



JPSS Proving Ground and Risk Reduction

Kansas City, Proving Ground and Testbed Meeting, April 11, 2018

Mitch Goldberg, JPSS Program Scientist and PGRR Program Manager

Program Science Coordination Team: Arron Layns, Sreela Nandi, Bill Sjoberg, Nazmi Chowdhury



- JPSS Proving Ground Risk Reduction Overview
- Vision for an Integrated Satellite Proving Ground



JPSS Proving Ground Risk Reduction

- Created in 2011 -- to facilitate O2O - operational use of NESDIS Operational products in NOAA LO's Product and Services through Demonstrations

- Proving Ground**

- Demonstration and utilization of data products by the end-user operational unit, such as at NWS, NOS, NMFS
- Promote outreach and coordination of new products with the end users, incorporating their feedback for product improvements

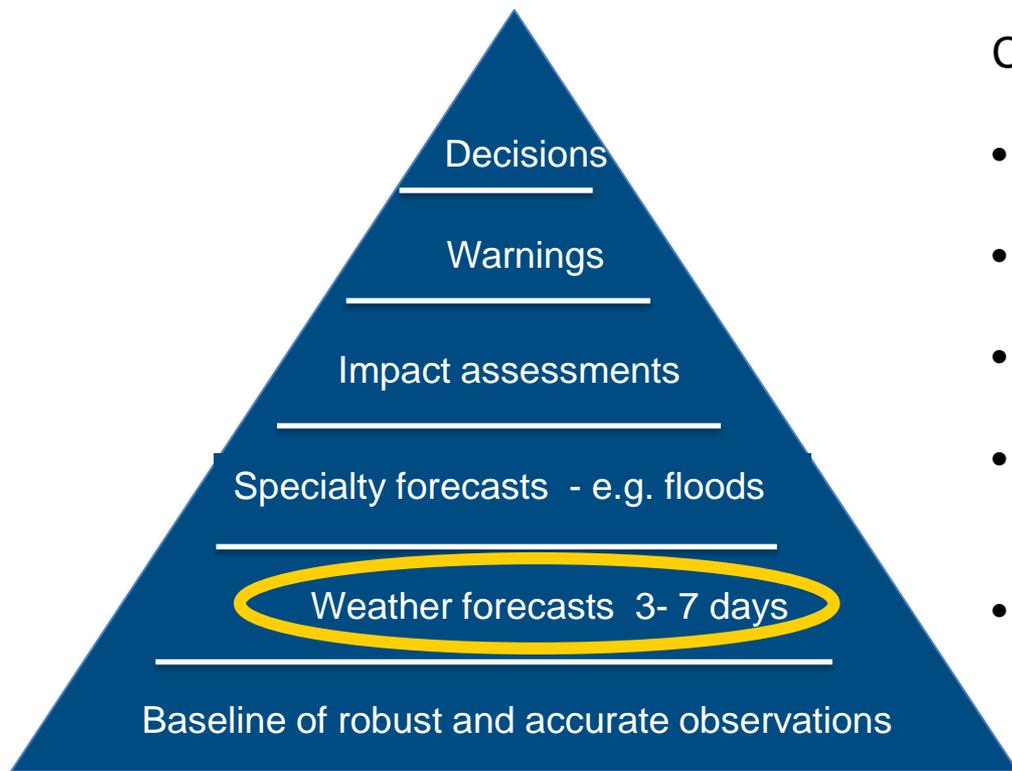
- Risk Reduction**

- Development of new research and applications to maximize the benefits of JPSS satellite data
 - Example - enhancing the HRRR model to incorporate VIIRS FRP to improve smoke forecasts which led to proving ground demonstrations with NWS.
- Encourages fusion of data/information from multiple satellite, models and in-situ data
- Address potential risk in algorithms and data products/processing by testing alternative algorithms and approaches.



JPSS Proving Ground User Initiatives focus on Applications and Decision Support for NOAA Service Areas and Partners

Starting in 2014 we transitioned from individual projects to coordinated team initiatives



Climb the pyramid through:

- Communicating our capabilities/needs
- Identifying user advocates/leaders
- Clearly stated objectives/deliverables
- Facilitators for managing meetings and milestones
- A very capable team



The Initiatives

The initiatives comprise of a team of developers and users working together to improve an application in a testbed environment providing assessments of utility from the users and feedback to the developers.

