SOCD Science Team FY11 Mid-year Review

30 March 2011

FY11 Mid-year Review Agenda

- ORS financial progress (5 min)
- SOCD Science Team overview presentations (2 hrs)
- FY12 ORS proposal schedule & template (20 min)
- Miscellaneous (15 min)
  - FY11 ORS budget sweep date
  - Science Team 5-yr plans
  - Q & A

FY11 ORS Q1 & Q2 Budget

Science Team	% Expended
CoastWatch / OceanWatch	17.7
Coral Reef Watch	100.0
Ocean Color	54.8
Ocean Surface Winds	3.8
Sea Ice	35.1
Sea Surface Height	0.0
Sea Surface Roughness	112.1
Sea Surface Temperature	83.9

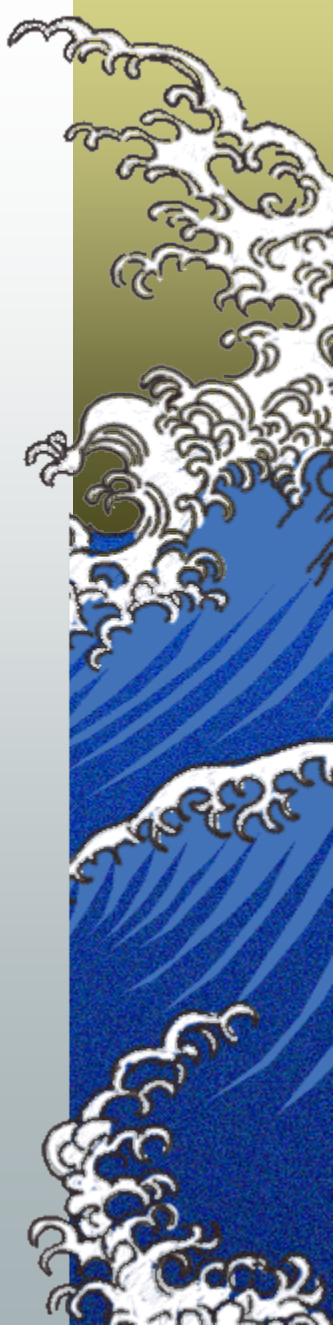
CoastWatch/OceanWatch

FY 2011 SOCD Mid-year Review

Kent H. Hughes

March 30, 2011

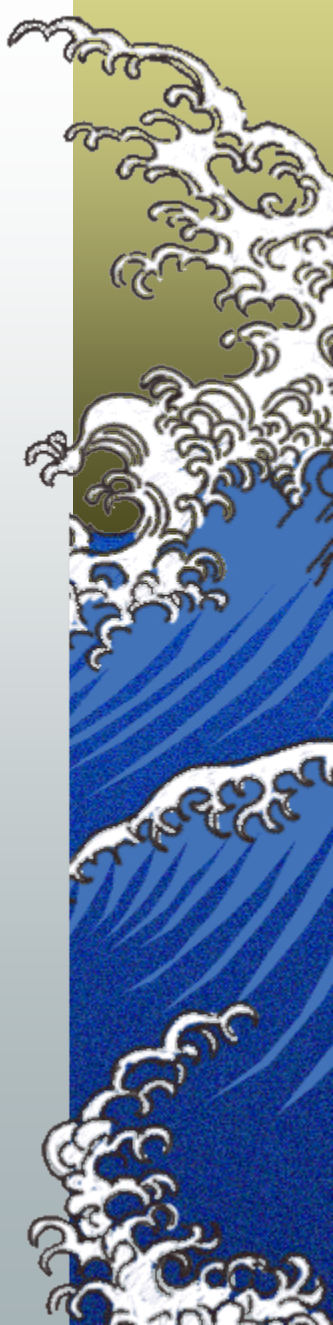
http://coastwatch.noaa.gov



CoastWatch/OceanWatch

2011 Overview

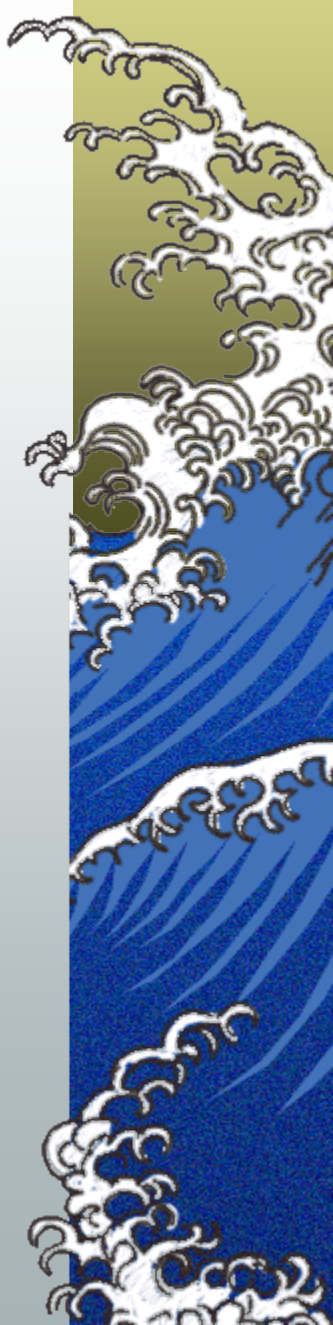
1. **PSDI award for NPP Ocean Color NUPS**
   - First ocean color NPP award via PSDI
   - First Enterprise Lifecycle Planning (EPL) for SOCD
2. **SeaWiFS no longer available**
   - Operational users anxious
   - Satellite succession planning important
   - Full resolution beginning to be examined
3. **NPP /JPSS imminent**
   - VIPER planning continues after PDR
   - Critical NOAA deficiencies become increasingly apparent
4. **MOBY sustainment effort continues: Up and Down**
   - MOBY continuity suffers from apparent lack of commitment
   - “sociological” issues abound
   - New PI named – Ken Voss
   - Last year of joint ORS-IPO funding agreement
5. **STAR Central Data Repository takes shape with first investments**
   - NPP SDR and EDR storage for STAR science enterprise access.
   - Enables algorithm and product development quality assessment. Reprocessing?



CoastWatch/OceanWatch

Accomplishments (ORS Support)

1. **Ocean Color Full Resolution moves forward**
   - CoastColour locations on website (chl).
   - MODIS Full Res (true color) also on website
2. **IOOS: Thredds server support continues**
   - Opportunity for “end of year award” – OSU/DB?
3. **MOBY Grants awarded, in process, or hoped for:**
   - Refurbishment grant awarded
     - Established Ken Voss (Univ of Miami) as PI.
     - CIMAS
     - “Breathing room” for MLML
   - In process - Bridge grant (operations through end of CY 2011)
   - Hoped for - Operations continuation under JPSS (CY 2012 and beyond)



CoastWatch/OceanWatch

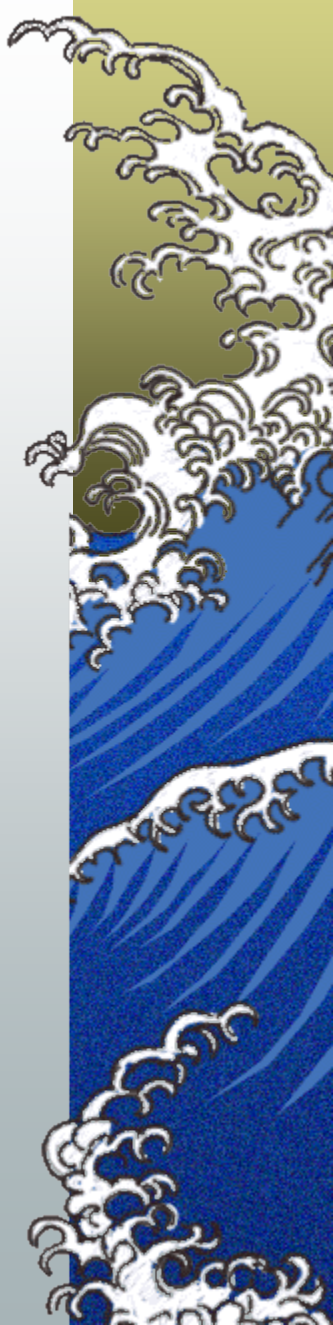
Milestone summary

Milestone status	#	Comments
Completed early	1	ASCAT on CoastWatch Website
Completed on time	2	ASCAT on WCN website
Threatened	1	MODIS-MERIS-MOBY Matchup: MOBY availability issues
Completed late	0	
On track	11	
Delayed	0	
Busted	2	MOBY: On station and SI traceability
Total	17	

Current : March 28, 2011

CoastWatch/OceanWatch
FY 2012

What	Specifics
New Activities	OceanWatch altimetry
	Ocean color direct broadcast station (OSU)
	Evolution of OceanWatch science enterprise.
	Air quality user request/PSDI proposal (?)
	Full resolution operationalization (MODIS and MERIS)
Challenges	Ocean color NPP launch readiness, independent quality assessment, and support (VIPER)
	MOBY: operations, funding sustainment , and technology refresh.
	Satellite succession planning/support for operational users (HAB)
	Node managers meeting – April 2012. Focused agenda – results oriented
	NPP Ocean Color NOAA Unique Products (PSDI) initial accomplishments



CoastWatch/OceanWatch

Funding Status and Issues

Item	Comments
Total – Out or on the way out	
IMSG/Sky (partial year)	Sky partial year through Sep 2011 (apparent end of Sci-Tech 1)
CoastColour travel to Frascati	
Moby Bridge	Bridge grant for MOBY ops. Thru end of 2011.
NIST	MOBY operations (additional 50K for science). MOU in review -
Expenditures awaiting external actions	
Awaiting BOP authority	Node ops salary – JIMAR, CIMAS and CILER
Available for Nodes refresh	Node server refresh, other equipment, communications, etc.
Contracts awaiting MOBY decision	Awaiting MOBY decision: Hawaii Rafting and UH (facilities)
Menghua Wang repay	
Travel (KH) – MOBY planning	Awaiting MOBY decision
Node travel, as requested	Awaiting requests
Data current as of March 29, 2011	

*Coast**W**atch/**O**cean**W**atch*

Looking ahead 2011 / 2012 / 2013

1. NPP Launch – October 2011
   - VIPER readiness (distribution, quality assessment, archiving,
   - STAR Central Data Repository (NPP SDR and EDR)

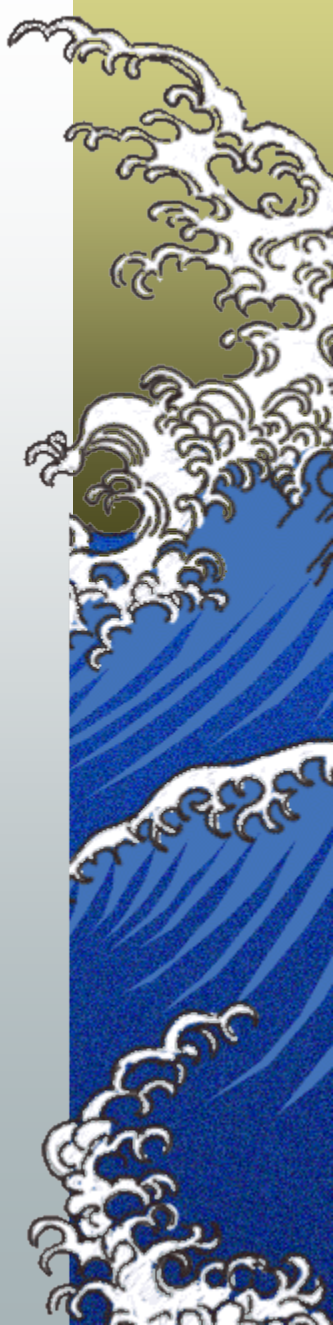
2. Sea Surface Salinity

3. New PSDI supported products: Emilana huxlei and Chlorophyll frontal
   - Initially MODIS
   - Eventually VIIRs (PSDI supported SOCD proposal)

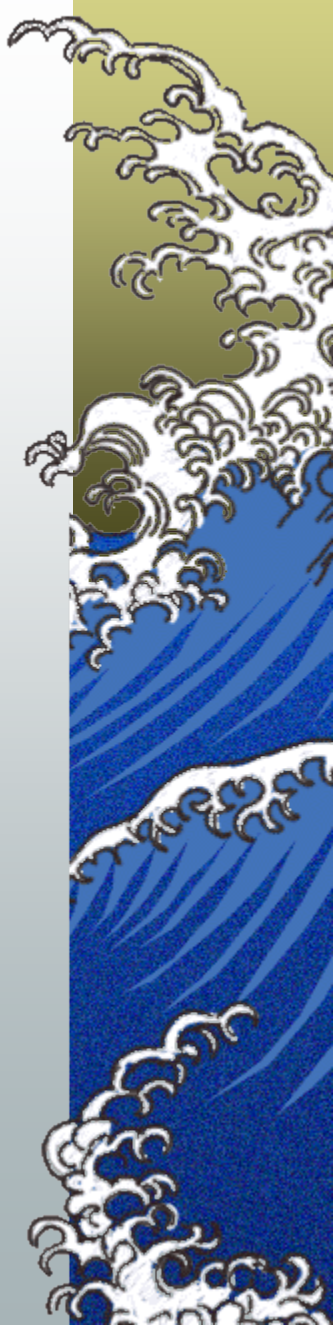
4. MOBY Deployment Supporting VIIRS Vicarious Calibration

5. National Research Council Ocean Color Panel: Final Report

6. Node Managers Meeting (proposed) – Kona, Hawaii April 2012



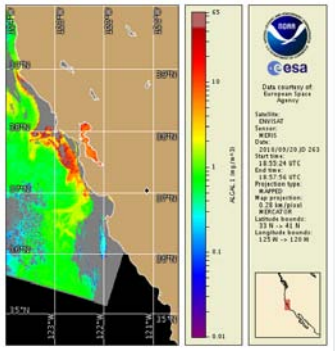
Backup slides

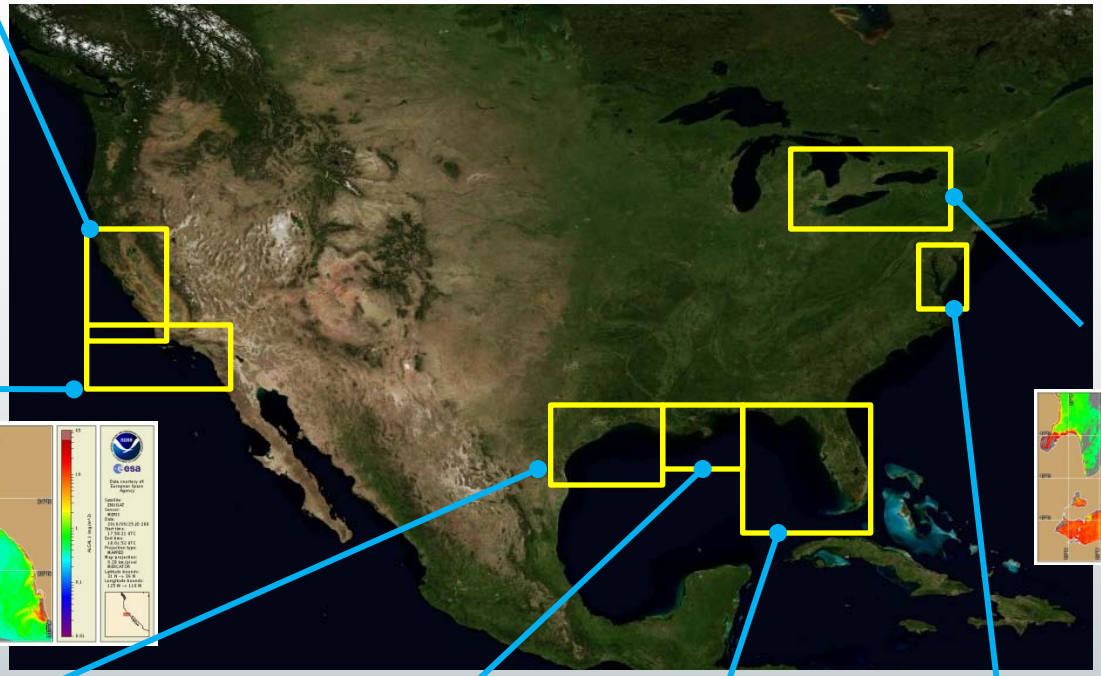


CoastWatch/OceanWatch

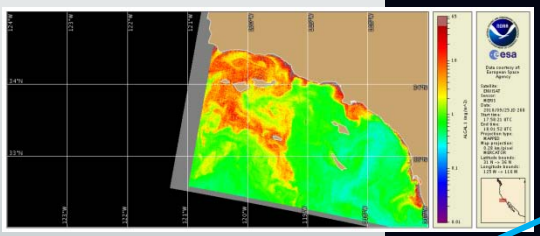
High resolution MERIS/MODIS chl/TC

California Coast

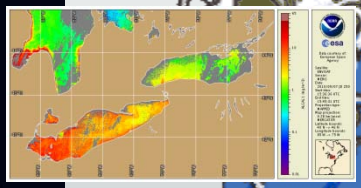




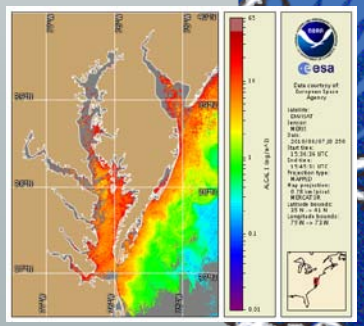
Southern California



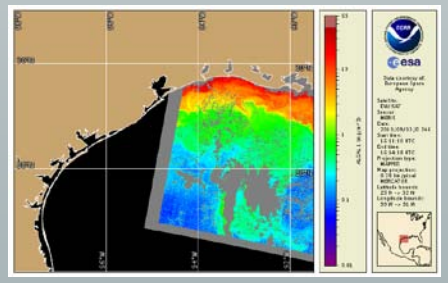
Lake Erie



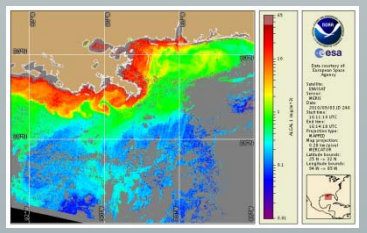
Chesapeake Bay



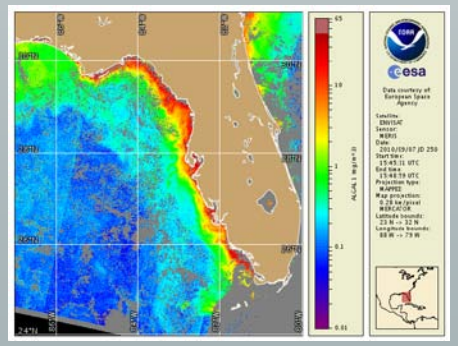
Texas Coast



Mississippi Delta



Florida



*Coast**W**atch/**O**cean**W**atch*

Team Locations/Size (February 14, 2011)

Name	Affiliation/Location	SY
Kent Hughes	NOAA Camp Springs, MD	1
Heng Gu	NOAA Camp Springs, MD	1
Phil Keegstra	NOAA Camp Springs, MD	1
Sathya Ramachandran	NOAA Camp Springs, MD	1
Michael Soracco	NOAA Camp Springs, MD	.5
Xiaoming Liu	NOAA Camp Springs, MD	1
Ron Vogel	NOAA Camp Springs, MD	1/2
Regional Nodes		
Jeff Polovina/ LucasMoxie	Central Pacific - Honolulu, HI (JIMAR)	1
Wilson/Foley	West Coast Regional Node, Pacific Grove, CA (JIMAR)	1
Leshkevich/LI	Great Lakes Regional Node, Ann Arbor, MI (CIILER)	1
Nelson May/Joaquin Trinanes	Stennis SFC, MS / Campostella, SPAIN (CIMAS)	1
Kinkade/Vogel	East Coast Regional Node, Annapolis, MD	1/2
MOBY		
Ken Voss/ x / y	University of Miami (CIMAS)	0.8
Mark Yarbrough/Mike Feinholz/Terry Houlihan	MOBY Operations, Snug Harbor, Honolulu, Hawaii	5
Carol Johnson	NIST, Gaithersburg, MD	
Stephanie Flora/Darryl Peters	Moss Landing Marine Laboratory, Monterey, CA	2
	TOTAL	**17.8**

NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)

FY2011 SOCD Mid-year Review

NOAA Coral Reef Watch

March 30, 2011

I.M. Systems Group, Inc.

Coral Reef Watch web site: http://coralreefwatch.noaa.gov/satellite/index.html

Outline

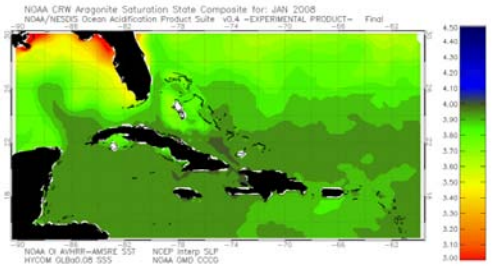
- **Overview:**
  - **What is Coral Reef Watch?**
  - **Funding Sources**
  - **FY 2011 Milestones**
- **Progress toward milestones**
- **Other major progress**
- **FY 2012 Potential Plans**

NOAA Coral Reef Watch (CRW)

- ***Mission: To provide remote sensing tools for the conservation of coral reef ecosystems.***

- CRW's satellite-based near-real-time sea surface temperature products and forecast models are key to reporting environmental conditions of coral reef ecosystems, monitoring coral bleaching events, and predicting future impacts of environmental change on coral reef ecosystems.

