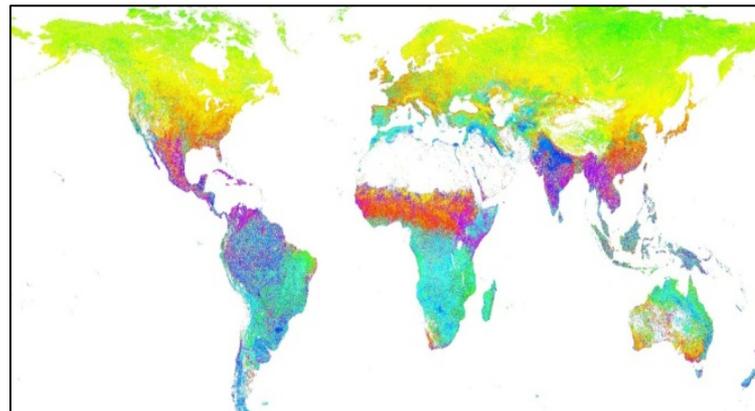
Maximizing Product Use



- To maximize the benefits of JPSS data for our stakeholder community, we continuously work to improve the quality and user of our data product suite within a cost-constrained environment while leveraging enterprise solutions whenever possible
- This is done with consistent programmatic oversight applied to the execution of requirements including scientific product reviews, evolving systems engineering solutions and stakeholder preparedness
- Program Science and Program Systems Engineering (PSE) work synergistically to ensure the products both meet specifications and are readily available at low latency
- But it is not enough to simply generate the products and discuss with the users— facilitation of product exploitation is vital and JPSS accomplishes this through the Proving Ground Risk Reduction Program



False color VIIRS image used by Alaska NWS to help Coast Guard respond to vessel trapped in the ice