- Arctic
- Fire and Smoke - *will include GOES-R in 2018*
- Hurricanes and Tropical Storms
- Hydrology
- NWP
- Oceans and Coasts - *includes Sentinel 3*
- River Ice and Flooding - *includes GOES-R since 2017*
- Sounding - *includes EUMETSAT MeTOP*
- Training
- Volcanic Hazards - *new and includes both JPSS and GOES-R*



JPSS PGRR Process Review

- FY 2018 Call for Proposals Released: October 13, 2017
- Letters of Intent
 - 134 received on or before: November 10, 2017
 - 27 Reviewers provided LOIs: November 13, 2017
 - Reviewer Scoring Criteria: Invite for Full Proposal, Reject/Do not Invite, Move to Another PGI, Not Sure
 - JPSS Program Science invited 74 proposals by December 8, 2017
- Full Proposals
 - 76 received on or before: January 19, 2018
 - Proposals provided to 42 Reviewers: January 22, 2018
 - 39 Reviewers attended 10 panel discussions from February 21-23, 2018
 - Rated and Ranked all proposals
- 47 Proposals Funded



Floods & River Ice

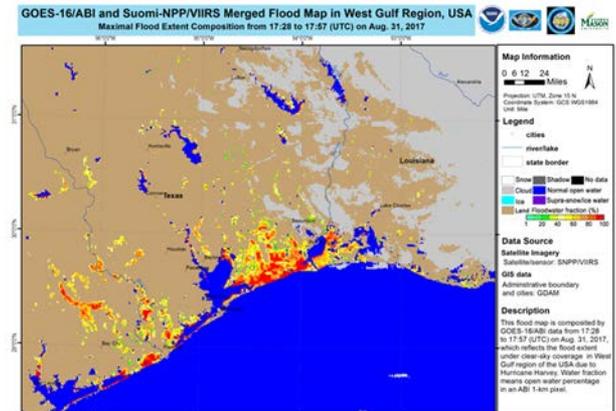
Provide conditions of river ice and standing water (flood) to NWS River Forecast Centers and FEMA. Supports International Disaster Charter

First initiative to include GOES-R

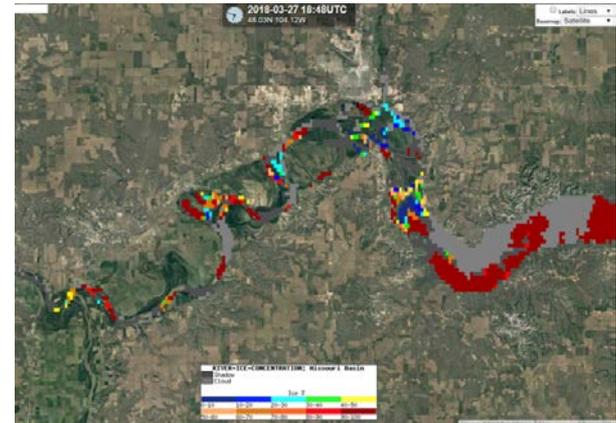
Funded Projects		
Principal Investigator	Title	Institution
Chaouch, Naira (FY15-18)	Operational river ice monitoring and forecasting over the US and the globe using SNPP and NOAA-20 VIIRS imagery	CCNY/CREST
Sun, Donglian Sanmei Li Jay Hoffman	Development of Global Geostationary-JPSS Flood Mapping Software and Products	GMU, CIMSS

Integrated JPSS/GOES-R flood maps:

Harvey



JPSS VIIRS ice map: Missouri and Yellowstone River: 3/27/18



Even though this initiative has only two funded projects, the participation is significant (next slide) because of the value they have returned to the NWS River Forecast Centers.

Flood/River Ice maps are integrated into AWIPS2 at each River Forecast Center, and used by FEMA

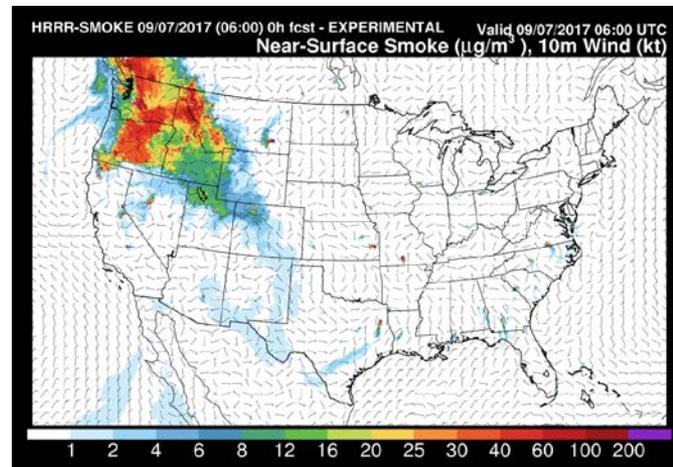


River Ice and Flooding Team – (April 2017 telecon)