- CRW collaborates with numerous domestic and international partners to develop higher-resolution tools addressing coral bleaching, coral diseases, ocean acidification, combining light and temperature to detect coral photosystem stress, and more.



- **ORS 2011 Knauss Fellowship Funding**: Received and obligated to NOAA Sea Grant (complete) and current SciTech Contract (pending)

- **NOAA Coral Reef Conservation Program Funding**: Not yet received; Pending Congressional Budget

- **NASA ROSES Year 2 Funding for NOAA-NASA Decision Support System Project**: Not yet received; Pending DOC OGC approval and clearance of NIPR

- **Australian Research Council Linkage Grant:** Year 5 MOA approved, awaiting US funds

- **Issue 1:** So, when are we going to get a budget?

- **Issue 2:** Need new mechanism (SciTech NG IDIQ contract or other) to load FY2011 funding for Contracted Staff Salary and Travel

Coral Reef Watch
FY2011 Milestones

Milestone	Target	Status
Launch experimental FL Keys **Bleaching Weather Forecast System** product. **STAR**, **CRCP**	Dec – Q1	Completed Dec 2010
Develop v0 algorithm for producing **Global High-Resolution SST** for Coral Thermal Stress products. **NASA**, **SOCD**	Mar – Q2	Completed Mar 2011
Expand the CRW **Virtual Stations** to cover more major coral reef locations. **CRCP**, **SOCD**	Mar – Q2	Completed Mar 2011
Develop **Seasonal Bleaching Outlook** experimental product based on NOAA/NCEP operational SST forecasts from fully coupled ocean-land-atmosphere dynamic seasonal prediction system. **STAR**, **CRCP**	Jun – Q3	On Target
Develop algorithm for new **High-Resolution Coral Thermal Stress** product based on STAR operational SST products. **NESDIS**, **STAR**, **NOS**, **CRCP**, **NASA**	Sep – Q4	On Target
Evaluate and Enhance new Coral **Light Stress Damage** experimental product. **STAR**, **CRCP**	Sep – Q4	On Target
Derive new **High-Resolution Gap-Filling** algorithm for operational and hindcast high-resolution SST. **STAR**, **CRCP**	Sep – Q4	On Target
Assemble and Quality Control high-quality GBR, Caribbean, and Global data to validate against **CRW Bleaching** products. **CRCP**, **SOCD**	Sep – Q4	On Target
Enhance **Hydrodynamic Modeling** in the GBR. **CRCP**, **SOCD**	Sep – Q4	On Target
Develop **Replacement 50-km Product Suite** based on SST data from AVHRR Clear-Sky Processor for Oceans (ACSPO) to ensure product continuity. **CRCP**, **SOCD**	Sep – Q4	On Target
Coordinate and Enhance **Operational Activities** (research; development; product validation, maintenance, enhancement, and delivery; program operations and support; CREIOS/IOOS integration; etc.). **CRCP**, **SOCD**	Sep – Q4	On Target
Coordinate **International Collaborations, MOUs/MOAs,** and **Program Outreach**. **CRCP**, **SOCD**	Sep – Q4	On Target
Develop **Framework Document** for the SOCD-CRW Advisory Board. **SOCD** **ORS funding**	Sep – Q4	On Target
Present at scientific meeting or submit paper with findings from **Knauss Fellowship**. **SOCD** **SOCD** **ORS funding**	Sep – Q4	On Target

Launch Experimental FL Keys Bleaching Weather Forecast System

- Partnership with the National Weather Service (NWS) forecast office in Key West, FL
- Combines wind and cloudiness (factors already in official NWS marine forecasts) into a product that specifically measures coral bleaching risk
- Seven-day forecast bridges gap between CRW near-real-time satellite products and longer-term seasonal bleaching outlook

Milestone Completed Dec 2010

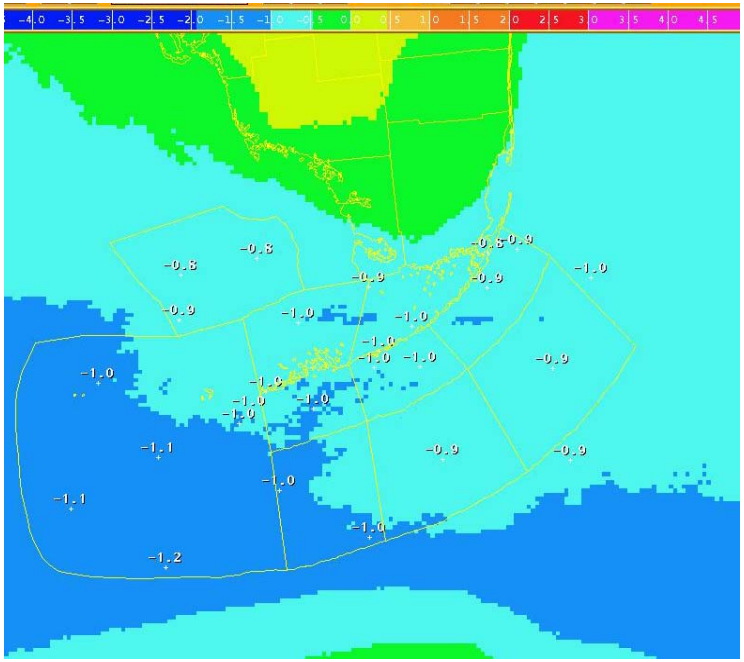


Figure 1. Example Bleaching Weather Forecast for the FL Keys, October 2010

CRW's products provide improved tools to coastal managers to monitor and maintain coral reef health domestically and internationally.

http://coralreefwatch.noaa.gov/

(Courtesy of M. Eakin, Coral Reef Watch) **(Sponsor: NOAA Coral Reef Conservation Program)**

NOAA Coral Reef Watch

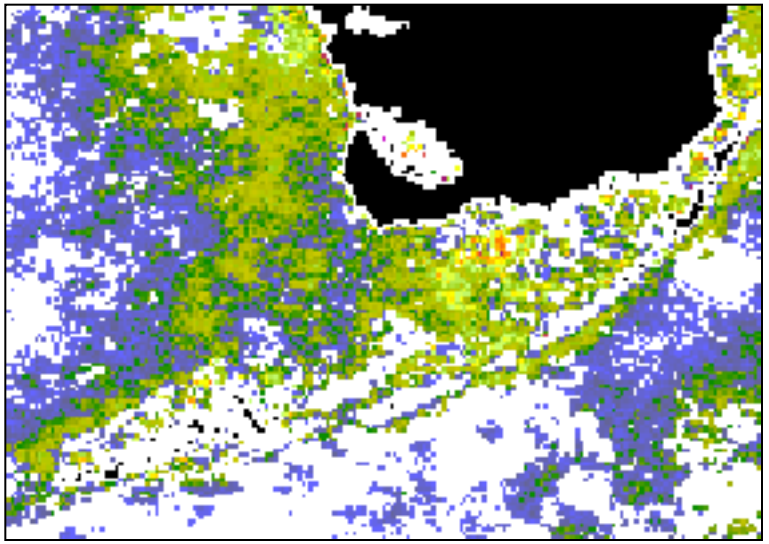
Next Generation, High-Resolution Products

- High-Resolution Decision Support System for Ecosystem-Based Tropical Coral Reef Management

- NASA funded, 4-year project

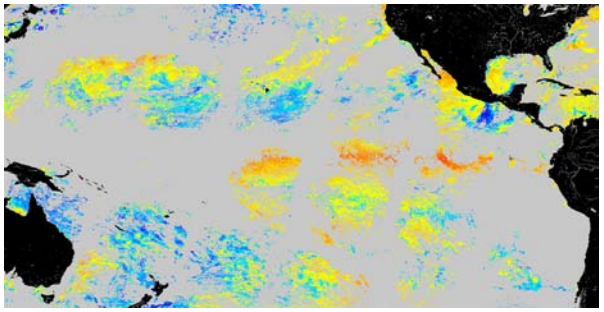
- High-resolution SST data:
  MODIS (Moderate Resolution Imaging Spectroradiometer)
  AVHRR (Advanced Very High resolution Radiometer)

- Partners include
  - NOAA Coral Reef Watch
  - University of South Florida
  - NASA-Ames
  - UNEP World Conservation Monitoring Centre
  - Cooperative Institute for Research in Environmental Science.

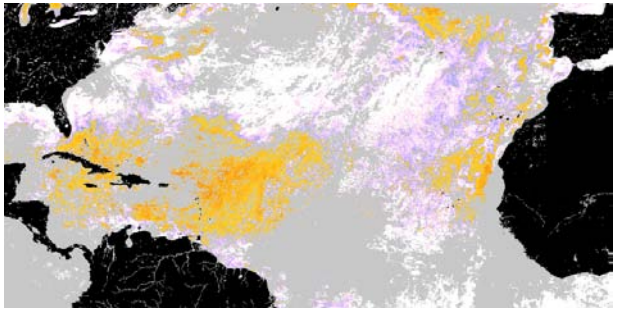


Develop Global High-Resolution SST Algorithm for Coral Thermal Stress products

- NOAA CRW partnership with University of South Florida, NASA Ames Research Center, and University of Colorado at Boulder/CIRES
- Goal: Enhance CRW's current Decision Support System with series of higher-resolution coral bleaching products derived using MODIS and AVHRR data

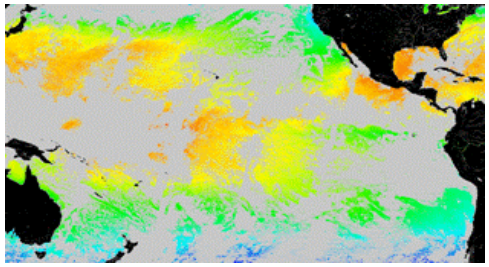


SST Anomaly - Tropical Pacific, 11/26/02

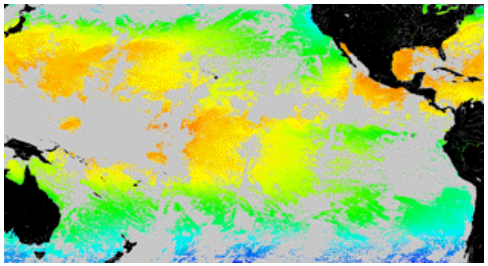


HotSpot - Caribbean and North Atlantic, 9/17/05

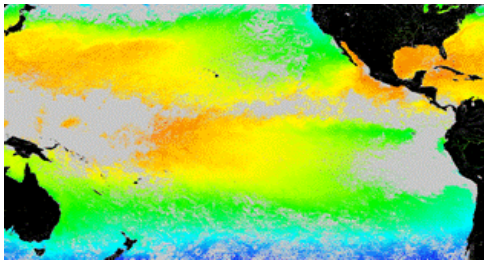
Developed 4km resolution global climatology for CRW SST product (based on original non-gap-filled 4km-resolution Pathfinder SSTs)



SST (non gap-filled) - Tropical Pacific, 8/10/02



SST (gap-filled spatially) - Tropical Pacific, 8/10/02



SST (gap-filled temporally) - Tropical Pacific, 8/10/02

Developed algorithms to gap-fill 4km-resolution Pathfinder SSTs

Milestone Completed March 2011

CRW's products provide improved tools to coastal managers to monitor and maintain coral reef health domestically and internationally: **http://coralreefwatch.noaa.gov/**

(Courtesy of M. Eakin, Coral Reef Watch) **(Sponsor: NASA and NOAA CRCP)**

Expand Virtual Stations to cover more major Coral Reef Locations

- Based on user requests received, enhanced CRW's Experimental Virtual Stations product by adding additional Virtual Stations to cover more key coral reef areas
- Conducted QA/QC of existing Virtual Stations and repositioned specific experimental stations to match updated coordinates provided by users
- Created new user interface for CRW's Experimental Virtual Stations web page using Google Maps

CRW's products provide improved tools to coastal managers to monitor and maintain coral reef health domestically and internationally.

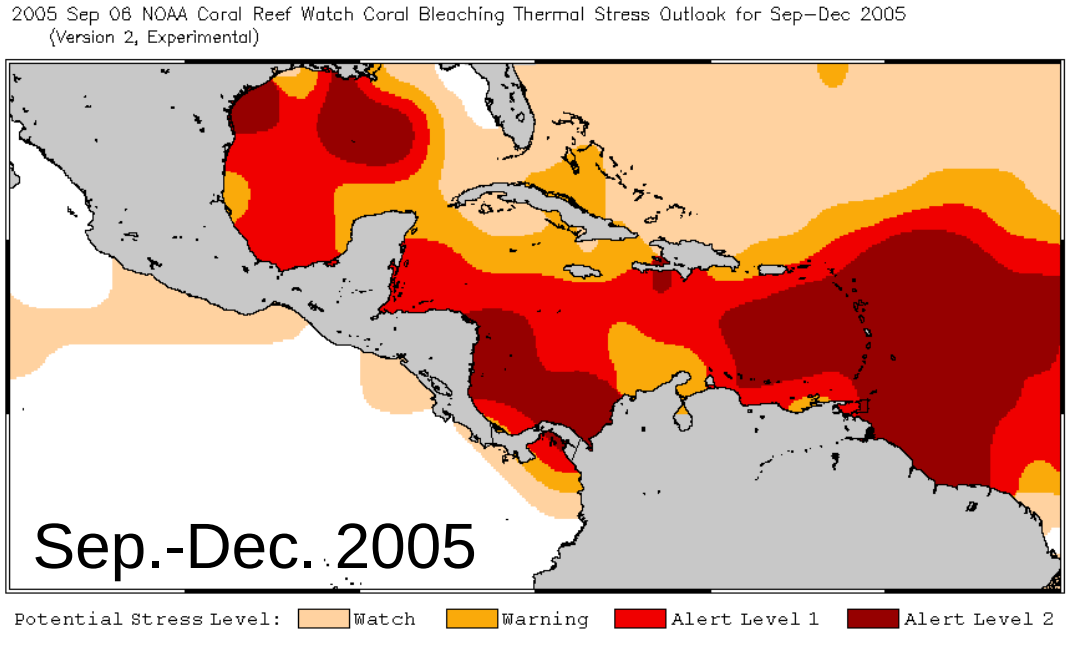
Milestone Completed March 2011

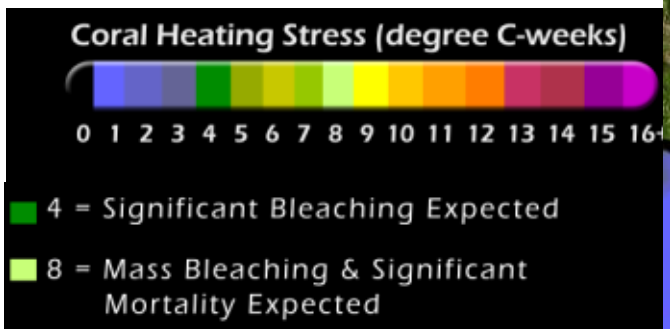
http://coralreefwatch.noaa.gov/

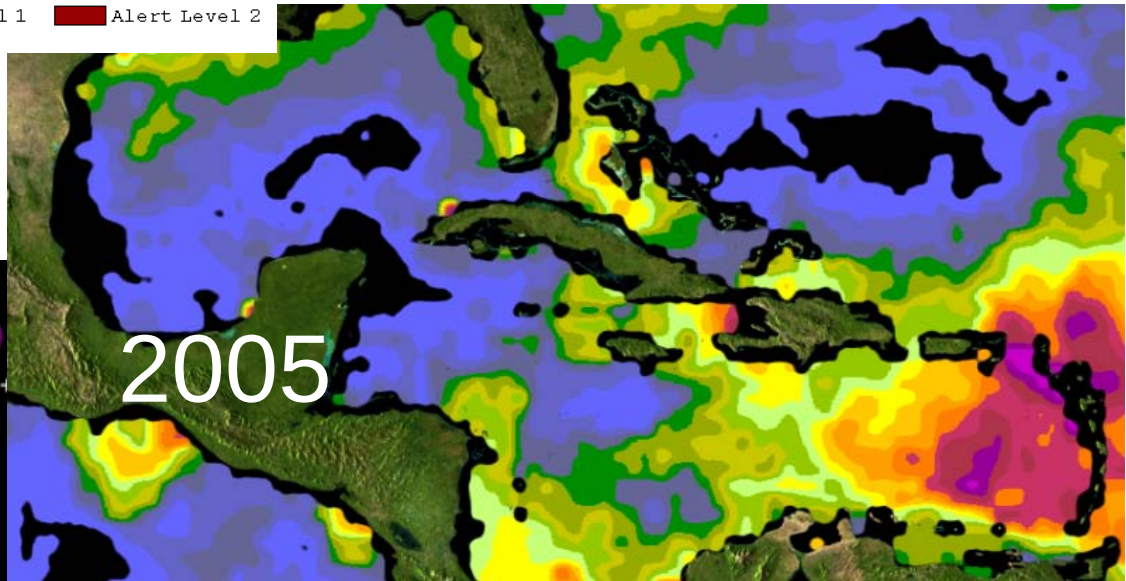
(Courtesy of M. Eakin, Coral Reef Watch) **(Sponsor: NOAA Coral Reef Conservation Program)**

Deterministic Bleaching Thermal Stress Outlook Based on ESRL LIM Model

(for Sep-Dec 2005)

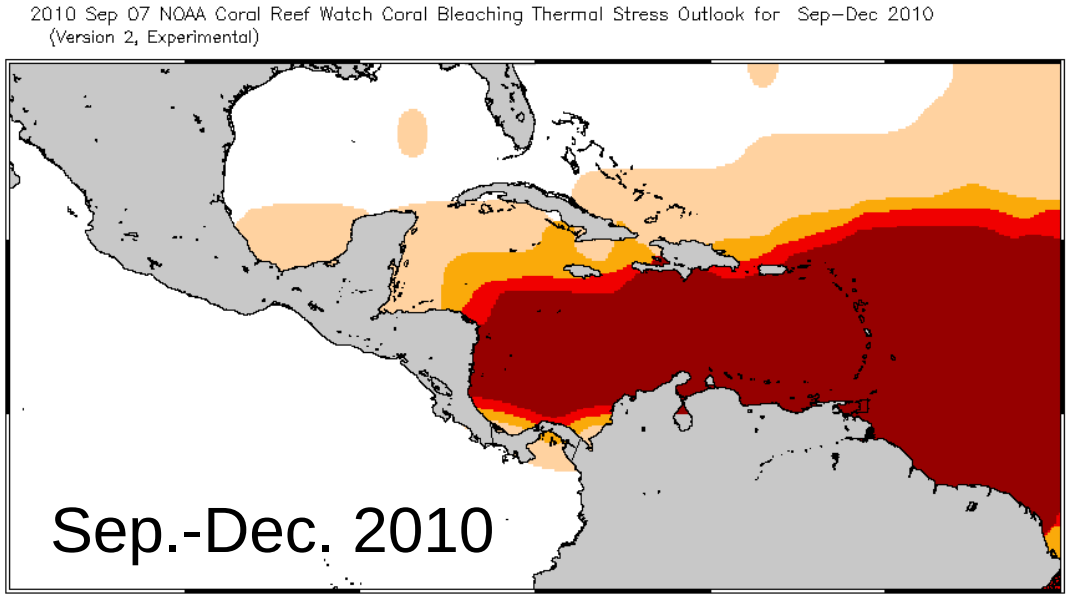


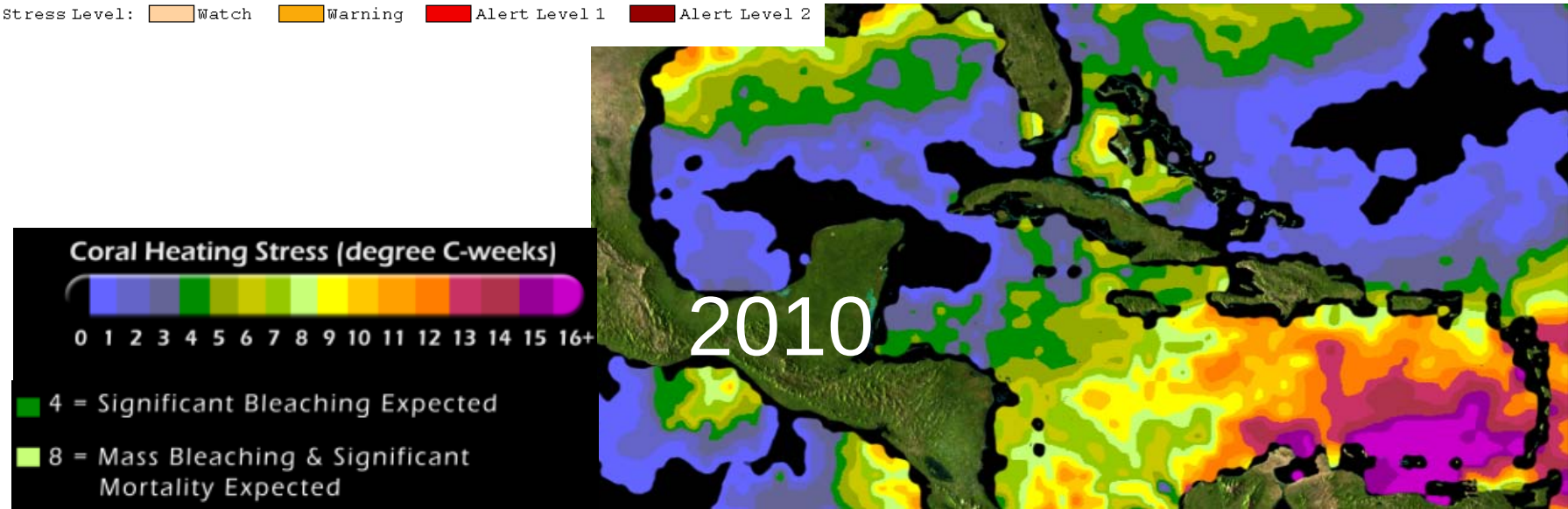




Deterministic Bleaching Thermal Stress Outlook Based on ESRL LIM Model

(for Sep-Dec 2010)