5 km VIIRS phenological dates for the onset of dormancy in 2013

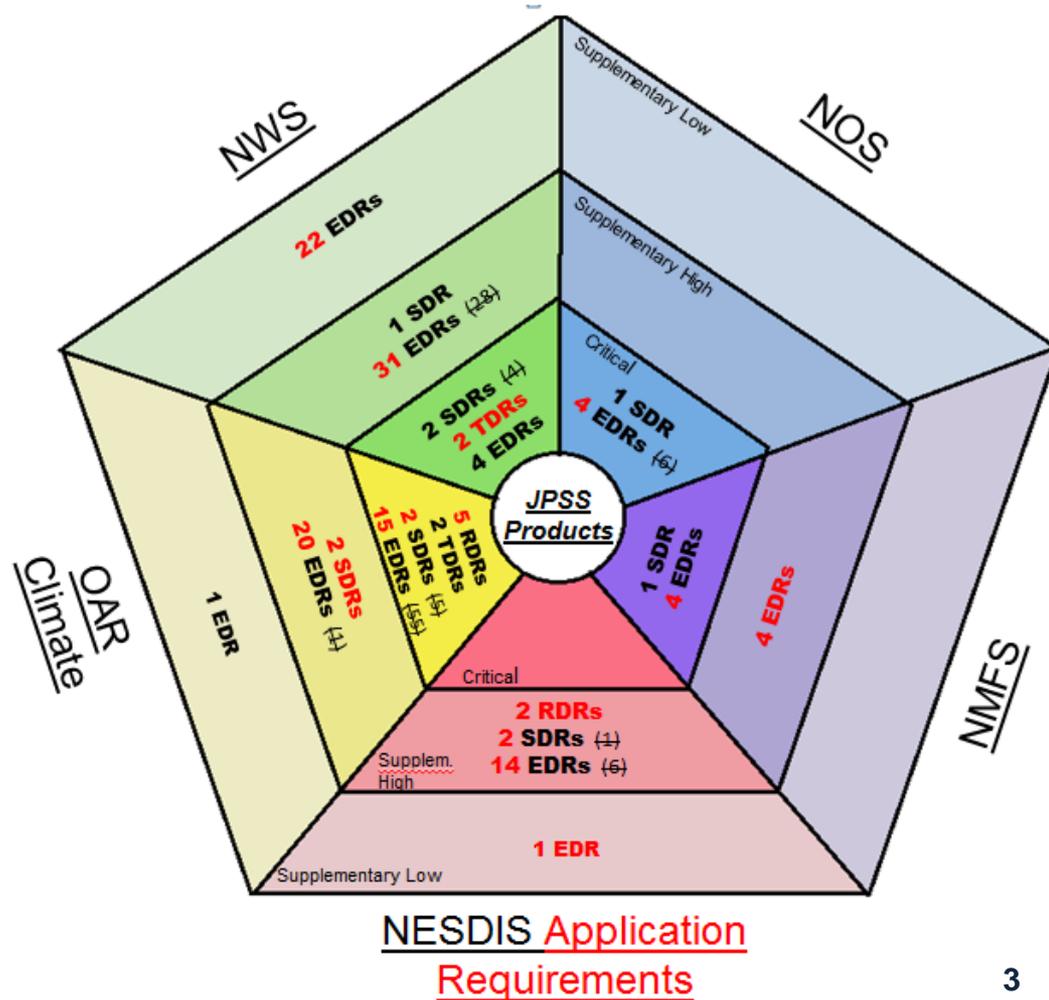


VIIRS coastal true color image of Lake Erie for a large HAB bloom

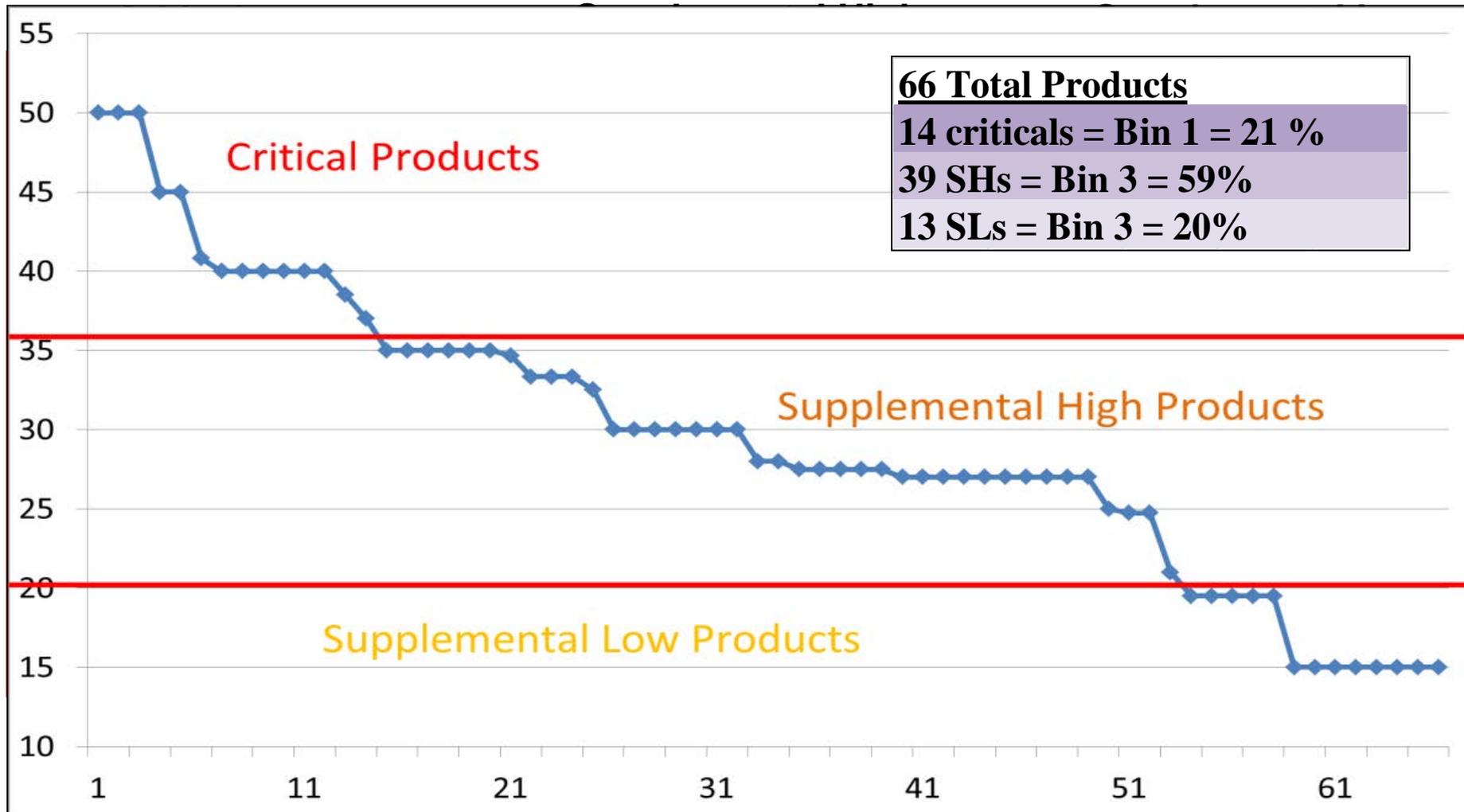
Data Product Requirements



- Each NOAA Line Office is a stakeholder in the JPSS Program, and therefore their product requirements are maintained within Level-1 documentation
- JPSS ensures that these NOAA-traceable Level-1 requirements are consistent with Line Office missions and objectives in support of operational and research users
- Recently, Program Science offered a reconciled suite of Level-1 product requirements for formal Low-earth Orbiting Requirements Working Group (LORWG) approval for update to the Level-1 requirements



Data Product Requirements



- JPSS maintains NOAA-traceable Level-1 requirements which specify product quality and programmatic relevance
- But also defines implementation