Name	Organization	Name	Organization
Paul Alabi	CCNY	Paul McKee	WGRFC
Aaron Bisig	NIC	Julie Price	JPSS
Ed Capone	NERFC	Fernado Salas	NWC
Jessica Cherry	APRFC	Bill Sjoberg	JPSS
Reggina Cabrera	SERFC	Donglian Sun	GMU
Gene Derner	MBRFC	Tim Szeliga	NWC
Mitch Goldberg	JPSS	Marouane Temimi	CCNY
Andy Heidinger	STAR	Jonathan Thornburg	NCRFC
Jay Hoffman	CIMSS	Jorel Torres	CIRA
Eric Holloway	APRFC	David Vallee	NERFC
Sanmei Li	GMU	John Walker	NOAA UAS
Yinghui Liu	SSEC		

Funded Projects		
Principal Investigator	Title	Institution
Ahmadov, Ravan, Shoba Kondragunta, Ivan Csiszar	Rapidly updated high-resolution predictions of smoke, visibility and smoke-weather interactions using the VIIRS fire products within the Rapid Refresh and High-Resolution Rapid Refresh coupled with Smoke (RAP/HRRR-Smoke) modeling system	OAR/ESRL/CIRES, STAR
Batzil, Sam	Web-based Tool for Rapid Burn Intensity Estimates Using VIIRS NDVI	UW/CIMSS
Ellicott, Evan	Improving user understanding and enhanced infusing satellite data into Environmental Applications	
Elvidge, Christopher		
Frost, Greg		
Kondragunta, Shobha		

Improving use of satellite fire and aerosol products for fire spread, air quality, visibility warnings and forecasts



JPSS PGRR funded OAR HRRR smoke model enhancements and will be transitioned to NCEP operations

Provide training to USFS and IMETS

Enhanced websites to display fire location, fire radiative power, aerosol optical thickness - Enhanced IDEA



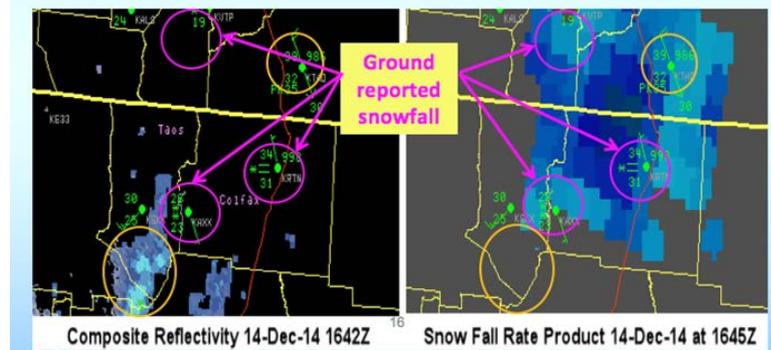
F&S Team (May 17 2017 telecon)

Name	Organization	Name	Organization
Ravan Ahmadov	CIRES	Jan Mandel	Univ of CO-Denver
Tianfeng Chai	CICS	Jeff McQueen	NCEP
Ivan Csiszar	STAR	Brian Motta	NWS
Russ Dengel	CIMSS	Li Pan	ARL
Andy Edman	NWS	Julie Price	JPSS
Evan Ellicott	U of MD	Brad Pierce	STAR
Greg Frost	STAR	Katherine Rowden	NWS
Robyn Heffernan	NWS	Scott Rudlosky	CICS
Amy Huff	PSU	Curtis Seaman	CIRA
Eric James	ESRL/GSD	Bill Sjoberg	JPSS
Hyun Kim	ARL	Eric Stevens	GINA
Adam Kochanski	Univ of UT	Jebb Stewart	ESRL
Scott Lindstrom	CIMSS	Jorel Torres	JPSS Training Liaison
Mark Loeffelbein	NWS		

- Evolving connections with the National Water Center
- Need for seasonal stream flow forecasting at NWC.
- Focus on snow, moisture and precipitation
- Multi-sensor /fusion approach for better temporal coverage