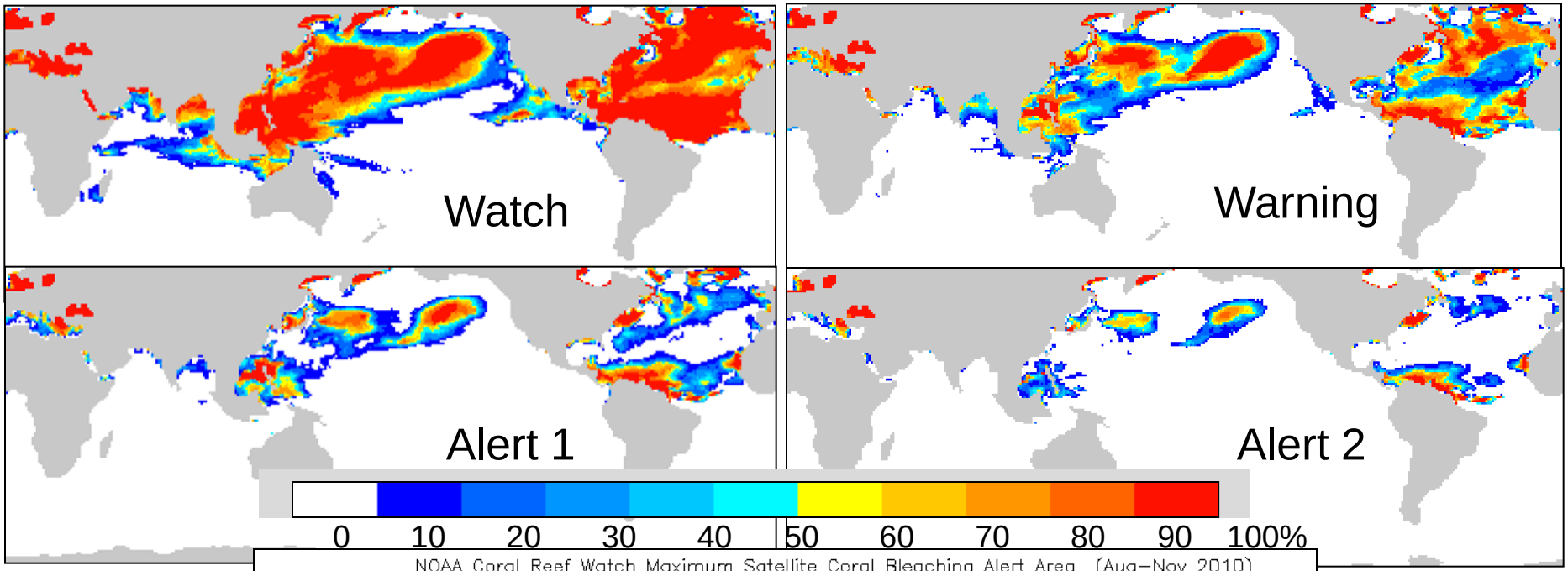


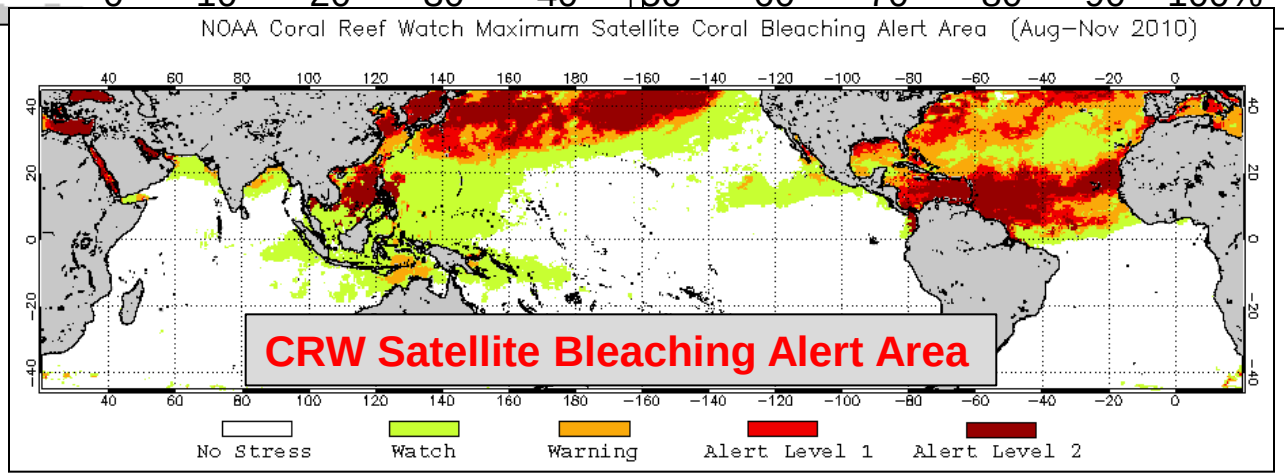


Probabilistic Bleaching Thermal Stress Outlook Based on NCEP Climate Forecast System

(for Aug-Nov 2010)

Probability based on 28 members (4 runs a day from 7 days)



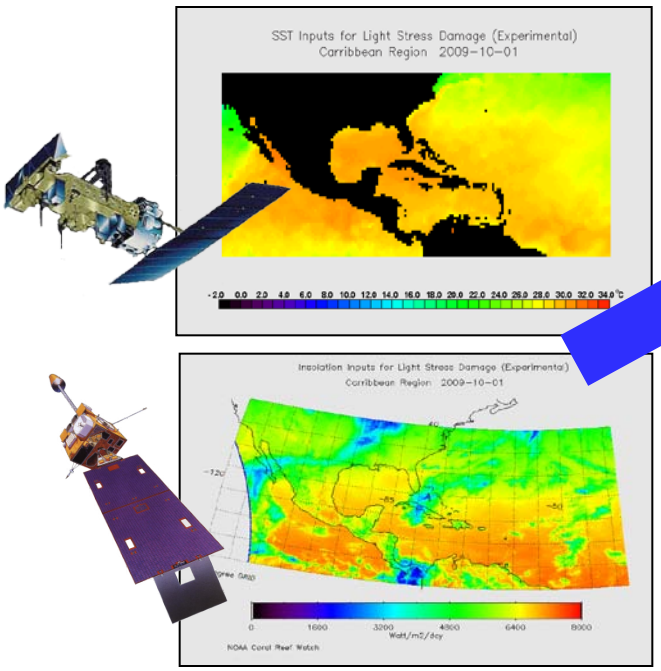


Milestone
On Target
June 2011

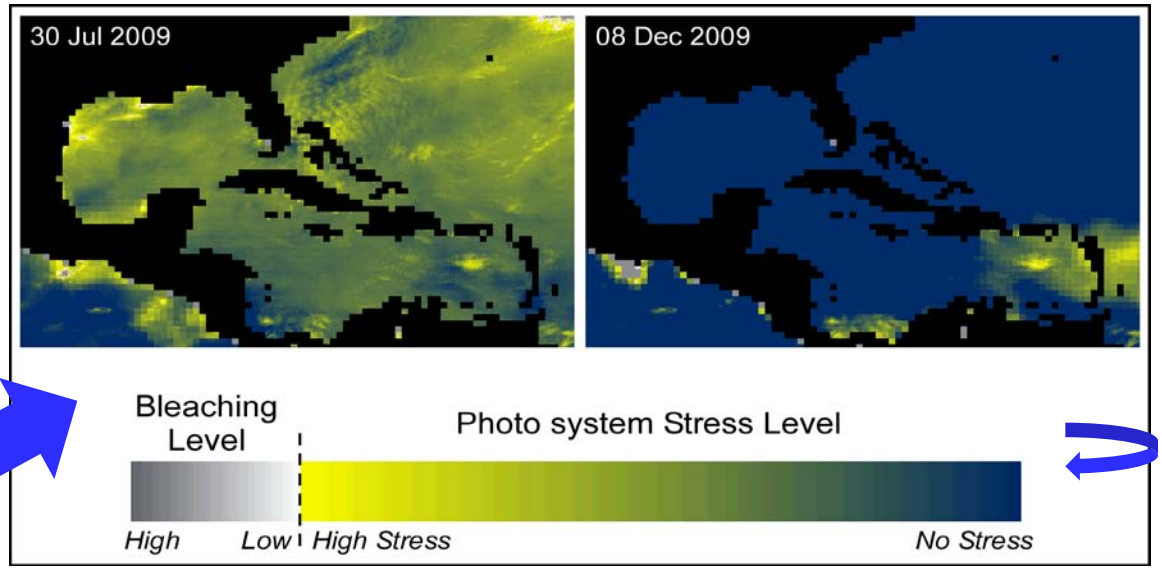
NOAA Coral Reef Watch

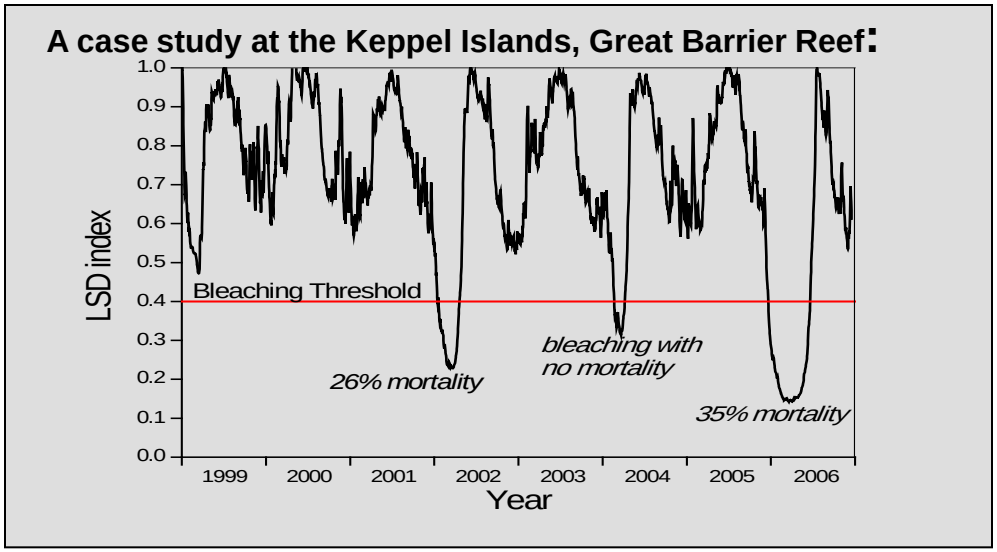
Regional Daily Light Stress Damage Product

(Under development)



NOAA GOES Surface and Insolation Products (GSIP) 1/8 degree.

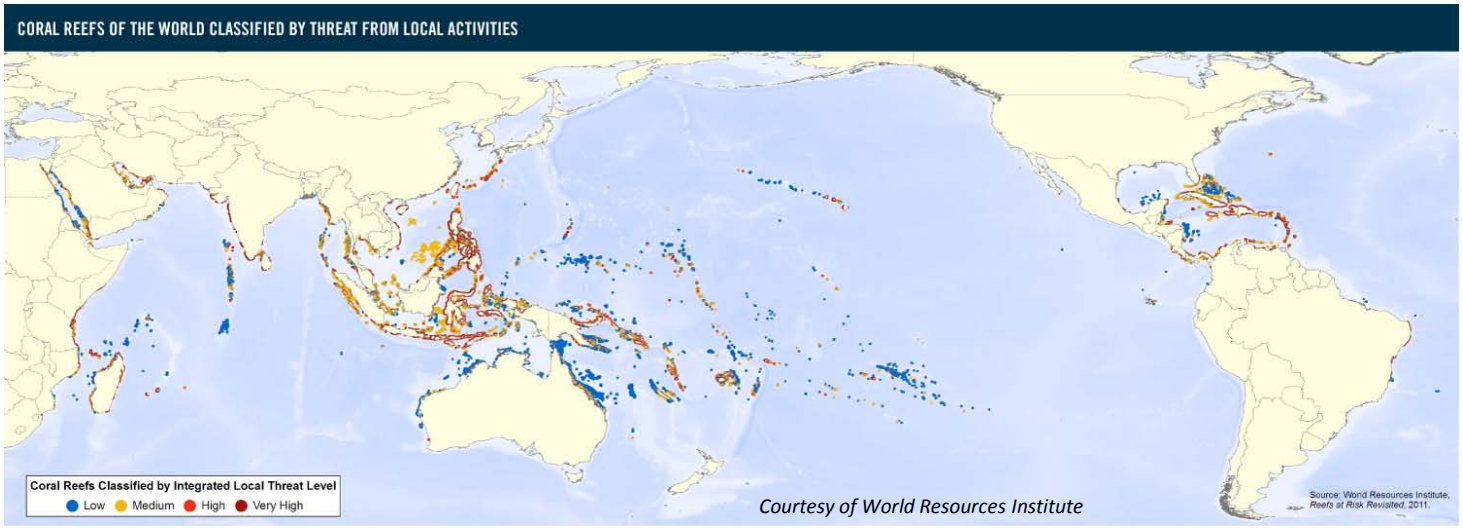




(Collaboration with the Universidad Nacional Autónoma de México (UNAM), the University of Queensland, and the University of Exeter)

CRW contributes to “Reefs at Risk Revisited” Report

- February 22: NOAA Coral Reef Watch (CRW) attends World Resources Institute’s “Reefs at Risk Revisited” Report Launch (http://www.wri.org/publication/reefs-at-risk-revisited)
  - Report provides detailed assessment of status of and threats to world’s coral reefs
    - 75% of world’s reefs currently threatened by climate change and local stressors
    - 100% of reefs could be threatened by 2050
  - Tracked changes since original “Reefs at Risk” report (1998)
  - Introduced assessment of climate-related threats to reefs
  - NOAA CRW and its partners contributed substantial data for climate change threat analysis



NOAA Coral Reef Watch engages in domestic and international partnerships to provide valuable products and information to coral reef managers worldwide to monitor and maintain coral reef health.

http://coralreefwatch.noaa.gov/

(Courtesy of M. Eakin, Coral Reef Watch) **(Sponsor: NOAA Coral Reef Conservation Program)**

NOAA CRW Leads Bleaching Paper in *PLoS ONE*

- "Caribbean Corals in Crisis: Record Thermal Stress, Bleaching, and Mortality in 2005" published in *PLoS One*
- Includes 65 authors from 22 countries
- Most comprehensive documentation of basin-scale bleaching to-date
- Directly compares 2005 record Caribbean bleaching and mortality to thermal stress measured by NOAA satellites
- NOAA press release issued about paper, "Heat Stress to Caribbean Corals in 2005 Worst on Record"

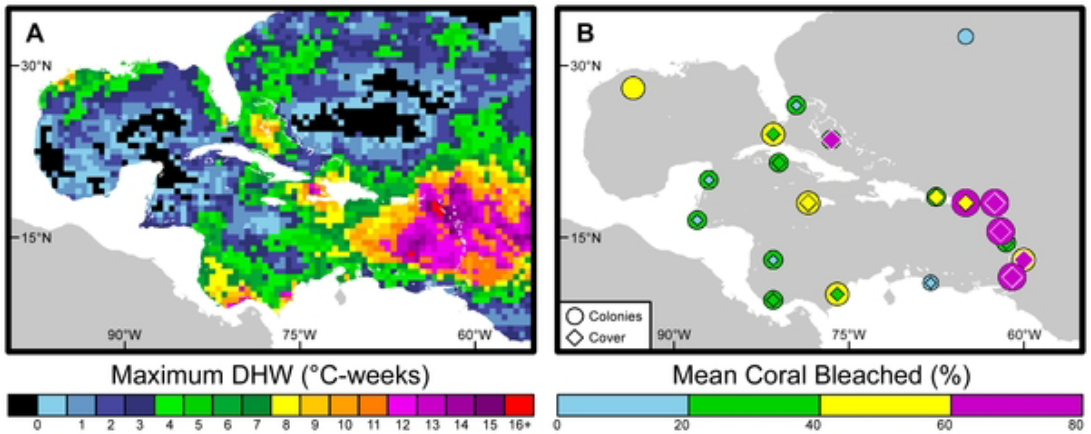


Figure 1. Thermal stress and bleaching during the 2005 Caribbean bleaching event.

NOAA Coral Reef Watch engages in domestic and international partnerships to provide valuable information to coral reef managers worldwide.

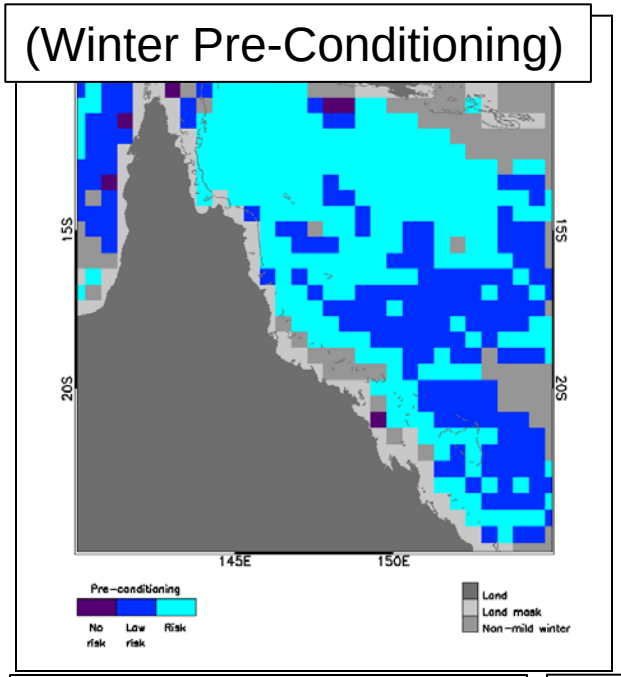
http://coralreefwatch.noaa.gov/

(Courtesy of M. Eakin, Coral Reef Watch) **(Sponsor: NOAA Coral Reef Conservation Program)**

NOAA Coral Reef Watch

Regional Coral Disease Outbreak Risk Product

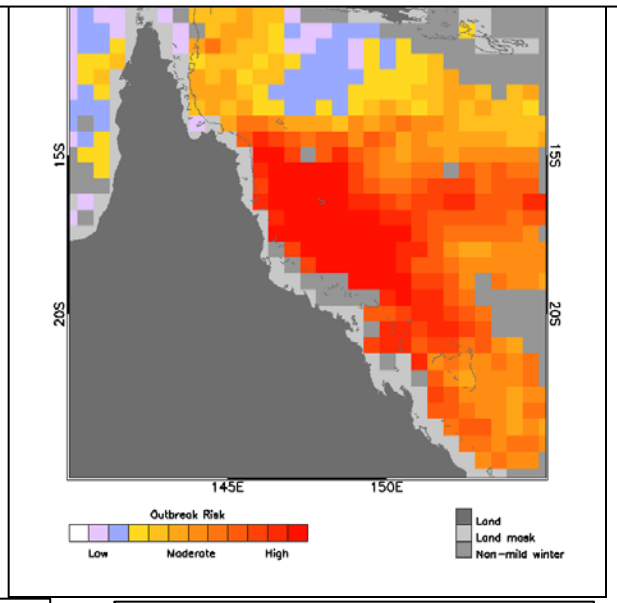
(Winter Pre-Conditioning)



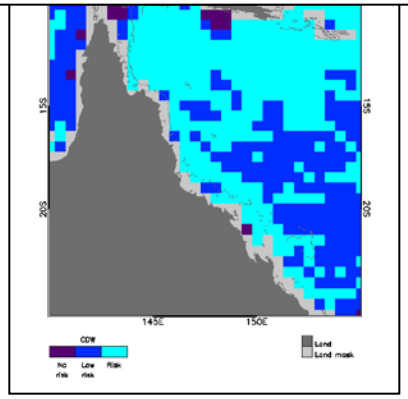
(Experimental)

2002
Austral
Summer Season

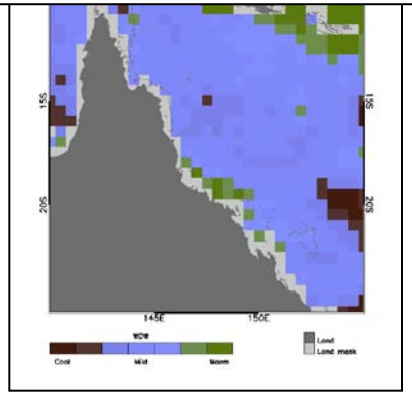
(Neal-Real-Time Summer Outbreak Risk)