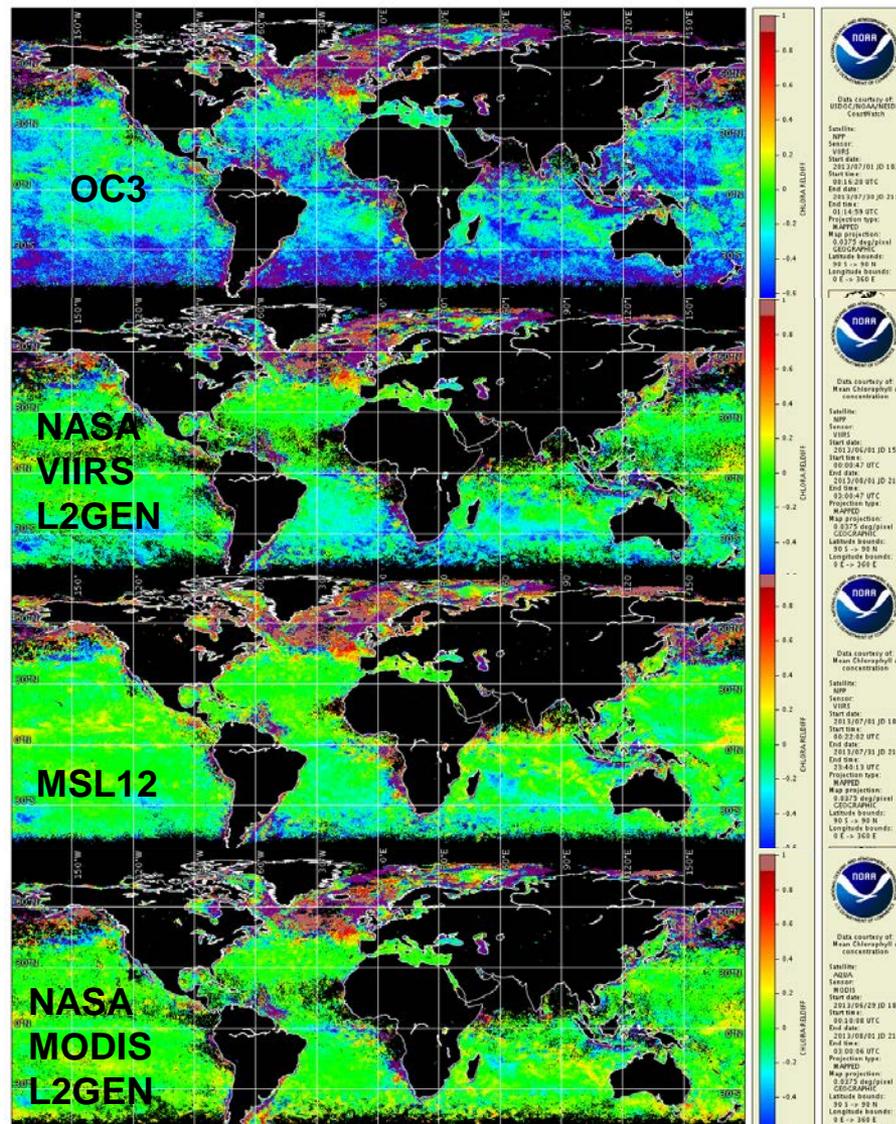


- Scientific reviews of data product validation maturity and usability help JPSS to obtain a high quality and user-vetted product suite
 - Maturity and operational reviews are conducted when an algorithm has met threshold validation requirements of the specified stage
 - During the review process, the products are assessed against specification and the review panel determines if the anticipated maturity level or operational status is attained
 - The review panel, chaired by the JPSS Program Scientist, is comprised of internal and external stakeholders which include the NESDIS development community, NOAA Line Office representatives and product advisors
 - The Center for Satellite Applications and Research (STAR) holds an annual science algorithm review of overall JPSS product suite status and uses the opportunity to engage with users in pointed workshops
 - All algorithms are reviewed at their current maturity status, validation plans and long-term enhancement strategy are proposed to ensure alignment with NOAA strategic goals
 - In light of NOAA enterprise implementation and product considerations, NPOESS legacy algorithms were evaluated at the 2014 STAR annual review; each algorithm development team was asked to compare the NPOESS algorithm to NOAA legacy/enterprise algorithms if they were available
- On October 6, 2014, the JPSS Program directed STAR to define and pursue enterprise algorithm solutions for future implementation in JPSS processing systems to align with strengthening NESDIS initiatives

Review Example: Ocean Color



- The implemented Ocean Color -3 (OC-3) algorithm did not meet user coastal requirements at the Provisional Maturity Review
- Product Review Panel recommended further evaluation of the algorithm and other similar algorithms
- The implemented OC-3 algorithm was found to be out of family and the NOAA/STAR-derived Multi-Sensor Level-1 to Level 2 (MSL12) algorithm was noted to be performing well
- The NOAA users approved use of MSL12 algorithm going forward and JPSS Program Systems Engineering is tasked to determine the best ground system implementation to generate the product