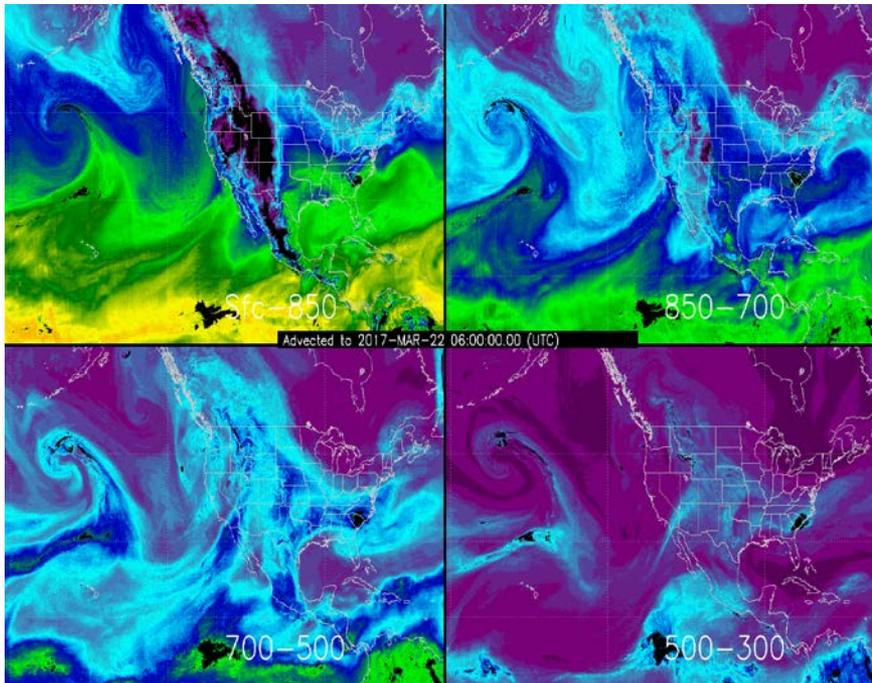
Funded Projects		
Principal Investigator	Title	Institution
Forsythe, John, Wimmers, Tony	Merged Water Vapor Products for Forecasters using Advanced Visualization Methods	Colorado State/CIRA; UW/CIMSS
Lakhankar, Tarendra	Ensemble flood forecasting system coupling WRF-Hydro with Satellite Data (JPSS and GOES-R) for Puerto Rico	University of Mayaguez, PR
Meng, Huan	Development of Snowfall Rate over Ocean, Sea Ice, and Coast Product to Support Weather Forecasting	STAR
Xie, Pingping	Improving and Reprocessing the CMORPH Satellite Precipitation Estimates and Global OLR Analysis with Retrievals from JPSS	NWS/NCEP/CPC
Zhan, Xiwu	Improving JPSS Soil Moisture Data Products for Use in Evaluation and Benchmarking of the National Water Model	STAR

Albuquerque, NM WFO (ABQ): The product (SFR) did validate that we will be able to complement radar void coverage areas in an operational forecast environment using polar-orbiting satellite imagery.



Success: Multi-Layer moisture fields

First ever multisensor and multilayer microwave (4 AMSUs, 1 ATMS, 2 SSMIS) using the operational MiRS Version 11 products. (credit: John Forsythe, CIRA)



Four Layers of integrated precipitable water - Surface to 850 mb, 850 – 700 mb, 700 – 500 mb, and 500 – 300 mb.

Excellent feedback from operational users - now working to replace the operational static blended product to this “advective blending” product

“A pretty amazing lake-effect/lake-enhanced event is unfolding for western/central NY tonight. **LPW data shines again, as the 700-500 mb panels show a lengthening moisture inflow, ...** Mid-level moisture is normally the achilles heel of many otherwise good lake-effect events, but not so this time.”

-- Michael Jurewicz, NWS Binghamton NY, 11/20/16

NWS National Hurricane Center Miami FL
616 AM EDT SUN JUL 10 2016

...TROPICAL WAVES... The wave is embedded in **a mainly low moist environment from surface to 850 mb as indicated by CIRA LPW imagery.**

... A tropical wave is in the central Caribbean with axis near 75W, moving west at 15 knots within the last 24 hours. **CIRA LPW imagery show the wave is embedded in shallow moisture whereas water vapor imagery show strong subsidence aloft.**



Soundings – Part of the Hazardous Weather Testbed Resulted in good feedback and enhancements; to reduce latency NUCAPS soundings will be delivered experimentally via direct broadcast

Funded Projects		
Principal Investigator	Title	Institution
Berndt, Emily	Expanded Application and Demonstration of Gridded NUCAPS in AWIPS	NASA/SPORT
Dostalek, Jack	Improving S-NPP and JPSS-1 NUCAPS Retrievals for CONUS Severe Weather Applications via Data Fusion	Colorado State/CIRA
Heidinger, Andrew	Merging NUCAPS with the VIIRS Enterprise Cloud Algorithms for Improved Polar Cloud Detection, Cloud Heights and Polar Winds	STAR
Kuciauskas, Arunas	Demonstrating, Evaluating and Promoting NUCAPS during Saharan Air Layer Events within the North Tropical Atlantic Basin	NRL
Kahn, Brian	“TRAJECTORY MODEL-ENHANCED NUCAPS FOR TRANSITION INTO AWIPS-II AND CONVECTIVE INITIATION FORECAST SKILL ASSESSMENT”	JPL, NASA/SPORT

Appeal of NUCAPS

Forecasters need to analyze the pre-convective thermodynamic environment

7 hour gap between 7 am and 2 pm!