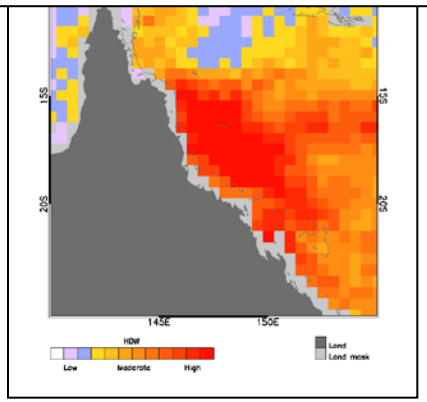
(Cold Degree Weeks)



(Winter Degree Weeks)



(Hot Degree Weeks)



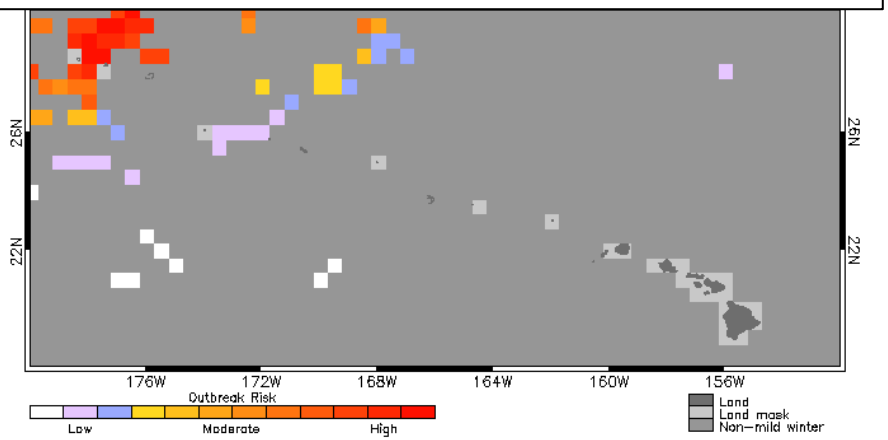
Based on Heron *et al.* 2010 (PLoS One)

NOAA Coral Reef Watch

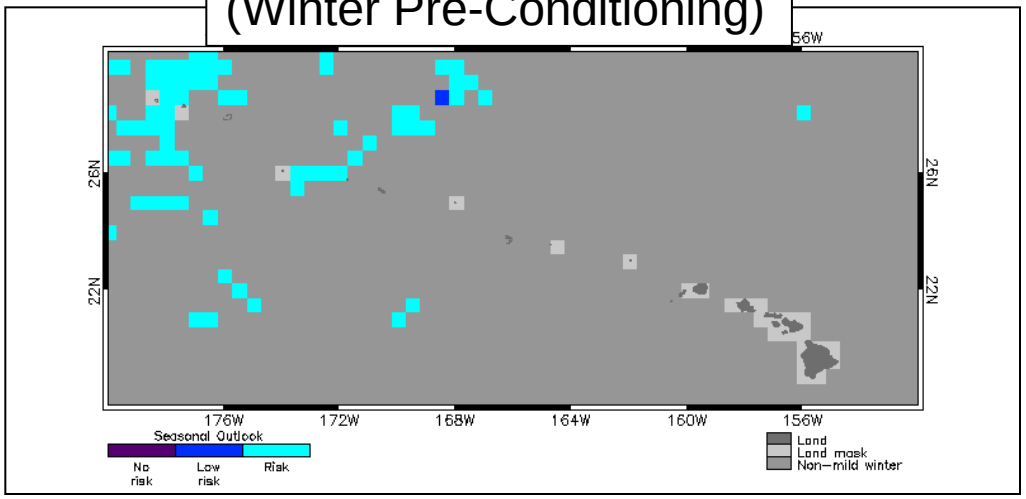
Regional Coral Disease Outbreak Risk for Hawai'i

(Experimental) 2010 Boreal Summer Season

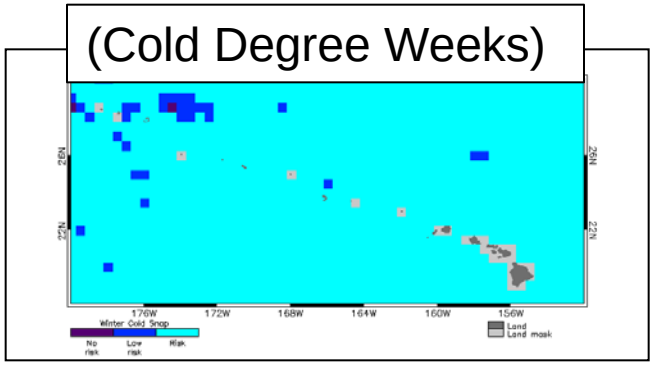
(Near-Real-Time Summer Outbreak Risk)



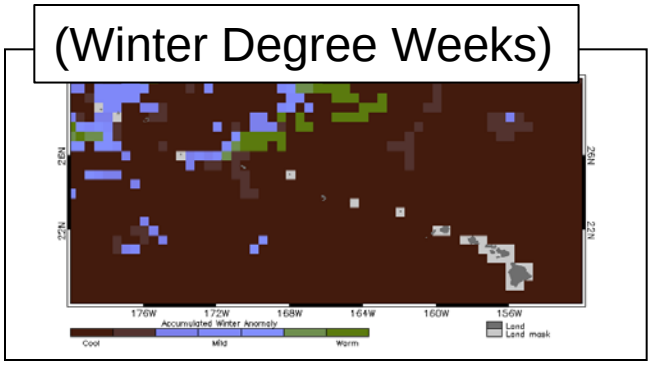
(Winter Pre-Conditioning)



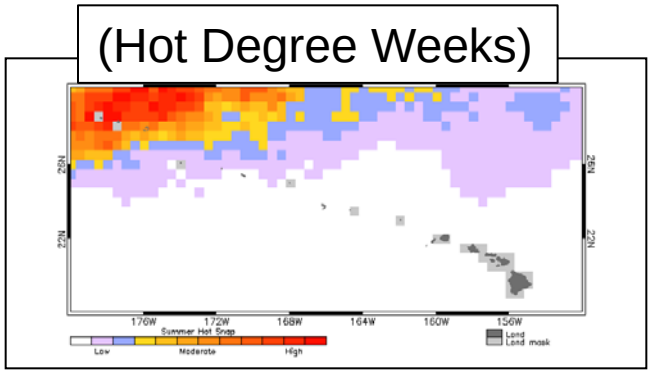
(Cold Degree Weeks)



(Winter Degree Weeks)

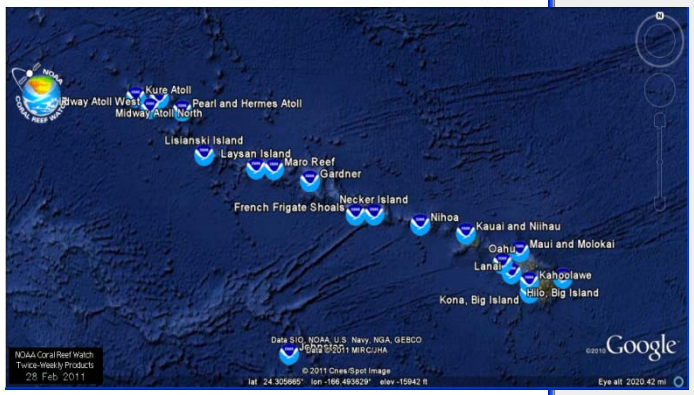


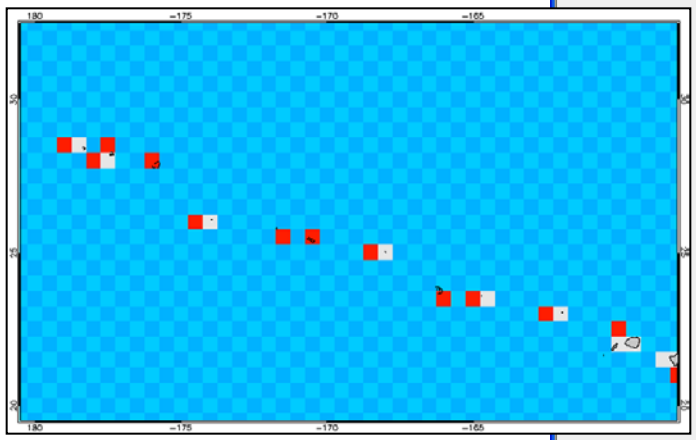
(Hot Degree Weeks)

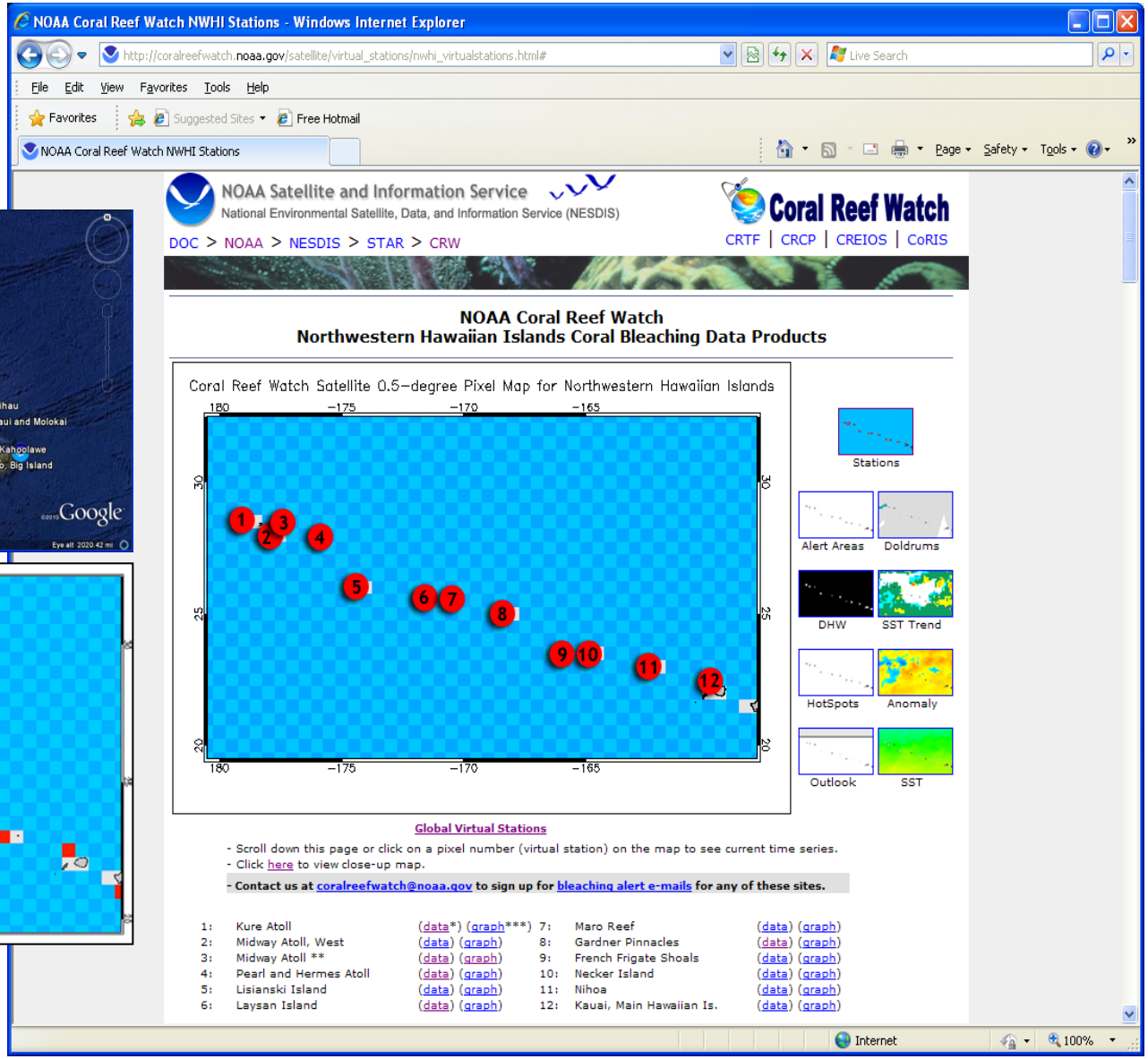


NOAA Coral Reef Watch

Satellite Bleaching Virtual Stations in NWHI







SOCD Team: ORS 2011 Knauss Fellowship Funding

The National Sea Grant College Program Dean John A. Knauss Marine Policy Fellowship, established in 1979, provides a unique educational experience to students who have an interest in ocean, coastal and Great Lakes resources. The program matches highly qualified graduate students with "hosts" in the legislative and executive branch of government located in the Washington, D.C. area, for a one year paid fellowship. The Fellowship runs from February to January each year.

- 2011 Knauss Fellow Initiatives (FY11 Q2-Q4 and FY12 Q1-Q2)
  - Assess current CRW product suite; work with CRW's Senior Consultant and STAR experts to identify areas of future product development/enhancement; draft final report to STAR and NOAA Coral Reef Conservation Program (CRCP)
  - Serve as a Liaison to STAR
  - Coordinate evaluation of the 2010 coral bleaching season and compare it with past major bleaching events
  - Help facilitate the NOAA CRCP National Coral Reef Monitoring Plan effort

Proposed FY2012 CRW Efforts:

- Work with NWS and FL Keys key partners to test and evaluate experimental Bleaching Weather Forecast System product.
- Evaluate and enhance Replacement 50-km Product Suite based on SST data from AVHRR Clear-Sky Processor for Oceans (ACSPO)
- Launch and Evaluate v3 of the Seasonal Bleaching Outlook experimental product, based on NOAA/NCEP operational SST forecasts.
- Develop experimental 4-11 km resolution Global Coral Thermal Stress SST products.

- Launch Coral Light Stress Damage operational product?
- Enhance Coral Disease Outbreak Risk Maps to include the Caribbean?
- Extend Regional Bleaching Stress Return Period experimental product to global coverage?
- Evaluate and enhance global Short-Term Nighttime SST Trends experimental product?
- Extend Regional Bleaching Duration experimental product to global coverage?
- Derive concept for Ocean Color experimental product?
- Evaluate and enhance Hydrodynamic Modeling in the GBR?

Funding Issues:

• Need FY2012 ORS funding to continue CRW's Senior Consultant oversight of the 2011 NOAA Knauss Fellow; to continue development of new products with STAR; and to implement SOCD-CRW Advisory Board framework document drafted in FY11

• How to fund reprocessing of data (funding to development teams, not CRW)

FY2011 SOCD Mid-year Review

Ocean Color Science Team
Menghua Wang

March 30, 2011

Ocean Color Science Team (OCST)

- Menghua Wang is new OCST leader.
- We just had a OCST meeting on March 7:
  - OCST will hold quarterly meetings
  - Next meeting June/July 2011
  - Projects that are funded by ORS require a progress report in OCST meeting.
  - Annual reports are also required
    == But a peer-reviewed paper is preferred
    == Acknowledgements of ORS funding must be made
  - Encourage collaborations within OCST and among other science teams

Overview

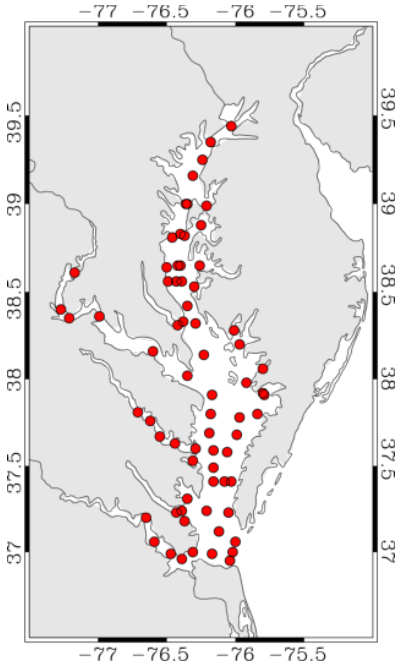
(ORS Funded Projects in FY11)

- **Son and Wang**: TSM Algorithm for the Chesapeake Bay – STAR/ORS
- **Ondrusek**: Provide ocean color validation data for the Chesapeake Bay, support Cal/Val for October 2011 VIIRS launch.
- **Johnson and Ondrusek**: MOBY Sciences.
- **Yuen-Murphy**: Water quality in the southern California bight.

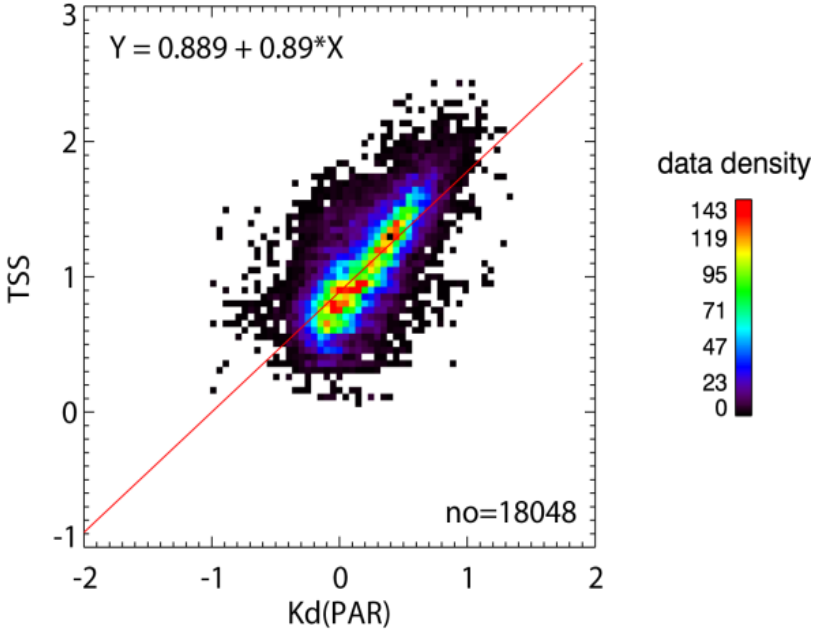
TSS Algorithm:

SeungHyun Son/Menghua Wang

- Various methods of obtaining in situ TSM measurements
- Multiple TSM models depending on platform used
- Used 3 approaches: single and multiple band ratios, backscattering coefficients, and diffuse attenuation coefficients
- Used in situ data from SeaBASS and the Chesapeake Bay program.
- Found TSS is correlated with backscattering coefficients.

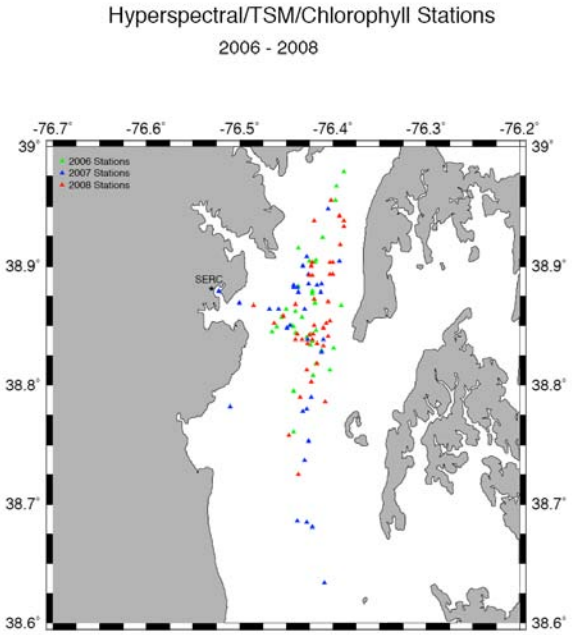


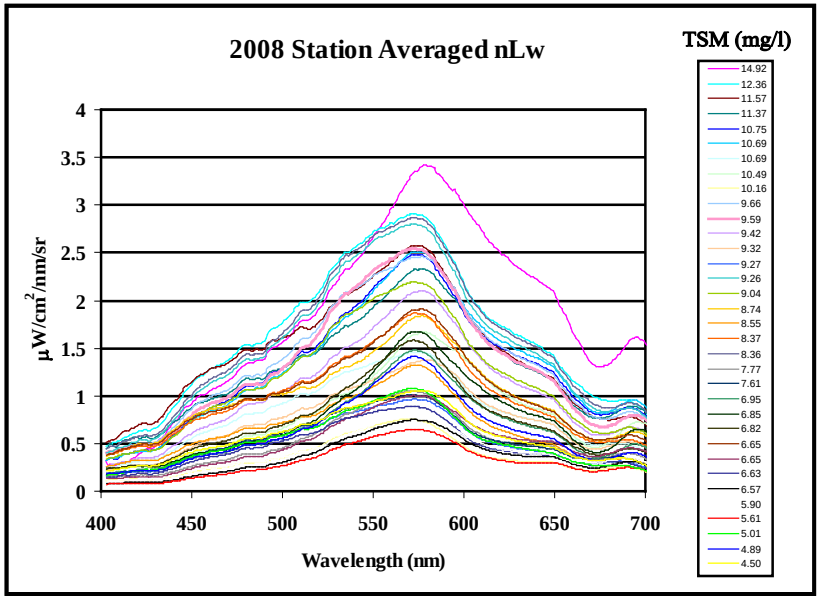
In situ TSM measurements are compared with the diffuse attenuation coefficients, K_d(PAR) (from the Chesapeake Bay Program Office Database)



COCE & Others:
Mike Ondrusek

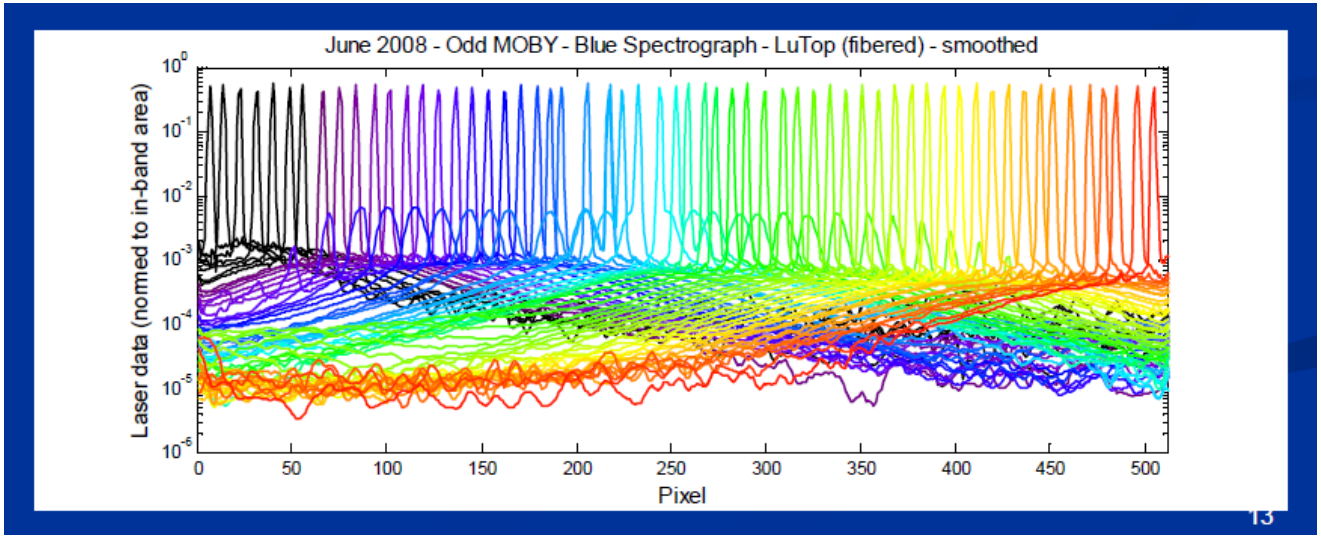
- Submitted publication on Chesapeake Bay hyperspectral data for TSM.
- Determined most effective sampling methods for collecting in situ optical data for calibrating and validating OC data in the Chesapeake Bay.
- Examined temporal and spatial variability of TSM in Chesapeake Bay.
- Questions on methodologies (1 vs. 2 bands, implementation of NIR-SWIR process) and data integrity.