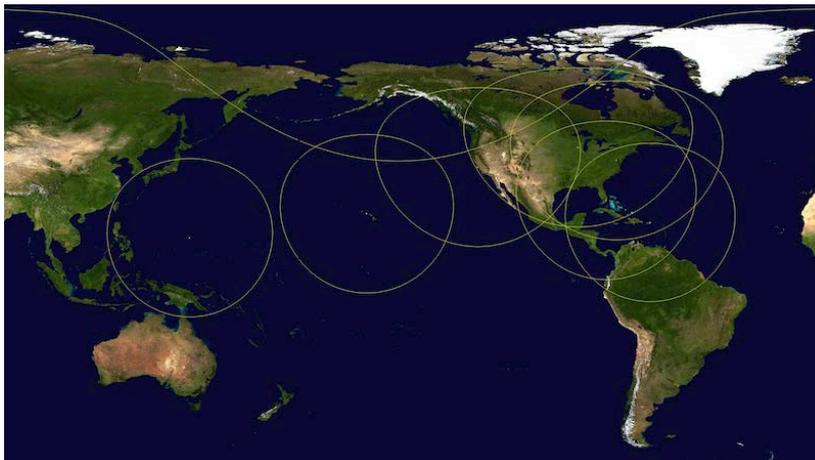


Monthly Relative Difference for July 2013

Implementation Platforms



- In the world of enterprise algorithms, enterprise ground system processing solutions offer cost-effective and consistency across multiple platforms
- JPSS offers two types of data processing
 - Stored Mission Data (SMD): longer latency and high fidelity
 - These are the Interface Data Processing Segment (IDPS) and NPP Data Exploitation (NDE) Systems
 - JPSS Program Systems Engineering (PSE) is completing a trade study with the Office of Satellite Ground Systems (OSGS) as the best way to leverage both SMD systems
 - Direct Broadcast (DB): processing is available on a pre-operational basis for local regions
 - The Community Supported Processing Package (CSPP) and the Direct Readout Lab (DRL) support JPSS data



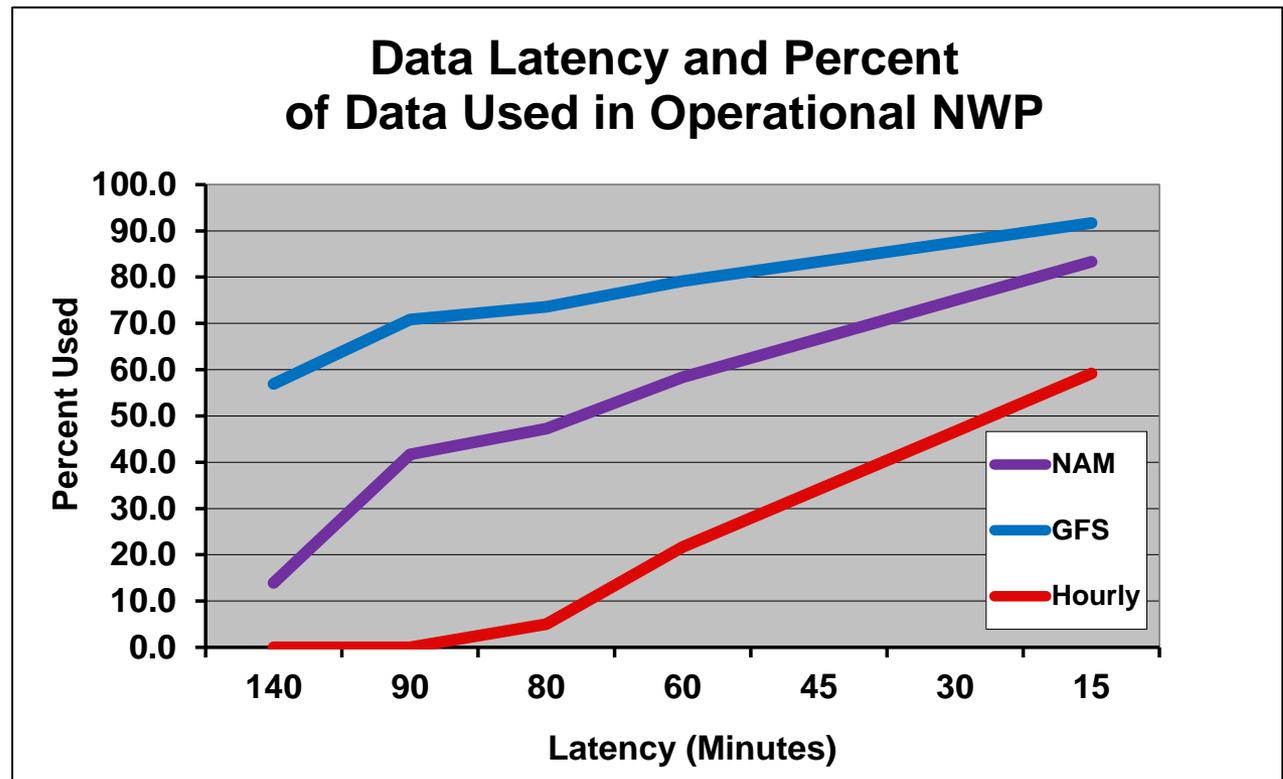
Direct Broadcast Benefits



- Program Science is demonstrating low-latency regional data flow to the NWS National Centers for Environmental Prediction (NCEP) numerical weather prediction models using the University of Wisconsin/CIMSS
- CSPP data provides operational demonstration satellite products to Alaska and Hawaii National Weather Service (NWS) Forecast Offices
- New products are tested with users as part of the Proving Ground Initiatives (PGIs) which leverage the low latency of CSPP