Most stable time of the day to the most unstable time of the day

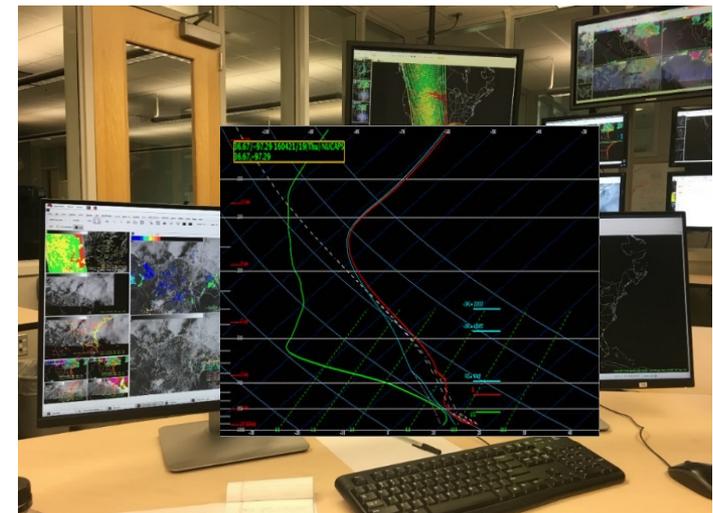
~7 am



~2 pm

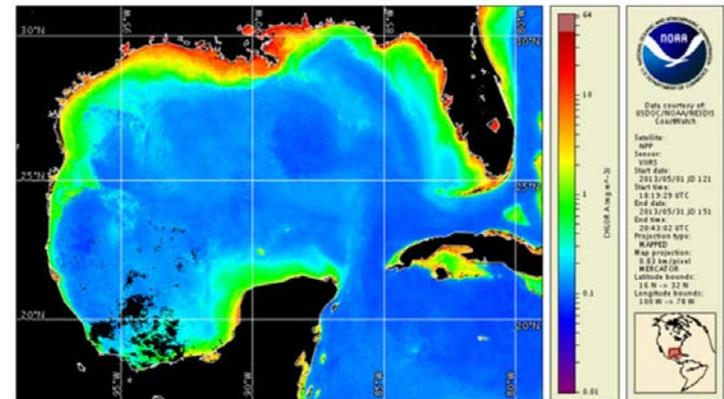


~4 pm



Funded Projects		
Principal Investigator	Title	Institution
Ahmed, Sam	CICS-CREST: Extending and Evaluating VIIRS Ocean Color Neural Network Retrievals of Harmful Algal Blooms and IOPs to Complex Inshore, Bay and Inland Waters and Examining Their Applicability to Different Bloom Types	CCNY/CREST
DiGiacomo, Paul	NOAA CoastWatch/ OceanWatch: Implement, process and serve JPSS program ocean products tailored for downstream user needs	STAR
Gladkova, Irina	Multi-sensor high-resolution gridded (super)-collated SST ACSPO L3C/L3S products	STAR
Hazen, Elliott	Using VIIRS to operationalize dynamic EBFM tools on the U.S. East and West Coasts	NMFS/SwFSC
Hyde, Kimberly	Optimization of phytoplankton functional type algorithms for VIIRS ocean color data in the Northeast U.S. Continental Shelf Ecosystem	NMFS/NeFSC
Jacox, Michael	Assimilating NOAA VIIRS Data into Near-Real-Time Ocean Models to Support Fisheries Applications off the US West Coast	NMFS/SwFSC
Mehra, Avichal (FY15- FY18)	Assimilation of VIIRS ocean color into a biogeochemical model for NCEP's Global Real-Time Ocean Forecast System in support of NOAA's Ecological Forecasting Roadmap	NCEP/EMC

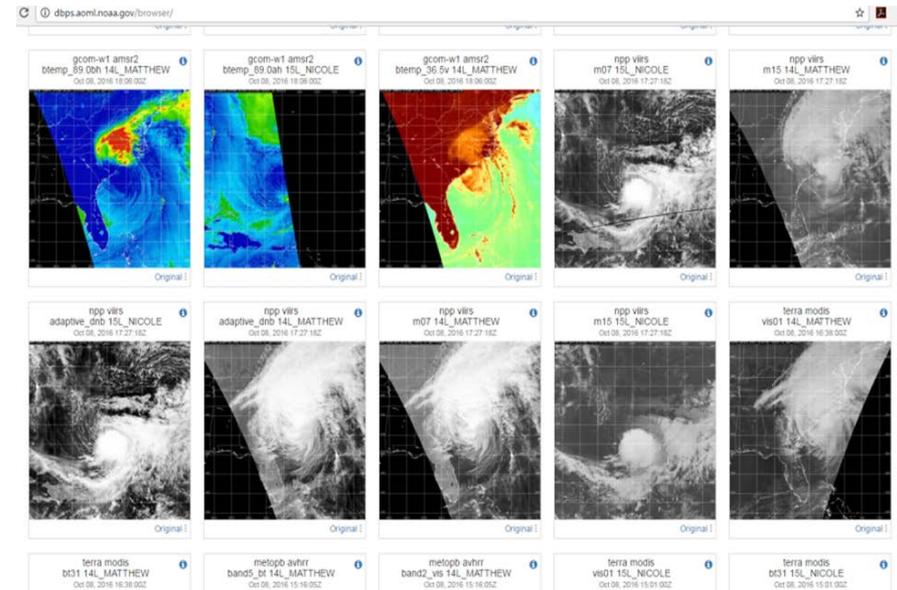
- Facilitate the use of VIIRS ocean data products
 - VIIRS SST has been implemented in code handoff for NCEP's real-time global (RTG) SST analysis
 - Annual VIIRS ocean color course
 - Advanced data portal for multitude of users
 - Data assimilation experiments
 - Funding new Fisheries projects



