American Meteorological Society

97th Annual Meeting

NOAA’s Joint Polar Satellite System’s

Proving Ground and Risk Reduction Program

The Innovative Use of JPSS Capabilities by NOAA Line Offices

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23 Jan 2017
Outline

Introduction

PGRR Background

PGRR Proving Ground Initiatives

Additional JPSS PGRR Project Images

Summary
JPSS PGRR Background Definitions

**Proving Ground**
- Demonstration and utilization of data products by the end-user operational unit, such as a NWS Weather Forecast Office or Modeling Center.
- 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 - use of Day Night Band for improved fog and low visibility products at night, benefiting transportation industry.
- Encourages fusion of data/information from multiple satellite, models and in-situ data.
- Primary work is done at the algorithm and application developer’s institution.
- Address potential risk in algorithms and data products by testing alternative algorithms.
The PGRR Program was established in early 2012, following the launch of the Suomi National Polar Partnership (SNPP) satellite on 28 Oct 2011.

Call-for-Proposals (CFPs)
- The initial CFP in Jan 2012 resulted in 100 teams providing Letters-of-Intent (LOIs) with nearly 40 projects selected for funding.
- A second PGRR Program CFP went out in Dec 2014. PGRR Initiatives were used as a focus for the responses to this CFP. Over 130 LOIs were received.

These proposals went through a rigorous user-led selection – between 40-50 projects selected for funding each time.

Project managers work with the users to determine how best to use new JPSS data, and to quickly transition these capabilities to operations.
The River Ice and Flooding Initiative was the first attempt at this new partnership and it was established in response to Galena AK flooding in May 2013.

The Initiative included River Ice and River Flooding Project teams, direct broadcast SMEs, and National Weather Service River Forecast Center forecasters.

The success of River Ice and Flooding Initiative led to creation of other initiatives that guided the 2014 PGRR CFP.

Initiatives have proven to be critical forums where JPSS personnel, product developers, and users interact. The effort is to evaluate current and future JPSS Capabilities in operational environments to determine which of these capabilities should be transitioned to operations.
PGRR Proving Ground Initiatives
List

- Ocean and Coastal
- Arctic
- River Ice and Flooding
- Hydrology
- Fire and Smoke
- Severe Weather/NWP/Data Assimilation

Joint Polar Satellite System
Bill Sjoberg – Global Science & Technology Contractor
<table>
<thead>
<tr>
<th>Initiative</th>
<th>Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>River Ice and Flooding</td>
<td>November 2013</td>
</tr>
<tr>
<td>Fire and Smoke</td>
<td>May 2014</td>
</tr>
<tr>
<td>Sounding Applications NOAA Unique CrIS/ATMS Processing System (NUCAPS)</td>
<td>July 2014</td>
</tr>
<tr>
<td>OCONUS and NCEP Service Centers AWIPS Initiative</td>
<td>June 2015</td>
</tr>
<tr>
<td>Hydrology</td>
<td>July 2015</td>
</tr>
<tr>
<td>Ocean and Coastal</td>
<td>March 2016</td>
</tr>
<tr>
<td>Severe Weather/NWP/Data Assimilation</td>
<td>March 2016</td>
</tr>
<tr>
<td>Arctic Initiative</td>
<td>June 2016</td>
</tr>
</tbody>
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PGRR Proving Ground Initiatives
Best Practices

- Clear Objectives
- Transition to Operations
- Key Milestones
- Frequent Meetings
- Working Groups
Accomplishments

- A NUCAPS Telecon was held on 9 Dec
- New Customer Liaison at the NWS Hazardous Weather Testbed starts work in Jan or Feb. Need to work with the new liaison to expedite the use of NUCAPS in the Spring Experiment
- NUCAPS Plan View is being tested in Alaska by the Alaskan Aviation Unit this winter

Key Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Target Date</th>
<th>Completed</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of NUCAPS at NHC for storms transitioning from tropical to extra-tropical</td>
<td>Oct 2016 Initiative Telecon</td>
<td>20 Oct 2016</td>
<td>Emily Berndt briefed the results of her study</td>
</tr>
<tr>
<td>Establish real-time NUCAPS feeds at GINA DB and add GRIB2 fie to AK Region LDM</td>
<td>Dec 2016 Initiative Telecon</td>
<td></td>
<td>AK personnel are evaluating latest capability</td>
</tr>
<tr>
<td>NUCAPS Plan View Evaluation in AK Winter for temperatures below -65F</td>
<td>Apr 2017</td>
<td></td>
<td>Evaluation has begun and some issues are already being addressed</td>
</tr>
</tbody>
</table>

Future Plans

- NUCAPS use in a convective environment will be one of the focus areas in the JPSS Short Course at the 2017 AMS Annual Meeting
- Gathering various training material to determine what should be included in the NWS Foundational Training Block or in the Focused Applications Training Block
Accomplishments

- A Fire & Smoke Telecon was held on 20 Oct and next one is scheduled for 15 Dec
- Obtained approval for Initiative participation in IMET Meeting at NIFC in Mar 2017 start work on content
- Evan Ellicott named to the planning committee for the AK Fire Workshop (4-6 Apr), he will look to include F&S Initiative issues on the agenda