30 min KPPs for NWS

ATMS TDR
CrIS SDR
VIIRS Imagery
(Alaska Region)



Proving Ground Initiatives



- To meet evolving and low-latency user needs for JPSS data, Program Science has begun work on Initiatives (PGIs) which facilitate current and new data product exploitation
- Three PGIs are currently underway, engaging operational user communities, product developers and implementation experts to demonstrate data usage, all supported by CSPP
 - River Ice and Flooding
 - Fire and Smoke
 - Soundings and Cold Air Aloft
- In addition to cross-office coordination, each PGI serves to establish a vital product, set up an operational demonstration and transition to operations, if it is found to be useful
- A draft PGI funding call was released to NOAA Cooperative Institutes for funding of current and future initiatives for 2015 and 2016





River Ice and Flooding

- Initiative began in November 2013 in coordination with NWS River Forecast Centers (RFCs)
- Test newly developed river ice and flooding products in operational RFC environments

Fire and Smoke

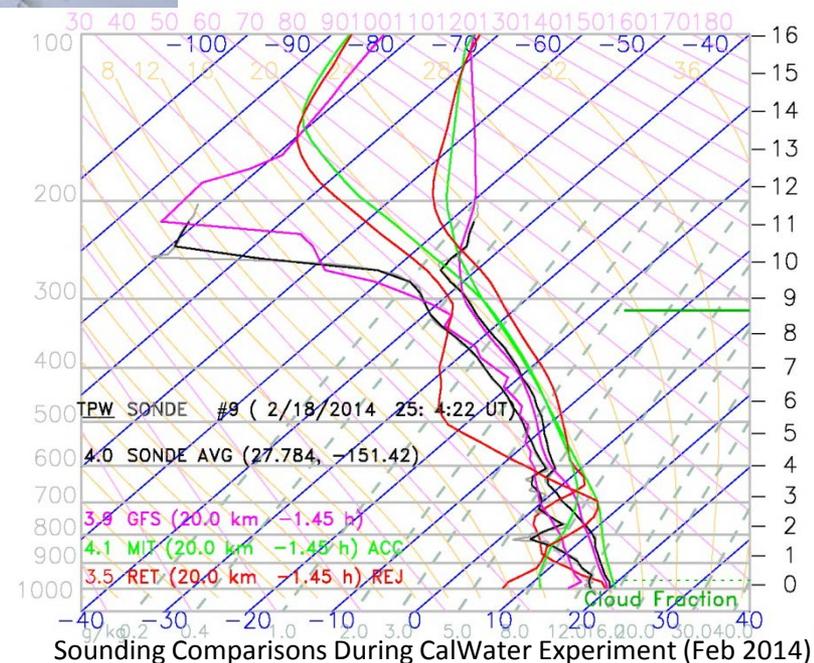
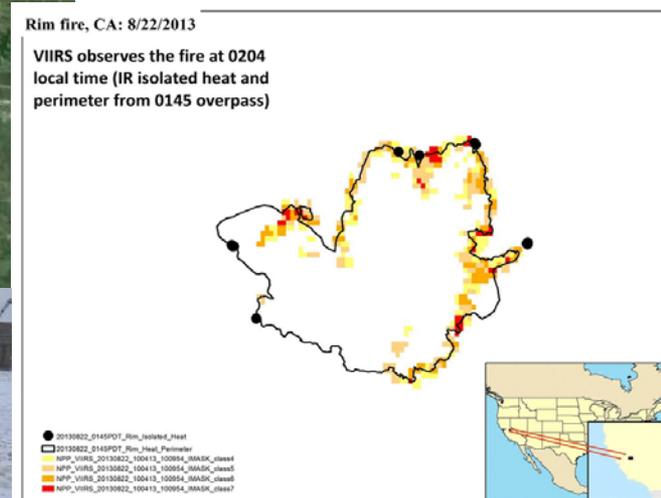
- Initiative began in May 2014 focused on Western Region fire risk areas
- Evaluate the current use of Fire and Smoke detection and forecasting mission and identify current JPSS/GOES-R data that may improve this mission