VIIRS derived Chlorophyll-a

Funded Projects		
Principal Investigator	Title	Institution
Chirokova, Galina	Real-time acquisition, processing, analysis, and operational integration of TC-centric polar orbiting data. Part III: Improving Tropical Cyclone Forecast Capabilities Using the JPSS data Suite	Colorado State/CIRA
Cossuth, Josh	Real-time acquisition, processing, analysis, and operational integration of TC-centric polar orbiting data. Part I: Implementation of a data ingest, standardization, and output system.	NRL
Wimmers, Anthony	Real-time acquisition, processing, analysis, and operational integration of TC-centric polar orbiting data. Part II: Serving forecasters with advanced satellite-based TC center-fixing and intensity information.	UW/CIMSS

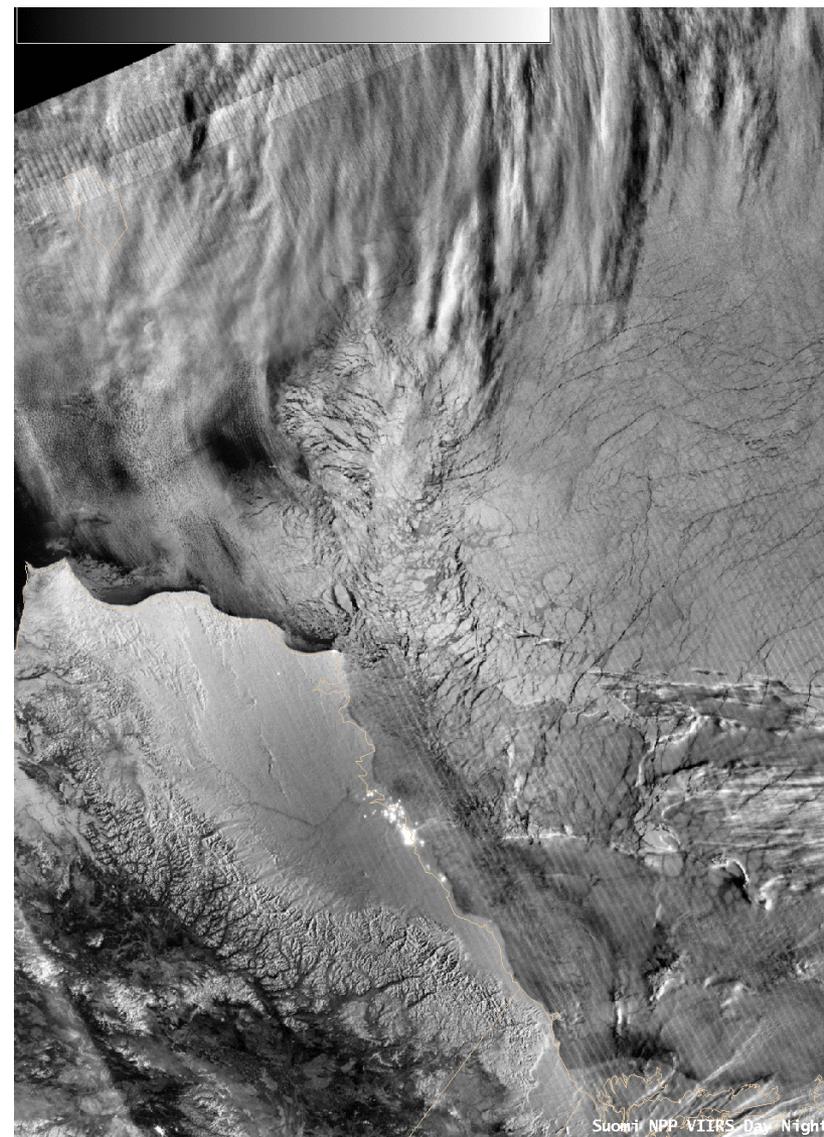
Making use of Direct Broadcast – Low Latency Data to improve hurricane intensity and center fixing through use of microwave imagery and products, unique day night band, along with visible/infrared imagery