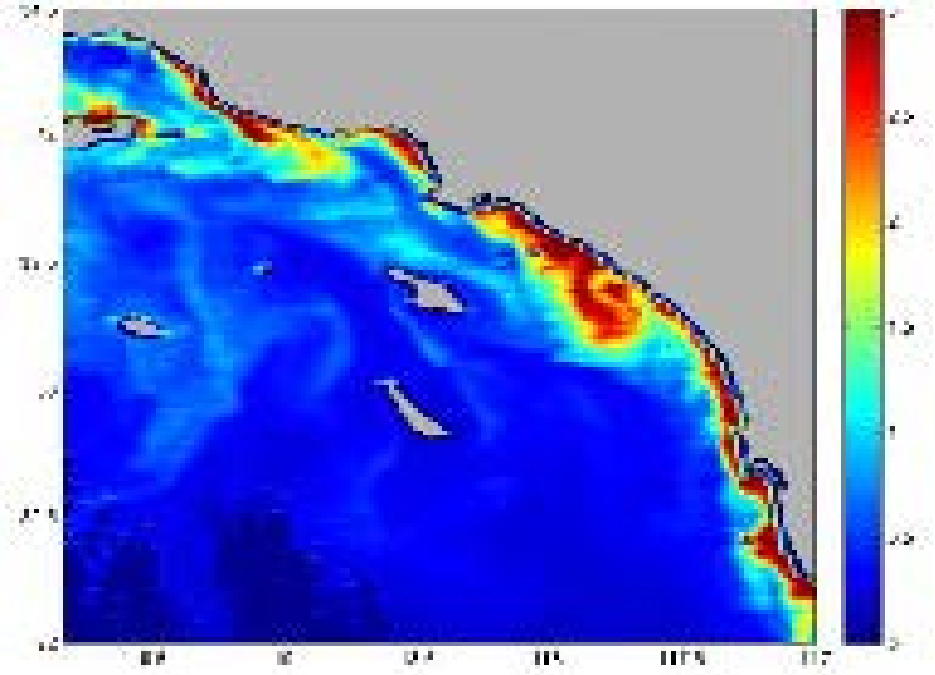
MOBY Science:
Carol Johnson / Mike Ondrusek

- MOBY single grading spectrograph needed stray light correction.
- Analyzed 2008 laser characterization data sets.
- Investigating other algorithms to validate approach
- Evaluating impact of new stray light characterization on 2008 deployments.
- Validating results using 2008 Es data.
- Estimating results uncertainty, documenting processing, and investigating uncertainty budget.
- Questions on how to deal with aging equipment.



Water Quality in Southern CA Bight:
Marilyn Yuen Murphy

- Evaluation of storm water runoff effects in the southern California bight.
- Chose 5 storm time periods that met criteria.
- Processed data using NIR-SWIR method.
- Preliminary data assessment is completed and alternative factors are being considered.



Accomplishments (FY11 Activities)

Supported from NOAA/NASA Funding/Grants

- **Two** new NASA projects/grant.
- **Five** peer-reviewed publications, **three** peer-reviewed papers in press, **two** other publications, **two** papers submitted, and several under preparations.
- We have more than **dozen** presentations/posters in various international and national meetings, workshops, and conferences.
- Actively participate various ocean color and other related activities, e.g., ACE, GEO-CAPE, JPSS/VIIRS, NRC study, IOCCG Level-1 WG, etc.

Research Support (from Oct. 1, 2010)

Wang, M. (PI), "Evaluation and Improvement of the NPP/NPOESS VIIRS Ocean Color EDRs," NASA ROSES-2010 NNH10ZDA001N-A.22: NPP Science Team for Climate Data Records (3-year).

Wang, M. (PI), NASA ACE, GEO-CAPE projects supports.

Peer-Reviewed Publications (from Oct. 1, 2010)

Shi, W., M. Wang, X. Li, and W. G. Pichel (2011), "Ocean sand ridge signatures in the Bohai Sea observed by satellite ocean color and synthetic aperture radar measurements," *Remote Sens. Environ.* (In press).

Shi, W. and M. Wang (2011), "Satellite observations of environmental changes from the Tonga Volcano eruption in the southern tropical Pacific," *Int. J. Remote Sens*. (In press).

Ramachandran, S. and M. Wang (2011), "Near-real time ocean color data processing using ancillary data from the Global Forecast System model," *IEEE Trans. Geosci. Remote Sensing* (In press).

Shi, W. and M. Wang (2011), "Satellite observations of asymmetrical physical and biological responses to Hurricane Earl," *Geophys. Res. Lett.,* **38**, L04607, doi:10.1029/2010GL046574.

Wang, M., W. Shi, and J. Tang (2011), "Water property monitoring and assessment for China's inland Lake Taihu from MODIS-Aqua measurements," *Remote Sens. Environ.*, **115**, 841-845.

Son, S., M. Wang, and J. K. Shon (2011), "Satellite observations of optical and biological properties in the Korean dump site of the Yellow Sea," *Remote Sens. Environ.*, **115**, 562-572.

Eakin, C. M., C. J. Nim, R. E. Brainard, C. Aubrecht, C. Elvidge, D. K. Gledhill, F. Muller-Karger, P. J. Mumby, W. J. Skirving, A. E. Strong, M. Wang, S. Weeks, F. Wentz, and D. Ziskin (2010), "Monitoring coral reefs from space," *Oceanography*, **23**, 118-133.

Shi, W. and M. Wang (2010), "Characterization of global ocean turbidity from Moderate Resolution Imaging Spectroradiometer ocean color observations," *J. Geophys. Res*., **115**, C11022, doi:10.1029/2010JC006160.

Other Publications (from Oct. 1, 2010)

Shi, W. and M. Wang (2010), "Sea ice optical properties in the Bohai Sea measured by MODIS-Aqua," *Proc. SPIE*, Vol. 7858, 78580L, doi:10.1117/12.869282.

Son, S. and M. Wang (2010), "The diffuse attenuation coefficient model in the Yellow Sea for the Korean Geostationary Ocean Color Imager," *Proc. SPIE*, Vol. 7861, 78610F, doi:10.1117/12.873335.

Milestone Status

Two items are carried over from previous year(s), all items are in good progress.

- Sediment sources in the Chesapeake Bay paper accepted for publication (from FY2008) (Ondrusek):
  - Paper submitted to RSE
- Submit Southern California Bight stormwater runoff event paper for publication in a peer-reviewed journal (from FY2010) (Yuen-Murphy):
  - Data analysis is ongoing
- Develop a new Total Suspended Solids (TSS) algorithm for the Chesapeake Bay (Wang):
  - In progress
- Validate the new MOBY stray-light correction matrix using colored sources and other methods, estimate and assign uncertainties in the stray-light correction for 2008 MOBY deployments, and publish results (Ondrusek):
  - In progress
- Provide Chesapeake Bay ocean color in situ data (Ondrusek):
  - In progress

Funding Status and Issues
(ORS Funded Projects in FY11)

- **Son and Wang**: TSM Algorithm for the Chesapeake Bay – STAR/ORS.
- **Ondrusek**: Provide ocean color validation data for the Chesapeake Bay, support Cal/Val for October 2011 VIIRS launch.
- **Johnson and Ondrusek**: MOBY Sciences.
- **Yuen-Murphy**: Water quality in the southern California bight.

FY2012

Looking Forward:

- New Activities:
  - In situ and satellite data analyses
  - New algorithm development in coastal ocean regions, e.g., the Chesapeake Bay
  - Satellite algorithms evaluation, validation, and assessments
  - Satellite ocean color data applications/studies
- Challenges:
  - Data quality, Data quality, Data quality
  - Documentation/Publications

FY2011 Science Team Mid-Term Review

SOCD and ORS

Sea Ice

Pablo Clemente-Colón

David McAdoo

30 March 2011

Sea Ice Science Team

FY2011 Research Plans

- Continue to closely changes in the Arctic sea ice during summer are moving toward seasonal opening and increased navigability in the region.
- Improving capabilities to support a more automated spatial forecast tools within the NIC.
- Pathway for scatterometer sea ice products research to operations transition affected with loss of QuikSCAT. Looking at OCEANSAT2 and processing of limited QS.
- Continue to validate and assess the capabilities of satellite altimeters to map Arctic sea ice elevation, particularly from Cryosat-2.
- Expanding deployment of a mix of ice, drifting, and seasonal buoys to support sea ice analysis, weather prediction and climate monitoring in the Arctic and Antarctic.

Science Team

FY2011 Research Objectives and Tasks

The research strategy is to investigate combinations of active (SAR, scatterometer, altimeter), passive microwave and other visible and IR missions/sensors to provide the best cryospheric products that can fulfill documented and emerging users requirements.

- redefine/extend the JPL task to provide/develop scatterometer sea ice
- organize collection and evaluation of coincident and near coincident SAR imagery from multiple sensors for improved sea ice characterization through NAIS working groups
- develop project to chart and validate walrus ecosystem sea ice conditions in the Northern Bering Sea
- conduct research on the integration and synergy of simultaneous sea ice and nearby surface wind coincident observations from single sensors
- continue development of the U.S. Antarctic Buoy Observing Network
- develop the IMS version 3
- develop POSIT and prepare APLIS 2011 or other validation opportunities

Science Team

FY2011 Significant Accomplishments

1) Participation in IceBridge 2011 Arctic and Antarctic campaigns.
2) Supported coordination of 2011 Navy ice camp sea ice characterization efforts.
3) NIC IMS-based Multisensor Analysis Sea Ice Extent (MASIE) product publicly released by NSIDC.
4) Coordinating the validation of the Arctic Cap Nowcast and Forecast System (ACNFS).
5) Refinement of NIC Seasonal Forecast and participation in the 2011 SEARCH Sea Ice Outlook of the Arctic summer sea ice extent minimum conditions.
6) IMS Ver.3 PSDI Project Execution is underway – PRR Completed.
7) JCTD Arctic Collaborative Environment (ACE) requirements development.
8) Organizing of the 4th .Symposium on the Impacts of an Ice-Diminishing Arctic.
9) Coordination of multi-band/dual-pol SAR acquisition and in-situ validation during the 4th Joint U.S.-Canada Arctic Extended Continental Shelf (ECS) mapping mission aboard the *USCGC Healy* and the *CCGC Louis S. St. Lauren* icebreakers.
10) Scatterometer requirements, data access and sea ice products development.
11) NSF funding of Antarctic buoy program for Bellingshausen/Amundsen to Ross Sea deployments.
12) Collaboration with Italian Antarctic Program and potentially with Korea in the same region.
13) 2011 NIC/USNA collaboration to include Polar Oceanography class, internships, IceBridge participation, symposium support.
14) Participating in the NSF Center for Remote Sensing of Ice Sheets (CReSIS) Site Visit Panel
15) Participated in the CNO Shipping Game at the Naval War College, Newport, RI.
16) Participated in the Arctic Frontiers meeting in Tromsø, Norway
17) Participated in the NSIDC Sea Ice Semantics Workshop in Boulder, Co.
18) Participated in the CliC Sea Ice Workshop at GSFC, Greenbelt, MD.
19) Participated in the ESA Sentinel Products Workshop, Frascati, Italy
20) Abstracts submitted to IGARSS2011, 2011 Eastern Snow Conference, and BioNature.

FY2011 SOCD Mid-year Review

Sea Surface Height
Science Team

30 March 2011

Accomplishments: Publications

Published:

- Scharroo, R. and W H F Smith, "A GPS-based climatology for the total electron content in the ionosphere", 115, A10318, *Journal of Geophysical Research*. doi:10.1029/2009JA014719, 22 October 2010.
- Singhal, G.; Vijay G Panchang; J L Lillibridge, "Reliability assessment for an operational wave forecasting system in Prince William Sound, Alaska," *Journal of Waterway, Port, Coastal, and Ocean Engineering*, DOI:10.1061/(ASCE)WW.1943-5460.0000056, November/December 2010.
- Marks, K M, W H F Smith, and D. T. Sandwell, Evolution of errors in the altimetric bathymetry grid used by Google Earth and GEBCO, *Marine Geophysical Researches*, Vol. 31, No. 3, 223-238, doi:10.1007/s11001-010-9102-0, 9 November, 2010.
- R. Timmermann, A. Le Brocq, T. Deen, E. Domack, P. Dutrieux, B. Galton-Fenzi, H. Hellmer, A. Humbert, D. Jansen, A. Jenkins, A. Lambrecht, K. Makinson, F. Niederjasper, F. Nitsche, O. A. Nøst, L. H. Smedsrud, and W. H. F. Smith, "A consistent data set of Antarctic ice sheet topography, cavity geometry, and global bathymetry," *Earth Syst. Sci. Data*, 2, 261-273, doi:10.5194/essd-2-261-2010, 22 December 2010.
- Marks, K M, W H F Smith, NOAA Technical Report NESDIS 132, "Assessing Errors in Altimetric and Other Bathymetry Grids". Published 28 January 2011.

Accepted/In Press:

- Leuliette, E. and J. Willis, "Balancing the sea-level budget." Submitted to special sea level issue of *Oceanography*.
- Lillibridge, Scharroo, Jacobs, Russell, and Tabor, "Quality Assessment of the Jason-2 Operational and Interim Geophysical Data Records," submitted to *Marine Geodesy* (second special issue on Jason-2 cal/val), to be published September 2011
- Merrifield M., G. Mitchum, E. Leuliette, D. Chambers, S. Nerem, P. Woodworth, S. Holgate, L. Miller, and S. Gill: Sea level variations [in State of the Climate in 2010], *Bull. Amer. Meteor. Soc.*

Accomplishments: Team meetings

- **GEBCO XXIII**, Lima, Peru, 11-18 September 2010, W.H.F. Smith, K. Marks (Smith chaired 3 days of meetings)
- **Second International Symposium of the International Gravity Field Service, Study of the Earth's gravity field, with a special emphasis on gravity change and the gravity field of the Arctic**, University of Alaska Fairbanks, 20 – 22 September 2010, D. McAdoo
- **4th Coastal Altimetry Workshop**, 14 – 15 October 2010, Porto, Portugal. L. Miller, W.H.F. Smith, R. Scharroo (Miller co-convened, Smith co-chaired retracking session)
- **Altimetry for Oceans and Hydrology/Ocean Surface Topography Science Team**, 18–20 October 2010, Lisbon, Portugal. L. Miller, W.H.F. Smith, J. Lillibridge, E. Leuliette, R. Scharroo
- **Fall AGU Meeting**, San Francisco, CA, 13 – 17 December 2010 (E. Leuliette co-chair of special oral and poster sessions “Observing and Interpreting Regional Sea Level Change)
- **ICEBridge Science Team Meeting**, 19 – 20 January 2011, NASA/Goddard, McAdoo, Connor, Farrell
- **ESA CryoSat Validation Workshop**, 1 – 3 February 2011, Frascati, Italy, W.H.F. Smith, L. Connor, R. Scharroo
- **Jason-3 Four-Partner System Synthesis Review**: 1 – 3 February 2011, Toulouse, J. Lillibridge
- **WCRP/IOC Workshop on Regional Sea Level Change**, 7 – 9 February 2011, Paris, E. Leuliette and L. Miller
- **GEBCO Gridders Working Group Meeting**, 9–11 March 2011, Boulder CO, W.H.F. Smith

Accomplishments: Presentations

GEBCO XXIII, Lima, Peru, 11-18 September 2010

- Marks and Smith, "GEBCO Cookbook Contribution: Assessing Errors in Bathymetric Grids"
- Marks and Smith, "Interpolating Across Gaps in Bathymetric Surveys: The Value of Altimetry"

Second International Symposium of the International Gravity Field Service, Study of the Earth's gravity field, with a special emphasis on gravity change and the gravity field of the Arctic, University of Alaska Fairbanks, 20-22 September 2010

- McAdoo D., S. Laxon, S. Farrell et al., "Satellite Altimetric Mappings of Arctic Gravity and Sea Surface Topography from Envisat RA-2 and ICESat Data and More"

4th Coastal Altimetry Workshop, 14-15 October 2010, Porto, Portugal

- The Impact of ECMWF Model Evolutions on Geophysical Corrections for Altimetry (Scharroo, Lillibridge)
- Radar Altimetry over the Gulf of Mexico Oil Spill (Smith, Leuliette, Lillibridge)
- Evaluation of Altimeter Observations and Model Forecasts of the Gulf of Mexico Oil Spill (Miller, Kuhn)
- Tide Gauge Calibrations and the Radar Altimeter Database System (Leuliette, Miller, Scharroo, Gary Mitchum)

Altimetry for Oceans and Hydrology/Ocean Surface Topography Science Team, 18–20 October 2010, Lisbon, Portugal

- The Impact of ECMWF Model Evolutions on Geophysical Corrections for Altimetry (Lillibridge, Scharroo)
- An investigation into the source of the 59-day variations in Jason sea level (Leuliette, Scharroo, Lillibridge, Smith, Miller)
- Evaluating and interpreting the global and regional sea level climate record (Leuliette, Scharroo, Miller, Gary Mitchum)
- Radar Altimetry over the Gulf of Mexico Oil Spill (Smith, Leuliette, Lillibridge)
- RADS 4: a new interface to precise and fast-delivery altimeter data from Geosat to Cryosat (Scharroo, Leuliette, Lillibridge, Eelco N. sDoornbos, Marc C. Naeije, Ernst J. O. Schrama)

American Geophysical Union Fall Meeting, San Francisco, CA, 13–17 December 2010

- Ocean mass transport estimates from GRACE, altimetry, and Argo (Leuliette, Miller)
- A first comparison of CryoSat-2 and ICEBridge altimetry from April 20, 2010 over Arctic Sea Ice (Connor, Laxon, McAdoo, Farrell, Ridout, Cullen, Francis, Studinger, Krabill, Sonntag, The IceBridge Sea Ice Science Team)
- The ICESat Arctic-Ocean Mean Sea Surface: Reference Field for Future Satellite and Airborne Altimetry over Sea Ice (Farrell, McAdoo, Zwally, Yi, Laxon)

ICEBridge Science Team Meeting, GSFC, 19 – 20 January 2011

- IceBridge Observations of Sea Ice Thickness, Structure, and Volume Change: Bringing a NOAA View & Update (McAdoo, Connor)

WCRP/IOC Workshop on Regional Sea Level Change, Paris, France, 7 – 9 February 2011

- Leuliette, Miller, Scharroo, and Mitchum, "Regional sea level budgets and ocean mass transport estimates from GRACE, altimetry, and Argo".
- Miller and Douglas, "Gyre-scale atmospheric pressure variations and their relation to 19th and 20th century sea level rise"

GEBCO Gridders Working Group Meeting, Boulder CO, 9–11 March 2011

- Smith, "Altimetric Bathymetry Algorithms"