Soundings and Cold Air Aloft

- Initiative began in July 2014 focused on leveraging the quality of the NOAA sounding products from SNPP for the NWS in AWIPS II
- The initiative will work to improve the NOAA Unique CrIS/ATMS Product Suite (NUCAPS) sounding products such that they can be used when radiosondes are unavailable.
- Additionally, training of NWS meteorologists on how to use the products will be accomplished.



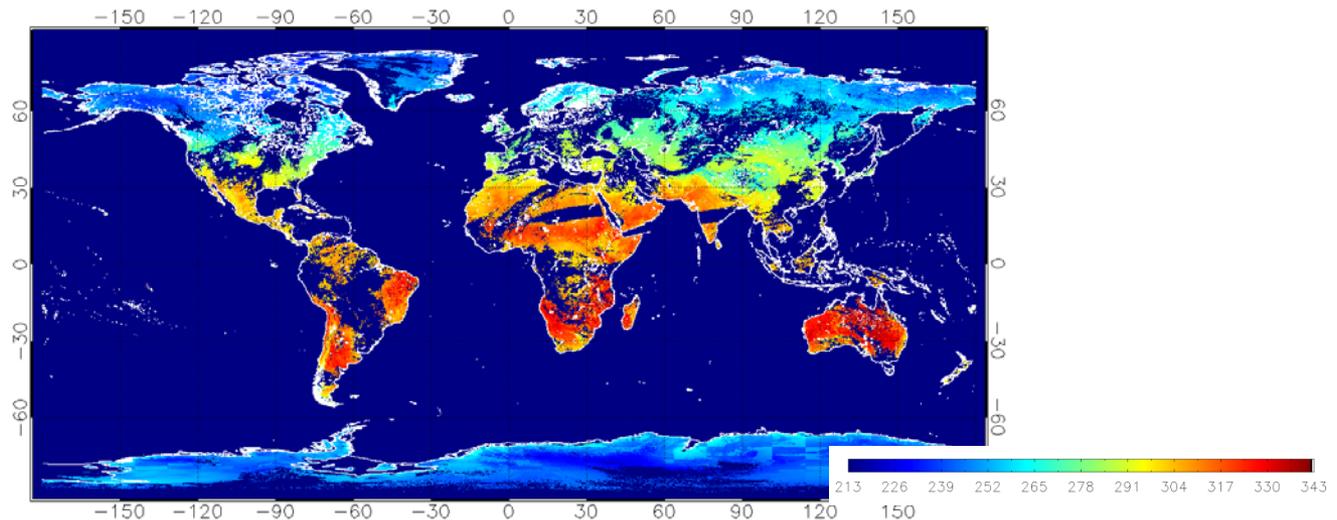
Hannibal Missouri Ice Jam (Jan-Feb 2014)