Key Milestones

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</tr>
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<tbody>
<tr>
<td>1. Summarize evaluation of HRRR Experimental Smoke Product during WR/AK Fire Season</td>
<td>Sept 2016</td>
<td></td>
<td>Western Region WFOs continue to use HRRR in Facebook Posts</td>
</tr>
<tr>
<td>2. Ensure and test algorithm consistency of VIIRS fire detection products in Direct Broadcast</td>
<td>Sept 2016</td>
<td>25 Aug 2016</td>
<td>Evan Ellicott 2nd visit to AK determined that the data was available</td>
</tr>
<tr>
<td>3. Determine what can be done with beta version of Blended Fire and Smoke Product</td>
<td>Oct 2016</td>
<td></td>
<td>Focus has been on HRRR smoke forecast. Amy Huff to determine if IMETs are using</td>
</tr>
</tbody>
</table>

Future Plans

- Determine the value of the HRRR Smoke Model to user support during the fires in Southeastern US
- Using the new version of HRRR-Smoke (with updated microphysics scheme) impact of smoke on numerical weather prediction will be extensively studied for a retrospective case
Accomplishments

- A River Ice and Flooding Telecon was held 21 Oct and the next is scheduled for 20 Dec
- CCNY briefed on work being done to account for cloud shadows on their river ice product
- Initiative considering how to develop a GOES River Flood Product similar to JPSS Product

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<tbody>
<tr>
<td>Work with Coast Guard and NIC to establish support process for ice breaker operations on rivers for Winter 2016-2017 (Action on NIC)</td>
<td>Dec 2016 Telecon</td>
<td></td>
<td>NIC Liaison identified the rivers that they were interested in during the Oct Telecon. Will check progress in the Dec telecon</td>
</tr>
<tr>
<td>Identify steps for moving River Ice and River Flooding Products into JPSS L1RD</td>
<td>Dec 2016</td>
<td></td>
<td>Fill out SPSRB forms for the River Ice and Flooding Products</td>
</tr>
<tr>
<td>Determine initiative interaction with the new Arctic Initiative</td>
<td>Jan 2017</td>
<td></td>
<td>On the agenda for the Jan Arctic Initiative Telecon</td>
</tr>
</tbody>
</table>

Future Plans

- Check with the River Forecast Centers to determine how their river ice-up is developing this Fall
- Work with the Office of Water Prediction experts to get some guidance on the best dataset to use for their algorithm
- The Southeast and lower Mississippi RFCs to be invited to the next initiative telecon
Image shows the presence of cloud-top gravity waves propagating westward along the Nicaragua/Costa Rica border; these waves were likely a response to deep convective bursts offshore near the center of Otto.
August 16th

Sand Fire
41,432 Acres
7/22
98% contained

Bluecut Fire
32,976 Acres
8/16
26% contained

Pilot Fire
8,110 Acres
8/7
100% contained
Blowing Dust Across North Africa

Credit: CIMSS Blog
2016 Lake Erie Algal Bloom "Mild" Compared to Recent Years

VIIRS true-color image showing the extent of the algal blooms in Lake Erie on October 11, 2015 (left), and, by way of comparison, October 10, 2016 (right)

Credit: Environmental Visualization Lab
Typhoon Megi – Before and After Hitting Taiwan

Before – 26 Sept

After – 27 Sep

Credit – William Straka
Post-Hermine Erosion of Coastal Sediments (white areas) 27 Aug

Suomi NPP before & after images show erosion of coastal sediments (white areas in image at right) following Hermine.

Credit: NESDIS STAR Joint Polar Satellite System Bill Sjoberg – Global Science & Technology Contractor
What is Next for the PGRR Program

- The JPSS Program to define linkage of PGRR work with NOAA Service Areas
- NOAA Service Area managers to document value of PGRR products and capabilities to their area
- Provide PGRR Stakeholders with final results of projects completing their work
- Use NOAA Service Areas to focus 2017 PGRR Call-for-Proposal (CFP)
- Work with initiatives to assimilate new projects selected from the 2017 CFP
NOAA Service Areas

Addressing Needs Across NOAA

WEATHER READY NATION
1. Aviation Weather and Volcanic Ash
2. Fire Weather
3. Hydrology and Water Resources
4. Marine Weather and Coastal Events
5. Hurricane/Tropical Storms
6. Routine Weather
7. Severe Weather
8. Space Weather
9. Tsunami
10. Winter Weather
11. Environmental Modeling Prediction
12. Science, Services and Stewardship

HEALTHY OCEANS
1. Ecosystem Monitoring, Assessment and Forecast
2. Fisheries Monitoring, Assessment and Forecast
3. Habitat Monitoring and Assessment
4. Protected Species Monitoring
5. Science, Services and Stewardship

RELIANT COASTS
1. Coastal Water Quality
2. Marine Transportation
3. Planning and Management
4. Resilience to Coastal Hazards and Climate Change
5. Science, Services and Stewardship

CLIMATE
1. Assessments of Climate Changes and Its Impacts
2. Climate Mitigation and Adaptation Strategies
3. Climate Science and Improved Understanding
4. Climate Prediction and Projections

NOAA Mission Service Areas by Line Office

National Weather Service
National Marine Fisheries Service
National Ocean Service
Office of Oceanic and Atmospheric Research

Bill Sjoberg – Global Science & Technology Contractor
• The JPSS PGRR Program has provided critical funds encouraging the transition SNPP capabilities from research to operations in preparation for JPSS

• PGRR Initiatives provide the forum for vital interaction between Project Teams and their users

• Through innovative ideas shared in these forums, NOAA users have made SNPP capabilities a valuable part of their integrated observation system

• Basic satellite, and specific product, training helps maintain initiatives over the long term

• NOAA users have experienced the operational value of the use of satellite data and have become agents of change to drive even more creative ways of using SNPP and JPSS data
For More Information on the JPSS Program (WWW.JPSS.NOAA.GOV)