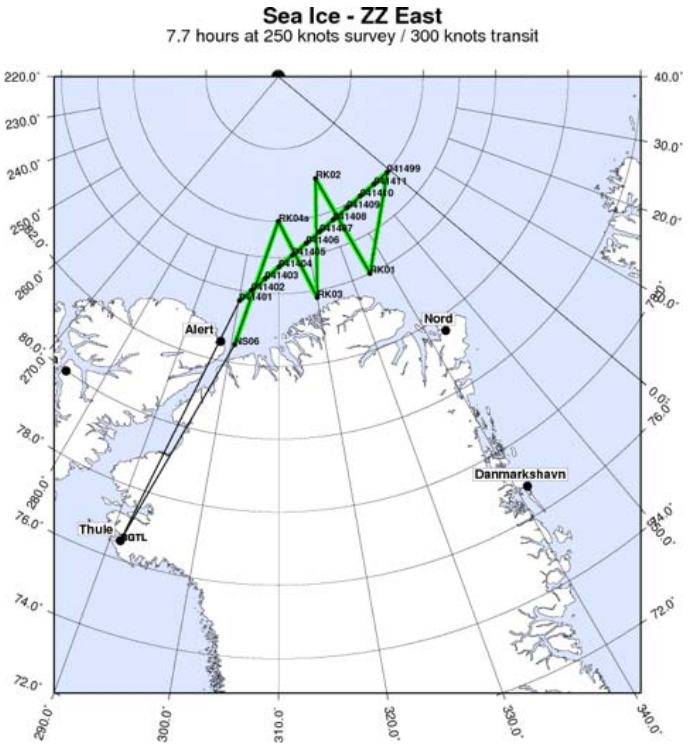
Accomplishments: Activities

- Jason-3 Budget FY11 & FY12
- Jason-CS planning (start FY13)
- Near-completion of *Oceanography* special issue (June)
- Participation in 3rd annual NASA Operation IceBridge (OIB) Mission
  - Overflights of Arctic sea ice (Connor and McAdoo)

Accomplishments: Activities

- NASA P3 flights
  - : ZigZag East: retrace ICESat ground-track

Map of IceBridge Sea Ice Science flight F07 track flown on 26 March 2011



Kent Dunwoody (DMS) and Dave McAdoo and looking at digital images of the sea ice at the DMS station

(Jim Yungel, NASA)

Milestone Status

Completed in Q1 and Q2: 4 of 6 early or on time

- Q1 STAR: Co-organize 4th Coastal altimetry workshop (Miller)
- Q1 SOCD: Present cal/val results and co-chair splinter sessions at 2010 OSTST meeting (Lillibridge)
- Q2 STAR: Prepare NOAA Technical Memorandum for contribution to GEBCO "Cookbook" guide for nascent mapping projects (Marks)
- Q2: SOCD: Update the LSA sea level rise website (Leuliette)

Cancelled: 1 of 6

- Q2 Team: Develop experimental new, higher resolution (1/3 degree) OSCAR surface current data processing system (Kuhn)

Incomplete: 1 of 6

- Q1 SOCD: Publish RADS data handbook with RADS4 rollout (Miller/Scharroo)
  New completion date:

Issues and concerns: correct wording

- Q4 NESDIS: Publish 2011 annual quality assessment and timeliness report for NRT Jason products (Lillibridge)

Funding Status and Issues

Renewing Altimetrics contract

New 4-year, sole-source

Jason Radiometer Project

Planned transfer of funds to Changyong Cao for support

Oceanography special issue on sea level

Transferred $15K

FY2012

- **New activities you will likely propose**
  - Tide gauge calibration
  - Ocean retracking of Cryosat data
  - Expanded analysis of sea level rise budget (ocean mass/ice sheet and steric sea level components)

- **Issues / Challenges**
  - Simultaneously analyzing current missions (Jason-1, Jason-2, Envisat, Cryosat, GRACE, GOCE) while planning for future missions (Jason-3, Jason-CS, Sentinel-3, AltiKa) with current staffing

FY2011 SOCD Mid-year Review

SSR Science Team

March 30, 2011

SSR Science Team - Overview

Overall goal

To research, develop, demonstrate, operationally implement, and perform science maintenance for SAR-derived oceanographic products.

- Automated SAR Products: Winds, Oil Spill Mapping, Vessel Positions, Lake Ice Classification, Waves
- Interactive SAR Products: Oil Spill Mapping, Oil Platform Change Detection, Marine Debris, Hurricane Winds and Structure, Coastal Bathymetric Change Detection, Coastal Flooding

SSR Science Team – Accomplishments

1. **Securing SAR Data Access**
   - Regular meetings on SAR data access – IIA, NIC, STAR
   - Formed Ground System working group – OSPO, NIC, STAR
   - Frascati meeting with ESA on Sentinel-1
   - Renegotiation of MOU with JAXA for ALOS
   - Draft of MOU with EC for joint wind R&D for operations

2. **SAR Wind Product Research and Development**
   - X-band algorithm implemented for TerraSAR-X and COSMO-SkyMed
   - Improved land masking
   - Implemented Mouche polarization ratio
   - Published paper on coastal mountain lee waves
   - Published paper on comparison of SAR and scatterometer coastal winds

3. **SAR Hurricane Research**
   - Completed SAR Hurricane Research Project – presented results in a report and at a workshop
   - Working on SAR Hurricane Manual – one chapter completed

4. **SAR Vessel Position R&D**
   - Working on integrating new Ingest Module and Ship Detection Module

5. **Emerging Applications Research – Great Lakes Ice, Waves, Bathymetry**
   - Software is at GLERL for testing – first two tasks completed on time
   - Scheduled multi-polarization RADARSAT-2, ENVISAT, and TerraSAR-X coverage of Great Lakes
   - Participated in FP7 proposal with DLR for operational SAR winds and waves development
   - Published paper on deep water bathymetry

SSR Science Team – Accomplishments (cont.)

6. **AKDEMO Maintenance**
    - Parallel testing of different wind model input to SAR winds

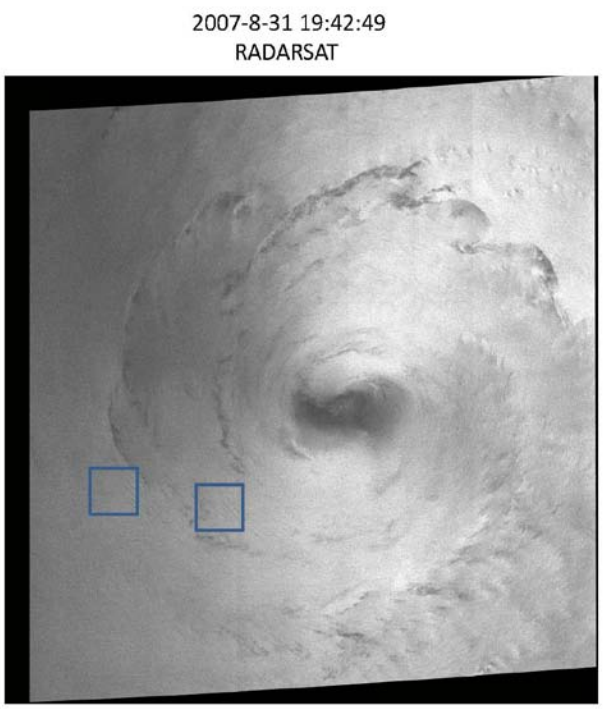
7. **GhostNet Support**
    - UAS SBIR project on schedule
    - Supporting joint NASA UAVSAR and Coast Guard C130 observer flights to N. Pacific convergence zone
    - Chaired Airborne Remote Sensing of Marine Debris session at the 5th International Marine Debris Conference

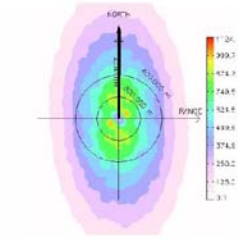
8. **Hurricane Hazard Response and Oil Spill Mapping Development**
    - GNOME paper published
    - TCNNA oil spill algorithm being trained with ALOS and ENVISAT data
    - NOAA Technology Summit presentation on SAR Applications including Deepwater Horizon response

9. **Operational Systems Development**
    - Completed Ingest and Wind module code and documentation
    - Draft wind ATBD completed
    - Completed preliminary winds walkthrough
    - Working with CoastWatch on output module
    - Archive request submitted
    - Implementation computer installed and being used
    - Working with OSPO on operational implementation

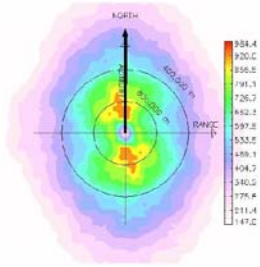
Present results of the STAR SAR Hurricane Wind Research project at the RADARSAT-1 Hurricane Applications Project workshop.

NESDIS/STAR responded to a Canadian Space Agency, NOAA, NASA, and University of Miami joint research announcement for a RADARSAT-1 Hurricane Applications Project. We presented our final report at the final project workshop October 6, 2010.





Far from the Hurricane eye box
1st peak: 1750 m
1st Peak Direction 33.7/Range
1st Peak Direction: 56.3/North



Close to the Hurricane eye box
1st peak: 1280 m
1st Peak Direction -90/Range
1st Peak Direction: 180/North

Analysis of boundary layer rolls for two locations (blue boxes) within a RADARSAT-1 SAR image from August 31, 2007. The Fast Fourier Transform (FFT) analysis at the right gives the distance between rolls and the orientation of the rolls for the two boxes.

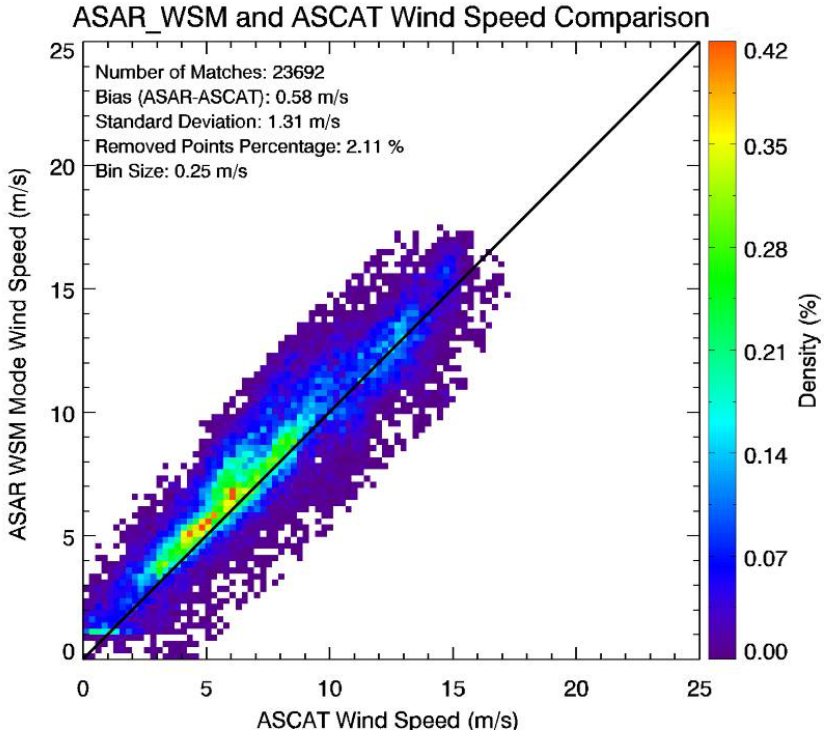
Significance: Wind measurements in hurricanes have been assessed along with hurricane morphology measurements (e.g., eye shape and orientation, boundary layer rolls), swell waves, and precipitation. Much unique information for the ocean's surface during hurricanes are obtainable from SAR instruments.

(Courtesy of W. Pichel)

Sponsor: ORS

SAR Operational Winds and Validation Modules code documented and software ready for code walkthrough

The Synthetic Aperture Radar High-Resolution Coastal Winds Integrated Product Team has completed coding and code documentation for the Winds and Validation Modules for operational implementation of SAR winds. A preliminary code walkthrough was held on October 18, 2010.



Comparison of ENVISAT Advanced SAR (ASAR) Wide Swath Mode (WSM) SAR-derived winds with ASCAT Scatterometer Winds. The mean difference is 0.58 m/s and the standard deviation of the differences is 1.31 m/s. This is one of the outputs of the Validation Module. Other outputs are comparison with fixed NOAA buoys and with forecast model winds.

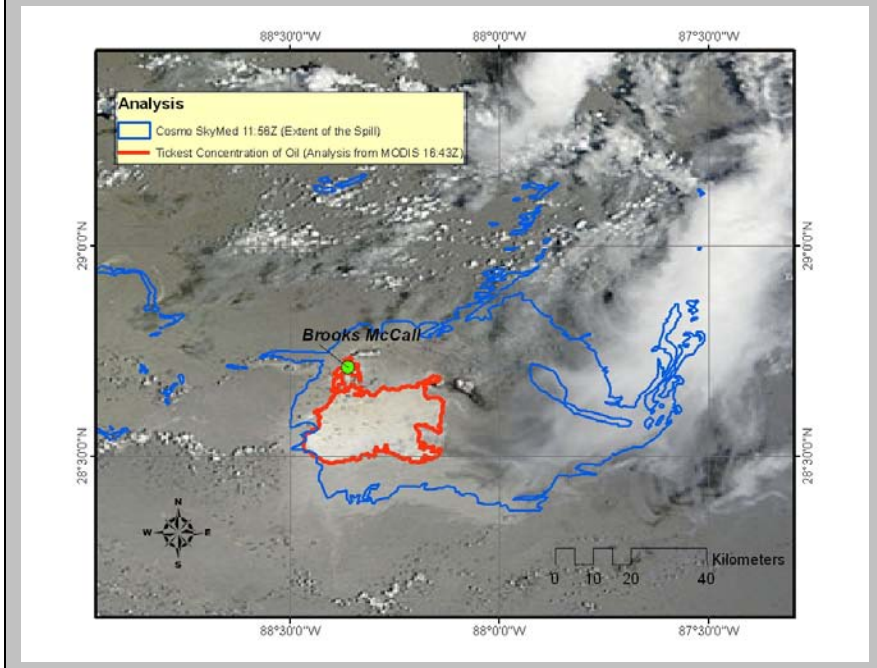
Significance: Code development is progressing on schedule for implementation of operational SAR-derived winds in July 2011. The Ingest, Winds, and Validation Modules have been written. Remaining is the Output Module development, completion of external documentation, and operational integration and testing.

(Courtesy of W. Pichel)

Sponsor: ORS

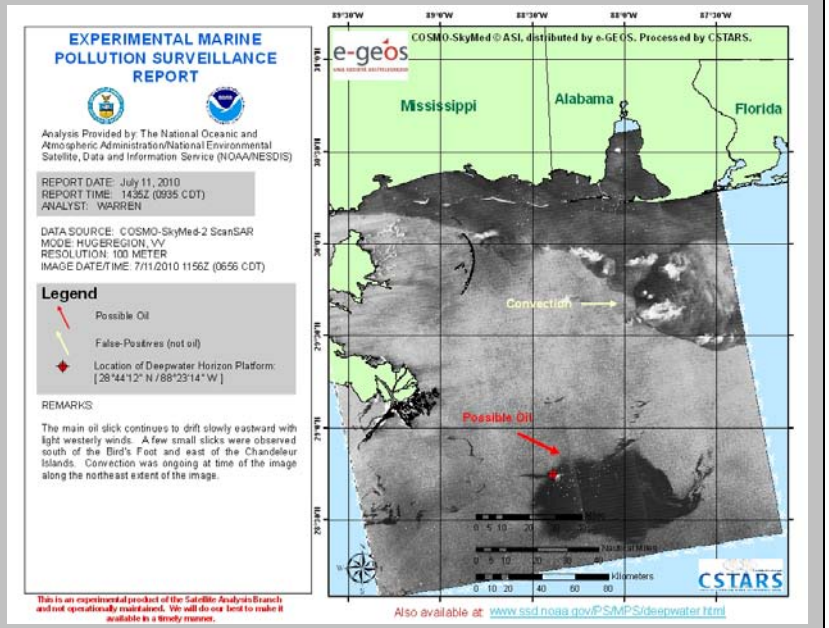
Presentation at NOAA Technology Summit

William Pichel gave a presentation at the NOAA Technology Summit in Silver Spring November 3, 2010. His presentation was entitled: "Synthetic Aperture Radar (SAR) Applications." Use of SAR imagery during the Deepwater Horizon Event was emphasized.



Above: MODIS Visible image July 11, 2010 16:43Z. Oil outline from SAR in blue; outline of possibly thicker oil from MODIS in red.

Below: COSMO-SkyMed-2 SAR image July 11, 2010 11:56Z.

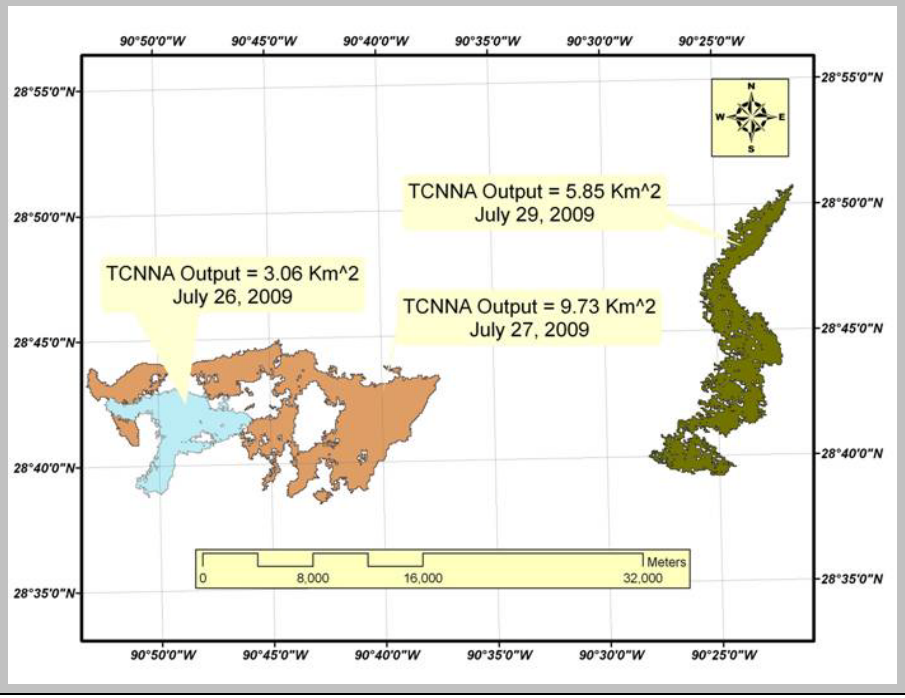


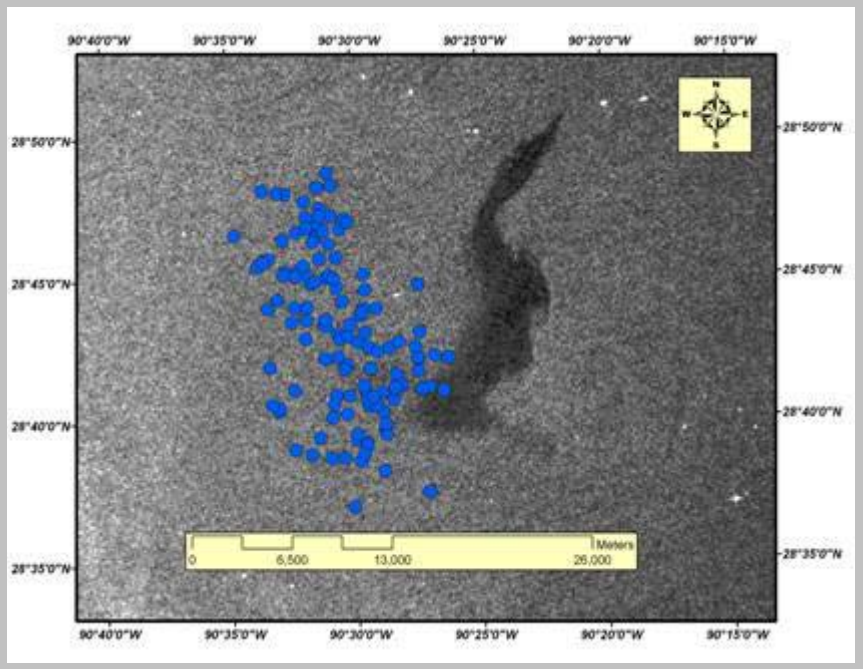
Florida State University and NOAA are collaborating on a study of the use of visible Sun glint imagery and SAR data to obtain qualitative information on surface oil thickness. Shipboard oil thickness samples were taken during July for algorithm development and validation.

(Courtesy of W. Pichel) **Sponsor: ORS**

Paper Published in Marine Pollution Bulletin

Xiaofeng Li, STAR contractor, and William Pichel of STAR are co-authors on a paper published in the Marine Pollution Bulletin. The title is: "SAR Observation and Tracking of an Oil Spill Event in Coastal Waters" by Yongcun Cheng, Xiaofeng Li, Qing Xu, Oscar Garcia-Pineda, Ole Baltazar Andersen, and William Pichel.