Storm-centered imagery from Miami DB

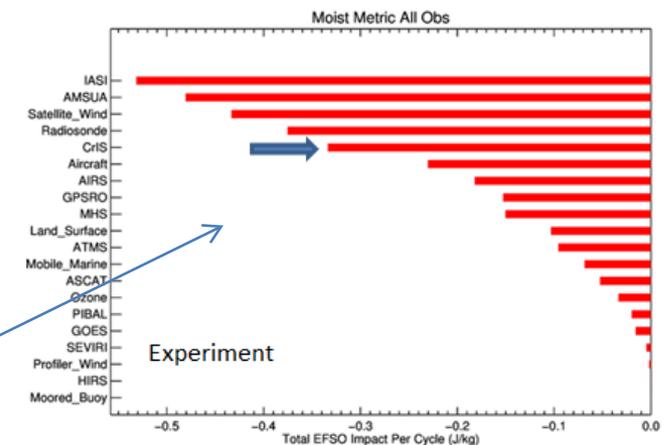
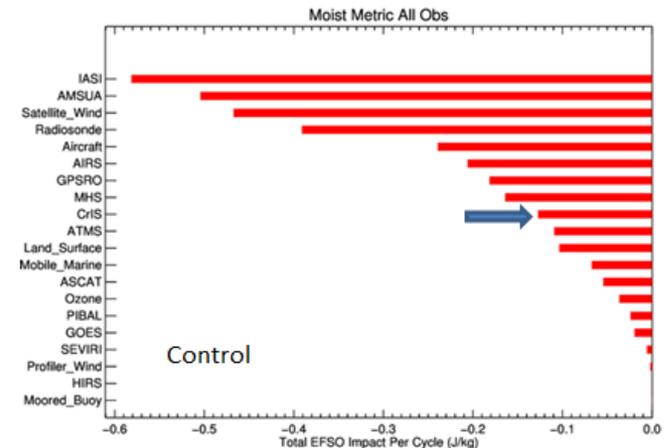
Improving warnings, forecasts and assessments of the Arctic – focused on the Alaska region services including aviation, storms, ice monitoring, fire detection, volcanic eruptions and ocean/coastal conditions (including surface winds from AMSR2) impacting lives, property and all forms of transportation.

Funded Projects		
Principal Investigator	Title	Institution
Liu, Yinghui	Ice Motion from VIIRS, AMSR2, and SAR – Development and Operational Applications	University of Wisconsin, CIMSS
Noh, Yoo-Jeong	Improving the VIIRS Nighttime Cloud Base Height and Cloud Cover Layers Products for High Latitude Weather and Aviation Forecast Applications	Colorado State, CIRA



Support improvements in NWP by better use of satellite observations in global and regional models

Funded Projects		
Principal Investigator	Title	
Cao, Changyong	CRTM Development for Direct OMPS UV Radiance Assimilation	STAR
Cronce, Lee	Using JPSS Moisture and Temperature Retrievals to improve NearCasts of Geostationary Moisture and Temperature Retrievals	UW/CIMSS
Kalnay, Eugenia	Advanced EFSO-based QC Methods for Operational Use and Agile Implementation of New Observing Systems	UMD/CICS
Karpowicz, Bryan	ATMS/CrIS Calibration and Validation and Assimilation Improving Correlated Error, Clouds, and the Surface	NRL
Li, Jun	Improving the Assimilation of CrIS Radiances in Operational NWP Models by Using Collocated High Resolution VIIRS Data	UW/CIMSS
Lim, Agnes	Quantifying NCEP's GDAS/GFS Sensitivity to CrIS Detector Differences	UW/CIMSS
Lin, Haidao	Enhancement of direct broadcast satellite radiance assimilation capabilities for regional and global rapid update models and assessment of forecast impact	OAR/ESRL
Jung, Jim	Using Full Spectral Resolution CrIS in GFS	UW/CIMSS (JCSDA)



Adding 20 channels and adjusting assimilation weights moved CrIS from 9th to 5th



Training – wide variety of material is now available online - JPSS.NOAA.GOV

Funded Projects		
PI	Title	Institution
Connell, Bernadette	International Virtual Lab Training Activities	Colorado State/CIRA
Lindstrom, Scott	The JPSS Advocacy Channel	UW/CIMSS
Jorel Torres	JPSS NWS Satellite Training Liaison	Colorado State/CIRA
Amy Stevermer	COMET	UCAR

Satellite Foundational Course for JPSS (SatFC-J) Training Modules

- 🔗 [SHyMet Home](#)
- 🔗 [All SHyMet Courses](#)
 - [Intern Course](#)
 - [Forecaster Course](#)
 - [Tropical Course](#)
 - [Severe Course](#)
 - [SatFC-G Course](#)
 - [Training Modules](#)
 - [Objectives](#)
 - [FAQ](#)
- 🔗 [Quick Reference](#)
- 🔗 [SHyMet Training DVD](#)
- 🔗 [Key Contributors](#)
- 🔗 [Sponsors](#)

Individual training modules are listed by "Title" and grouped under common topic categories. To sort by column, click the column heading at the top to reorder them. Length is given in minutes.