STAR Testbed



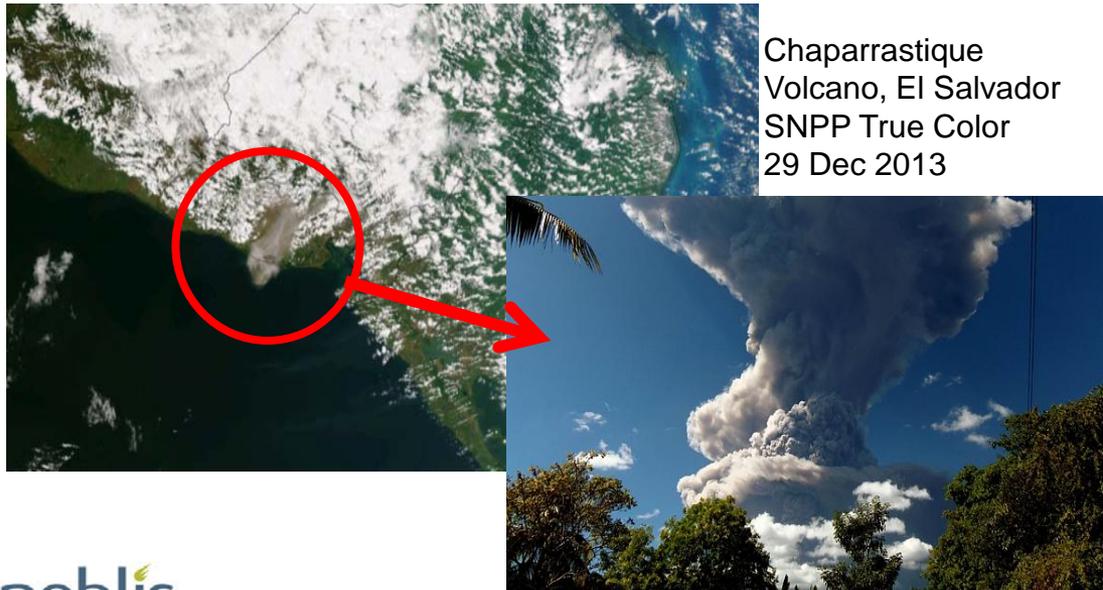
- Pre-operational demonstration via a testbed allows users time to integrate and demonstrate the value of a data product before the data provider (NESDIS) operationalizes it
 - This additionally lets the user community and algorithm developers to work together directly to make product improvements
 - If the usefulness of a product is not demonstrated to any users at the testbed, the JPSS program will not sanction its continued development at status and maturity reviews
- To improve current and future JPSS product usage, Program Science has funded the development of a testbed at STAR which will make products available at before are operational
 - Improved JPSS user engagement, clear demonstrated usability and potential cost savings are expected from this activity



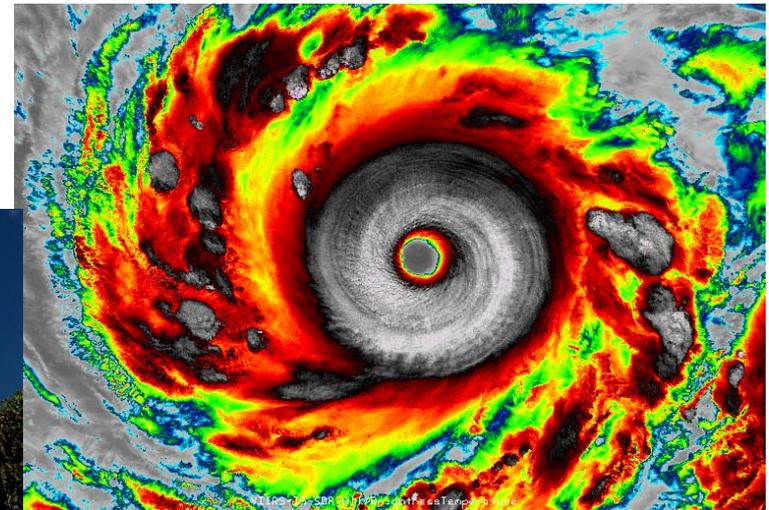
Future Expectations



- Maximum JPSS data quality and cost efficiency can be obtained only if product requirements, implementation and user readiness are all improved with consistent programmatic oversight
- JPSS is working to ensure data usability in coordination with NWS and partner stakeholders, striving for enterprise solutions which will path find for the strengthening NESDIS initiatives



Chaparrastique
Volcano, El Salvador
SNPP True Color
29 Dec 2013



Supertyphoon Vongfong
SNPP IR VIIRS, 7 Oct 2014