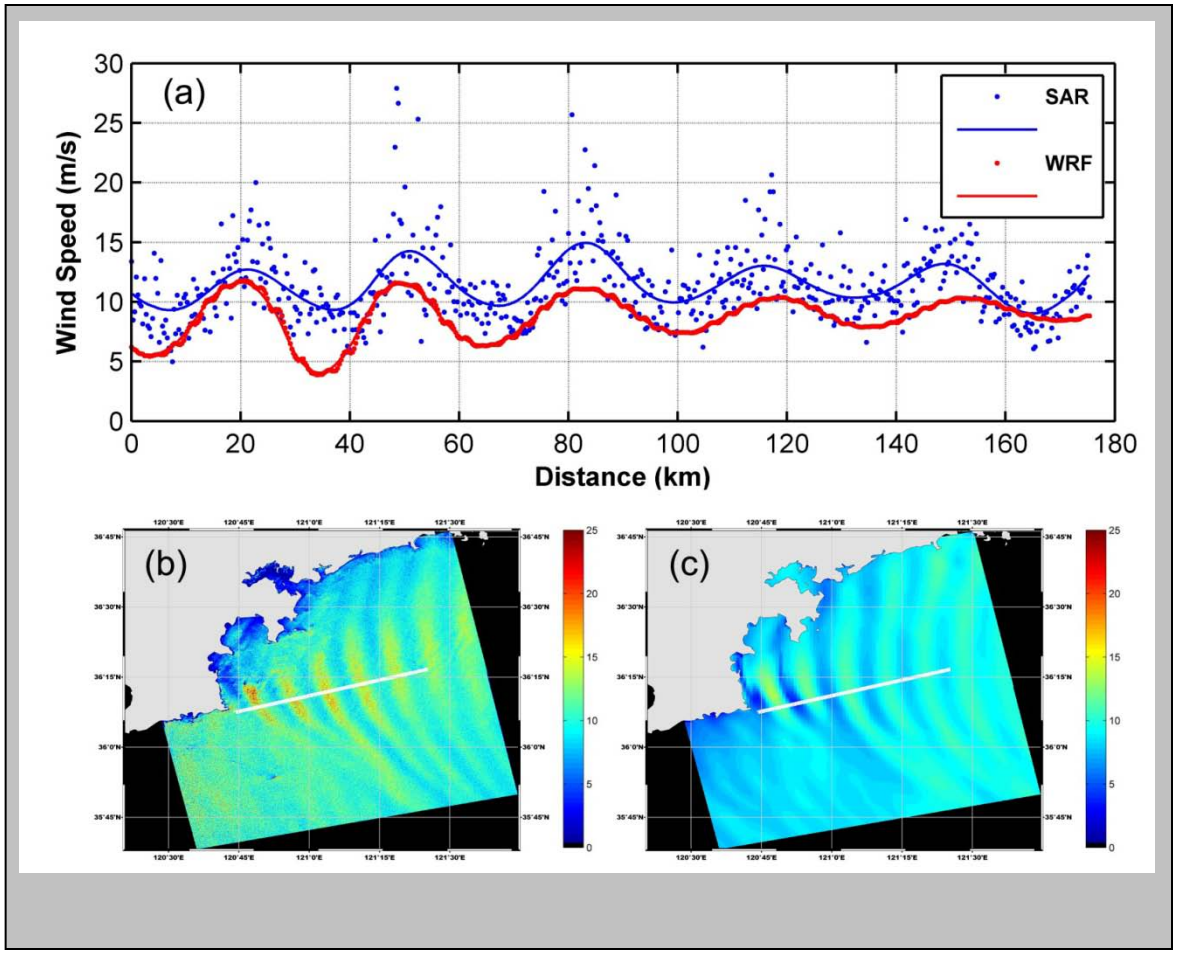


Left: Output of the Texture Classifying Neural Network Algorithm (TCNNA) for three days of a pipeline leak in the Gulf of Mexico. Right: General NOAA Operational Modeling Environment (GNOME) trajectory results (blue dots) after three days (July 29) on top of the SAR image for that day. The GNOME oil spill positions for day 1 were initialized from the TCNNA output of July 26.

(Courtesy of W. Pichel) **Sponsor: ORS**

Paper Published in Journal of Geophysical Research

Xiaofeng Li , STAR contractor and William Pichel of STAR are co-authors on a paper published in the Journal of Geophysical Research. The title is: "Sea Surface Imprints of Coastal Mountain Lee Waves Imaged by SAR" by Xiaofeng Li, Weizhong Zheng, Xiaofeng Yang, Ziwei Li, and William Pichel



(a) Comparison of Weather Research and Forecasting (WRF) model simulated surface wind speed with independent SAR measurements.

(b) SAR wind image

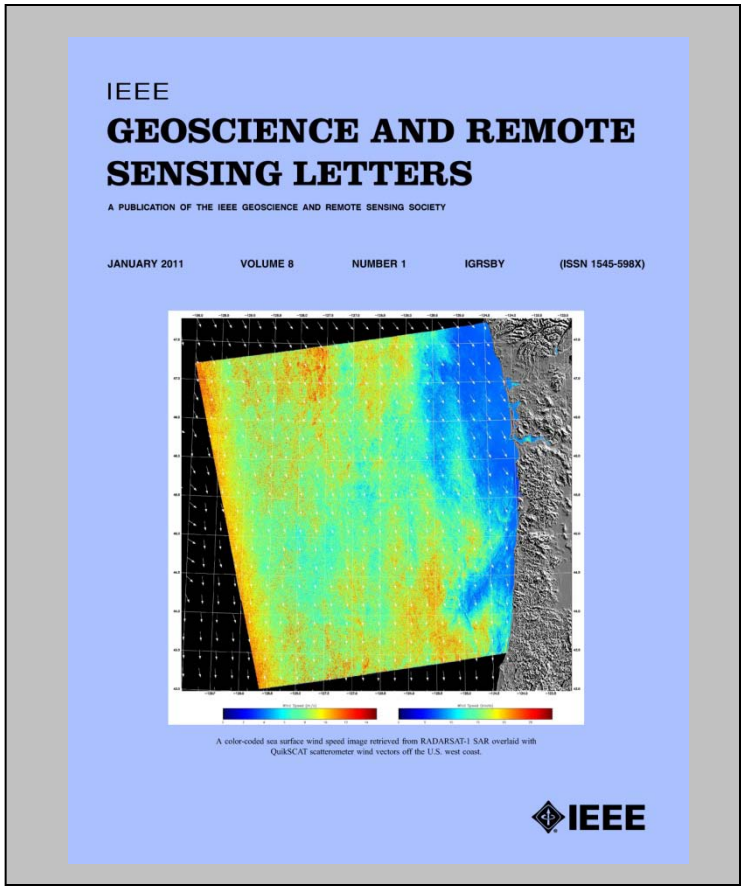
(c) WRF model simulated surface wind speed field.

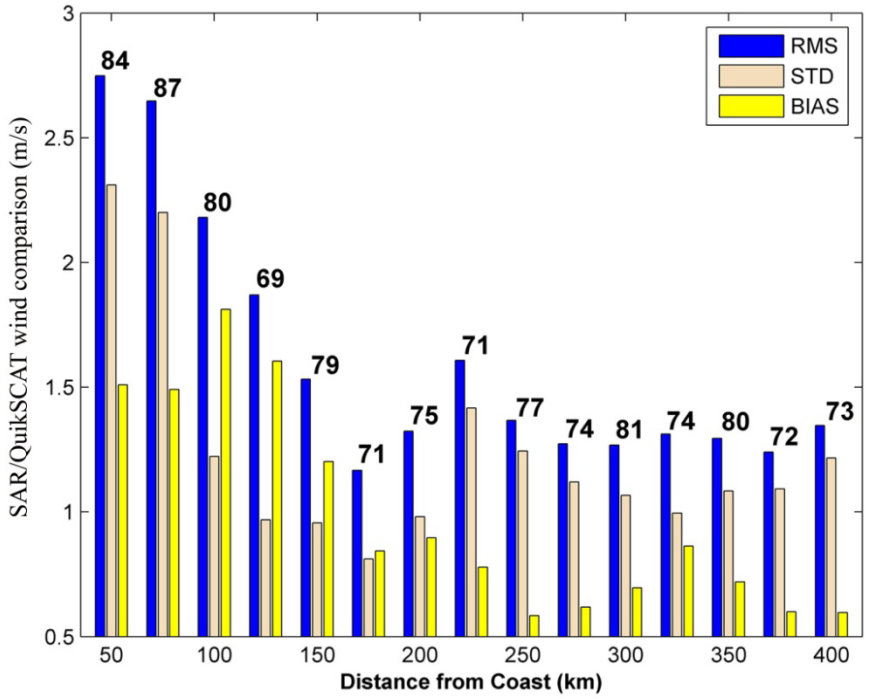
The wind speeds along the white line in (b) and (c) are extracted and their mean values are plotted as blue and red curves, respectively in (a).

(Courtesy of W. Pichel) **Sponsor: ORS**

Paper Published in IEEE Geoscience and Remote Sensing Letters

Xiaofeng Li , STAR contractor and William Pichel of STAR are co-authors on a paper published in IEEE Geoscience and Remote Sensing Letters. The title is: "Comparison of Ocean Surface Winds Retrieved from QuikSCAT Scatterometer and RADARSAT-1 SAR in Offshore Waters of the U.S. West Coast." by Xiaofeng Yang, Xiaofeng Li, Q. Zheng, X. Gu, W. Pichel, and Z. Li. A figure from this paper was selected as the front cover of GRS Letters for December 2010.



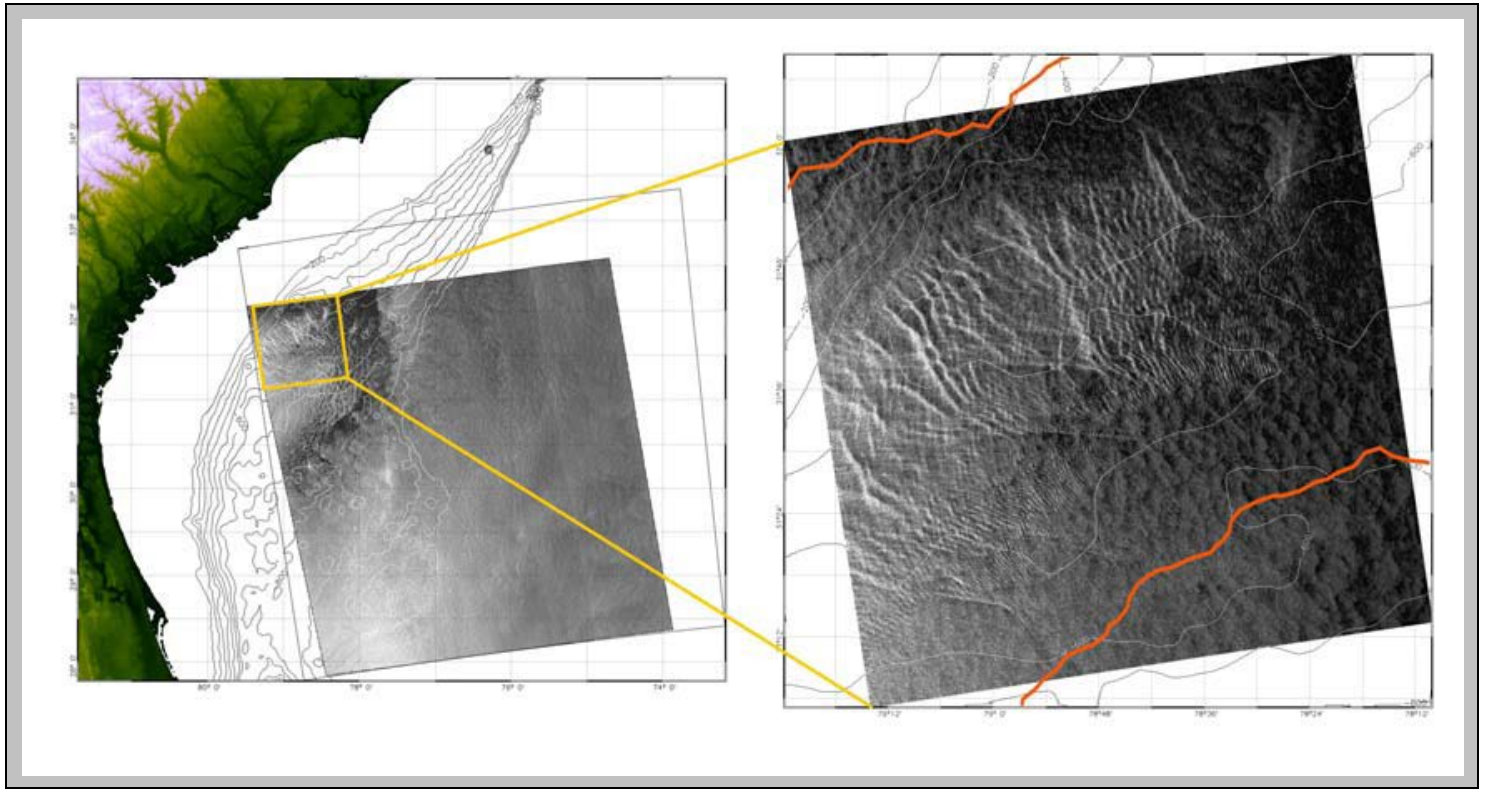


Significace: SAR and QuikSCAT winds agree well offshore, but diverge near the coast (125 km or less) where scatterometer winds are less accurate..

(Courtesy of W. Pichel) **Sponsor: ORS**

Paper Published in Geophysical Research Letters

Xiaofeng Li , STAR contractor and William Pichel of STAR are co-authors on a paper published in Geophysical Research Letters. The title is: "Deep-water Bathymetric Features Imaged by Spaceborne SAR in the Gulf Stream Region." by Xiaofeng Li, Xoaofeng Yang, Q. Xheng, L. Pietrafesa, W. Pichel, Z. Li, and X Li.

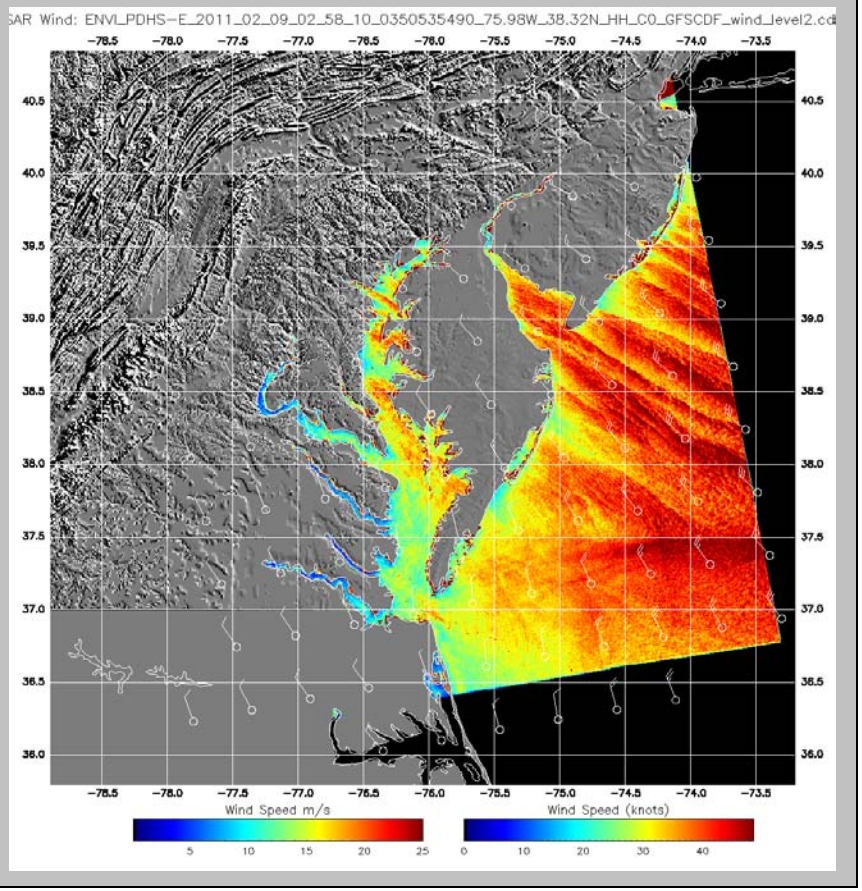


A SAR image (100 m resolution) shows the surface imprints of quasi-linear bathymetric features located in a region with water depth over 500 m. The SAR imaging time is at 23:04 GMT on October 15, 2006. Red lines on the right panel indicate the Gulf Stream boundaries extracted from a SST image. Bathymetry contour lines are from 200 to 1000 m with an interval of 100 m.

(Courtesy of W. Pichel) **Sponsor: ORS**

Progress toward Operational Implementation of SAR Winds

Rapid progress is being made in the operational implementation of SAR winds. A new Linux workstation has been installed in STAR for use by OSPO and STAR contractors for development of the operational scripts and testing of delivered software. External documentation is being developed . Arrangements for SAR wind archival in NODC are underway. And meetings have been held with CoastWatch on SAR winds product output and distribution.



February 9, 2011 ENVISAT Advanced SAR (ASAR) wind image of the Chesapeake Bay and Delaware Bay showing quite variable along-shore wind structure.

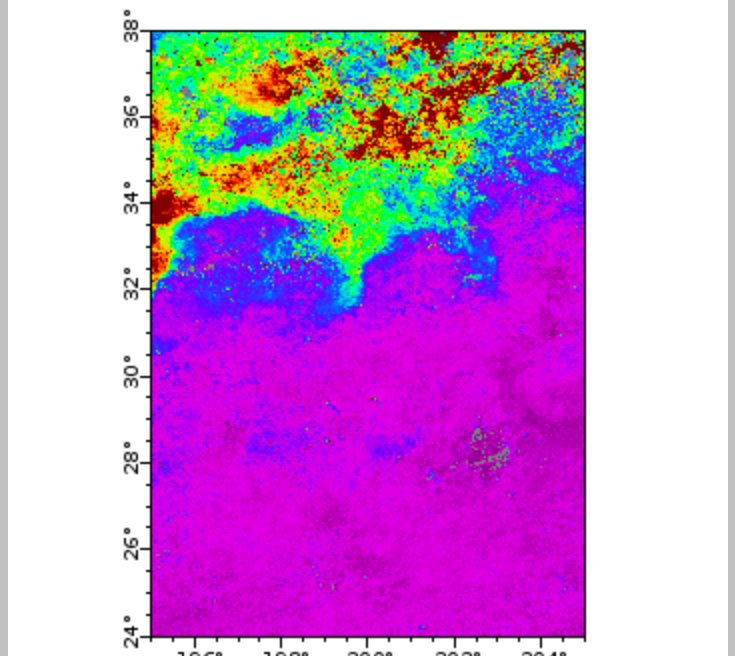
Significance – Good progress is being made Toward operational implementation of SAR winds scheduled for FY 2011.

(Courtesy of W. Pichel)

Sponsor: Polar PSDI and ORS

STAR and OSPO Participating in Marine Debris Field Program

The STAR Sea Surface Roughness Science Team and the OSPO Satellite Analysis Branch are participating in an aircraft field program for the detection of marine debris in the North Pacific Subtropical Convergence Zone. During the period April 5-11, 2011, the NASA UAVSAR Gulfstream jet and a Coast Guard C130 will fly on the same day to observe the oceanographic conditions and visible debris in the Subtropical Convergence Zone north of Hawaii.



(Courtesy of W. Pichel)

Right – NASA UAVSAR

Left – 14-Day MODIS chlorophyll composite. Marine debris collects in the convergence zone near the Transition Zone Chlorophyll Front (marked by 0.2 mg/m3).

Significance – Flights will provide validation of results from 2005 field program and a test of the utility of SAR data to marine debris detection.

Sponsor: ORS

Milestone Status

Completion

100% (3) completed in Q1 and Q2

33% early (STAR level)

67% on time (STAR level and Team level)

0% late

Incompletes – new completion date(s)

N/A

Issues and concerns

OSPO IT freeze will affect operational wind implementation schedule

Funding Status and Issues

Contracts:
AGU (Publications) – Awarded (ORS)
IMSG (SAR research) – Submitted (ORS)
UCLA (Great Lakes ice classification) – Submitted (ORS)
JHU/APL Task 4 (Wind operational implementation) – Submitted (PSDI)
GOA (SAR systems development) – C.Request at OSD for approval (PSDI and ORS)
JHU/APL Task 6 (Wind research) – C.Request in preparation/SOW complete (ORS)
FSU (oil spill mapping) – C.Request not prepared yet
ITT (ENVI maintenance) – Not prepared yet (ORS)
ERDAS (ERDAS maintenance) – Not prepared yet (ORS)

Pinks:
ESRI (ArcView maintenance) – Submitted (ORS)
Mathworks (Matlab maintenance) – Not prepared yet (ORS)
Oracle (Oracle license renewal) – Not prepared yet (ORS)
Taitus (SaVoir license renewal) – Not prepared yet (ORS)

FY2012

Looking forward:

- **New activities:**

  First operational update of SAR winds system
  Development of operational vessel detection system
  Completion of SAR Hurricane Manual
  Transition of Great Lakes Ice Classification from GLERL to NESDIS
  Begin development of 2nd Edition of SAR Marine User's Manual
  Begin experimental automated oil spill mapping
  Collaborate on wave product development
  Prepare for reprocessing of retrospective wind for coastal wind climatology studies

- **Issues / Challenges on the horizon**

  Preparation for Operational SAR Constellations
  Lack of personnel depth – both Government and contract
  Use of SMAP for winds and ice?