Topic	Title	Length	Contributor	Developed
Introduction to Microwave Remote Sensing	Introduction to Microwave Remote Sensing	12	CIRA	2018
Introduction to Microwave Remote Sensing	Oxygen and water vapor absorption bands	12	CIRA	2018
Introduction to Microwave Remote Sensing	Surface emissivity	12	CIRA	2018
Introduction to Microwave Remote Sensing	Influence of clouds and precipitation	12	CIRA	2018
Introducing Suomi NPP, JPSS, GCOM and GPM	Orbits and Data Availability	10	Dills (COMET)	2018
Introducing Suomi NPP, JPSS, GCOM and GPM	The VIIRS Imager	15	Lee and Dills (COMET)	2018
Introducing Suomi NPP, JPSS, GCOM and GPM	The CrIS and ATMS Sounders	10	Dills (COMET)	2018
Introducing Suomi NPP, JPSS, GCOM and GPM	The AMSR-2 Microwave Imager	10	Lee and Dills (COMET)	2018
Introducing Suomi NPP, JPSS, GCOM and GPM	GPM	10	SPoRT	2018
Beneficial Products and their Applications	Uses of VIIRS Imagery	20	Lindstrom (CIMSS)	2018
Beneficial Products and their Applications	The VIIRS Day / Night Band	20	Lee and Dills (COMET)	2018
Beneficial Products and their Applications	NUCAPS Soundings	9	Lindstrom (CIMSS)	2018
Beneficial Products and their Applications	Impact of Satellite Observations on NWP	15	COMET	2017



Course Listing » Description

JPSS Satellites: Capabilities and Applications Course



Languages: English
Completion Time: 3-4 hrs
Topics: Satellite Meteorology

Enrollment Information:

[Enroll](#)

Description Objectives Overview

AMS Short Course: Using JPSS Data Products to Observe and Forecast Major Environmental Events

Saturday, 6 January 2018, 8:30 a.m.–5:00 p.m.
Austin Convention Center 17A

AGENDA

All links will open videos of the specific presentation.

Introduction: Using JPSS Data Products to Observe and Forecast Major Environmental Events

8:40 a.m. Overview of JPSS program; Mitch Goldberg, NESDIS /NJO, Lanham, MD

9:15 a.m. Use of JPSS to support NOAA operational missions; Dan Nietfeld, NOAA /OAR Boulder, CO

9:30 a.m. Introduction to JPSS data and products and their scientific maturity (Suomi-NPP and JPSS -1); Lihang Zhou, NESDIS/STAR, College Park, MD



Proposals		
Principal Investigator	Title	Institution
Berbery, Hugh	Maximizing CICS-MD Contributions to the JPSS PG Initiative	UMD/CICS
Key, Jeff	Development and Impact of Global Winds S-NPP/ NOAA-20 VIIRS	STAR
Miller, Steven	Visible Applications in Dark Environments, Revisited (VADER): NOAA-20 Joins S-NPP on the 'Dark-Side' to Empower Day/Night Band Research and Operational Capabilities	Colorado State/CIRA
Pavolonis, M.	JPSS Initiative for Improving Volcanic Hazard Monitoring/Forecasting	STAR
Seaman, Curtis	Exploiting VIIRS Multispectral Imaging to Support Hazard Detection, Nowcasting, and JPSS PGRR Initiatives for Benefit of Stakeholders	Colorado State/CIRA
Tong, Daniel	Improving NOAA operational forecasts of Dust Weather Hazards through assimilating JPSS aerosols and land products (AOD, Dust Mask, and Albedo)	OAR/ARL/GMU
Weisz, Elisabeth	Concept Study to Extend VIIRS Spectral Coverage Using CrIS Radiance Measurements and to Explore Potential Applications	UW/CIMSS
Zou, Cheng-Zhi	Extending the Atmospheric Temperature Climate Data Record from POES Microwave/Infrared Sounders to JPSS/ATMS/CrIS	STAR



Can we have one satellite proving ground?

After JPSS and GOES-R are both mature, with respect to product distribution and user access, the transition to an enterprise satellite proving ground will naturally take place.

e.g. Fire products from both JPSS and GOES-R need to be accessible in AWIPS. Both products have to be displayed together with one training module for both.

The JPSS use of Initiatives have worked well, and they are conducive to adding other observing systems like GOES-R.

The VIIRS/ABI integrated flood mapping is a good example. VIIRS provides higher spatial resolution, while ABI does a better job in mitigating clouds.

Satellite Liaisons, pioneered by GOES-R, will also evolve to scenario based where the liaison does not promote the use of one observing system, but considers the entire problem and the solutions. Most liaisons are already doing this.

The Satellite Proving Ground provides cross-cutting support to the discipline-based Proving Ground.