FY2011 SOCD Mid-year Review

Sea Surface Temperature

March 30, 2011

Overview

ORS

- Supplement PSDI development (Ignatov) – on track
- GOES Cal/Val (Maturi) – on track

GOES-R

- SST Team (Ignatov) – on track
- Ocean Dynamics (Maturi) – on track
- Cal/Val tools workshop (mid-Apr 2011) – on track

JPSS, NPOESS Cal/Val

- SST Team (Ignatov) – SOW submitted; on track

NDE

- SST (Ignatov) – on track

Polar/GOES PSDI

- ACSPO (Ignatov) – on track
- POES, GOES (Maturi) – on track
- GOES (Maturi) – on track

JCSDA

- L4-SQUAM – renewal proposal submitted

Accomplishments

JPSS

Proposal submitted

Publications

JGR in situ SST paper published (Sep 2010)
JTECH SQUAM paper published (Nov 2010)
JTECH Cloud Mask paper published (Dec 2010)
JTECH MICROS paper resubmitted (Mar 2011)

ACSPO

ACSPO v2 – on track (fundamentally redesigned; includes MODIS, VIIRS)

SST Quality Monitor

L4-SQUAM draws community attention; Paper due in Jun'2011
SQUAM takes over GOES Cal/Val responsibilities (adding GEO)

GOES-R

Ocean Dynamics ATBD delivered; Code v4 delivered

JCSDA

renewal proposal L4-SQUAM – on track

Milestone Status

% completed in Q1 and Q2

- % 15
- % 85
- % 0

Incompletes – new completion date(s)

- 3 milestones: code delivered to OSPO; implemented after 15 Apr 2011

Issues and concerns

- Personnel departure: Wen Meng, Peter Kiss – increased load on Team
- Unplanned JPSS workload – takes up to 50% time
- Inefficient funds allocation due to SciTech protest
- Other planned activities delayed/complicated (e.g. ORS funds allocation)

Other, as appropriate

- None

Funding Status and Issues

Status of processing / moving money via MOUs, contracts, grants, and/or Procurements – Significantly complicated this year due to SciTech issues

Other issues / concerns – Need more Fed support for SST

FY2012

Looking forward:

- JPSS related – will likely need 2 new hires
- Issues: increased workload, inefficient and non-supportive environment

FY11 Milestones

FY2011 SOCD Milestones	POC	Completion Target Date				Elevation	Funding	Comments
		Q1	Q2	Q3	Q4	Level	Source	
SEA SURFACE TEMPERATURE								
ACSPO v1.40 tested & delivered to OSDPD for operational implementation	S. Ignatov	D				STAR	PSDI, ORS	Delivered to OSPO Dec'10. Not implemented (freeze).
Publish peer-reviewed paper on *in situ* SST analyses in JGR	S. Ignatov	D				STAR	ORS	JGR paper published Oct'10
Drop-5 ACSPO code to NDE & GOESR algorithm integration teams	S. Ignatov	D				SOCD	NDE, GOES-R	Code dropped Dec'10.
Publish peer-reviewed paper on ACSPO Cloud Mask in Jtech	S. Ignatov		M			STAR	ORS	Papepr published Dec'10
Operational AMSR-E SST Product	E. Maturi		M			STAR	PSDI	moved to Q4 due to OSPO freeze
Present SST paper(s) at AMS 2011 conference	S. Ignatov					SOCD	ORS	5% cut eliminated this milestone
Implement Validation System for AMSR-E SST Product	E. Maturi		M			SOCD	PSDI, ORS	moved to Q4 due to OSPO freeze
Update SQUAM page for NRT monitoring AVHRR SST: Add L4, NAVO, and MeteoFrance SSTs	S. Ignatov		M			SOCD	IPO, JCSDA	NAVO & MeteoFrance SSTs added, L4 in progress.
Resubmit revised peer-reviewed MICROS paper	S. Ignatov		M			SOCD	ORS	Paper resubmitted to JTECH
Publish peer-reviewed paper on SST Quality Monitor (SQUAM) in Jtech	S. Ignatov			J		STAR	ORS	Paper published Nov'10.
Incorporate AMSR-E SST into POES GOES Blended SSTAnlaysis	E. Maturi			J		STAR	PSDI	Delayed due to W.Men departure
Submit peer-reviewed paper on hybrid SST algorithm	S. Ignatov			J		SOCD	ORS	Paper submitted in Feb'11.
Update Validation System for Enhanced POES GOES SST Analysis with AMSR-E SST	E. Maturi			J		SOCD	PSDI, ORS	moved to Q4 due to OSPO freeze
Global Geo-Gridded SST Product	E. Maturi				A	SOCD	PSDI	on track
Implement Validation System for Global Geo-Gridded SST Product	E. Maturi				A	SOCD	PSDI, ORS	on track
Set up a prototype in situ SST Quality Monitor webpage (iQuam)	S. Ignatov				S	NESDIS	IPO, GOES-R	Prototype iQuam page under testing
Set up webpage for Cal/Val of satellite SST against in situ SST (CALVAL)	S. Ignatov					STAR	IPO, GOES-R, ORS	ORS 5% cut delayed this milestone to FY2012
GOES-R Ocean Dynamics Algorithm , 80% ATBD, Delivered	E. Maturi				S	STAR	GOES-R	Q2 completed
GOES-R Ocean Dynamics Version 4 Algorithm Delivered	E. Maturi				S	STAR	GOES-R	Q2 completed
Operational Oceanic Heat Content Product for the N. Atlantic and Pacific Basins	E. Maturi				S	STAR	PSDI	on track
Implement Validation System for Oceanic Heat Content Products	E. Maturi				S	SOCD	PSDI, ORS	on track
Deliver Version-1 Documentation on GOES-R SST Cal/Val to Integration Team	S. Ignatov				S	SOCD	GOES-R	on track
Test ACSPO v2 at STAR (Modularized code, able to process MODIS and simulated VIIRS data)	S. Ignatov				S	Team	PSDI, ORS	on track
Test MICROS, SQUAM, and CALVAL pages with MODIS and simulated VIIRS data	S. Ignatov					Team	IPO, GOES-R, ORS	ORS 5% cut delayed this milestone to FY2012

FY2011 SOCD Mid-year Review

Ocean Winds Team

March 30, 2011

OSVW Team

- NESDIS/STAR
  - **Paul Chang (fed)**
  - **Zorana Jelenak**
  - **Seubson Soisuvarn (Golf)**
  - **Khalil Ahmad**
  - **Qi Zhu**
  - **Micah Baker**

- Current Main Research Activities
  - **OSCAT cal/val and product development**
  - **Ocean Winds Project aircraft flight experiments**
  - **ASCAT product improvement**
  - **Extratropical cyclone QuikSCAT climatology (NASA proposal)**

FY11 Accomplishments

- Participated in OSCAT cal/val meeting in Ahmedabad (EUMETSAT, KNMI, ECMWF, NASA/JPL, ISRO) – Preliminary OSCAT validation
- Conducted GCOM-W2/DFS ROUWG and technical meeting with JAXA and NASA/JPL
- Participated in EUMETSAT ASCAT Science Advisory Group meeting
- Planned and conducted the Ocean Winds Winter Storm Flight Experiment Program
  - Sampled 40+ m/s at the surface!
- Developed and supported FY13 SDE initiative
- Program committee for ESA/EUMETSAT Scatterometer Workshop
- Technical Program Committee for IGARSS 2011
- NOAA OSCAT processing system development initiated
- ASCAT impacts paper, ASCAT high wind GMF, and SFMR papers in preparation for submission
- Preparing for NASA OVWST meeting

STAR Ocean Winds Team ASCAT and OSCAT Product Improvements and Developments

Improvements made to ASCAT high wind retrievals through a newly developed Geophysical Model Function to better support NWS wind warning products, which was made possible in part by the NOAA Ocean Winds P-3 flight experiment project. Product ready to be transitioned to operations

Development of NOAA's Scatterometer Wind Data Processor to support calibration, validation and product improvements in order to provide OSWV data that will meet NOAA's operational product quality, consistency and monitoring requirements

Winter 2011 NESDIS Aircraft Wind Experiment

Winter experiment conducted from Halifax, Nova Scotia

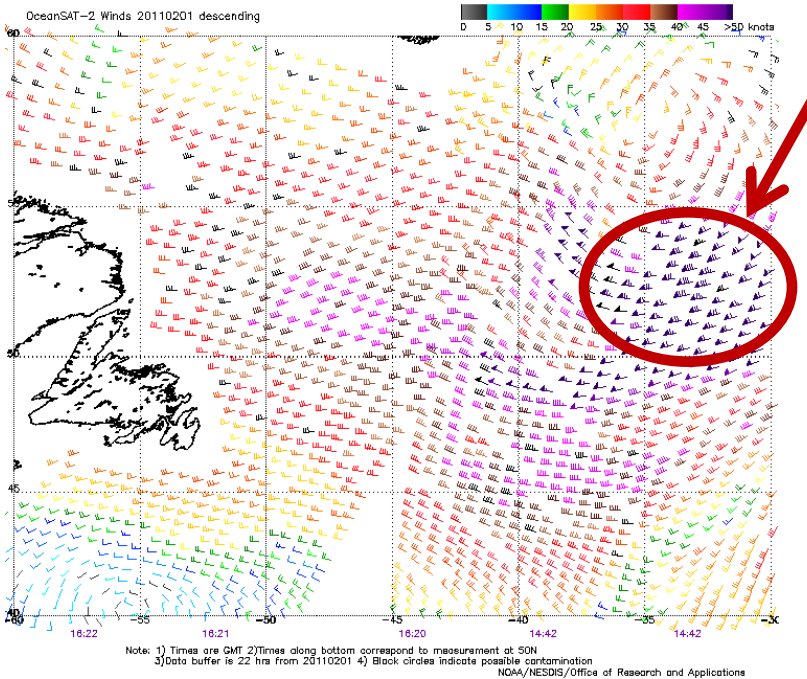
9 flights into North Atlantic extratropical storms

Data collected in support of NRA proposal "**Decadal Trends of Hurricane-Force Extratropical Cyclones and the Resulting Impact on Oceanic and Atmospheric Forcing**"

Data supported OPC operations

Experiments are relayed to the OPC operational forecasters. The experiment conducted on Feb 1st 2011, sampled a cyclone's central pressure that was found to be 5 mb deeper than NWP analyses. It prompted forecasters to upgrade the surface analysis and disseminated that information to mariners at sea.

Data supports ASCAT and OSCAT wind product validation and improvements

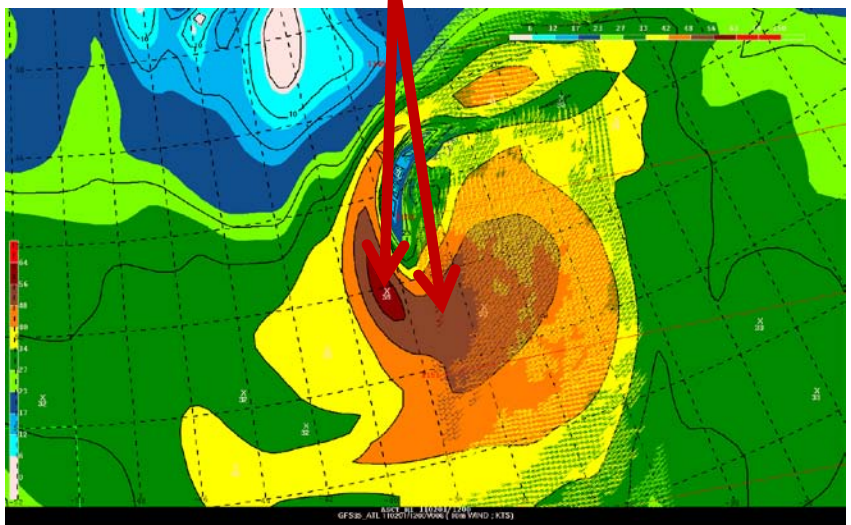


Feb 2nd 2010

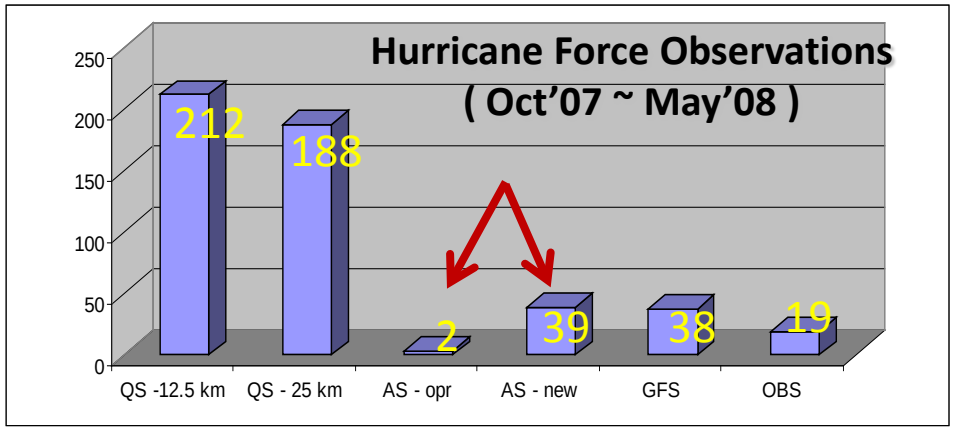
Max sonde measurements: 43.6m/s

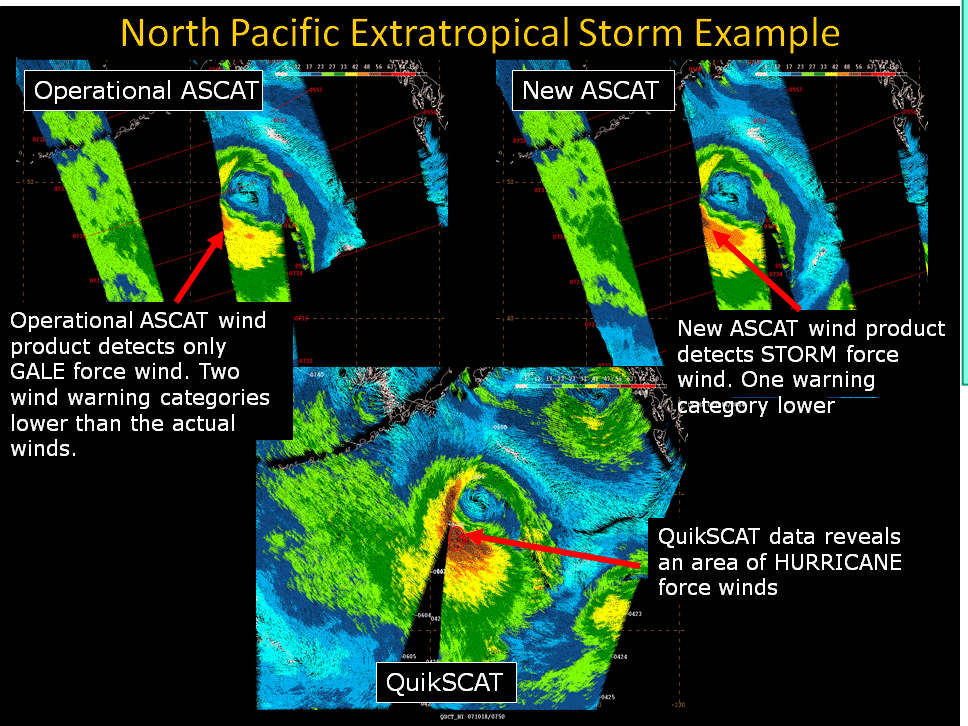
OSCAT 40m/s

Max GFS winds: 32m/s position >10nm off



New High Wind Model Function Implemented in ASCAT Wind Data Processor



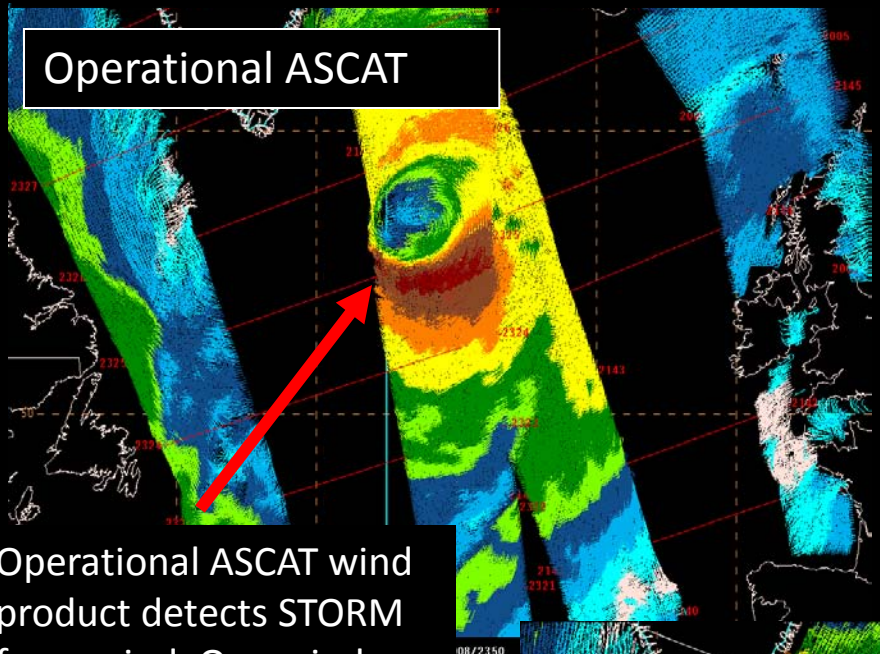


New C-band high wind model function developed by Seubson Soisuvarn (Golf) based on ASCAT, QuikSCAT and IWRAP Aircraft measurements

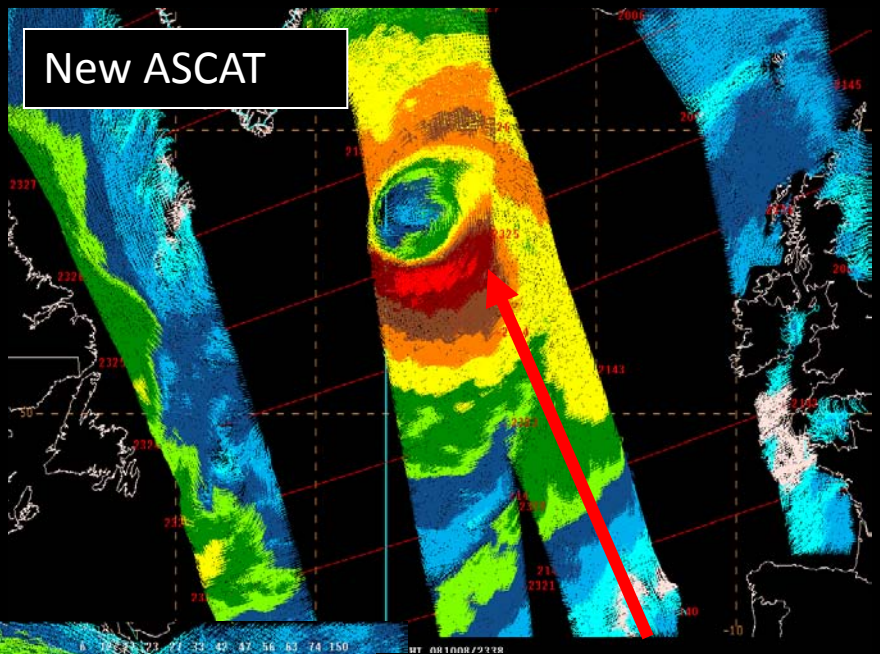
Currently new data available via OW Team web page and via ftp to OPC forecasters

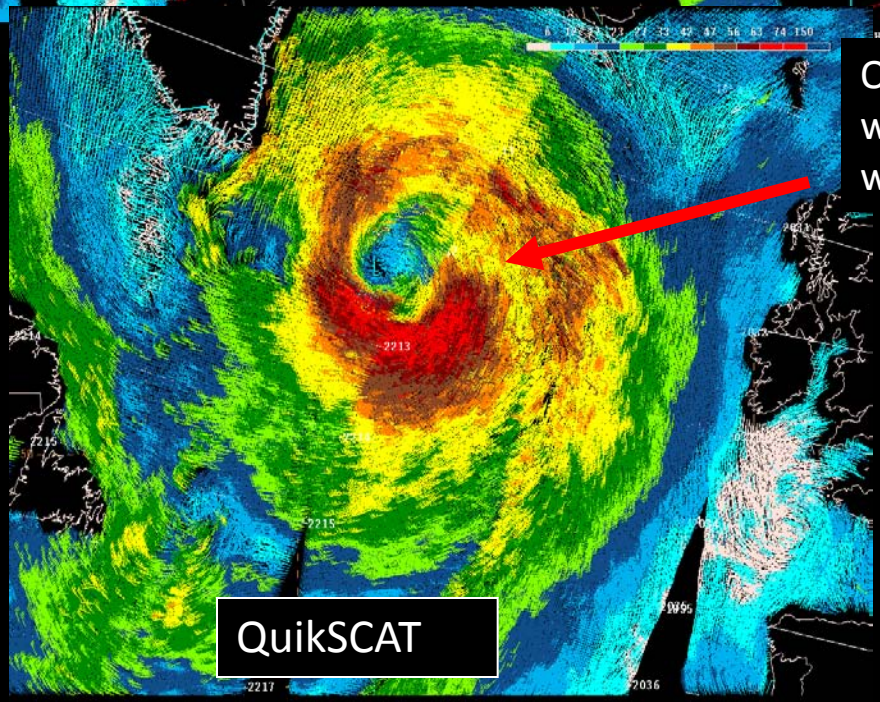
- Operational and statistical validation has been carried out at STAR, OPC, NHC and KNMI
- New data leads to at least one wind warning category improvement
- High demand for this from NWS forecasters
- Plan is to operationalize this data stream

North Atlantic Extratropical Storm Example



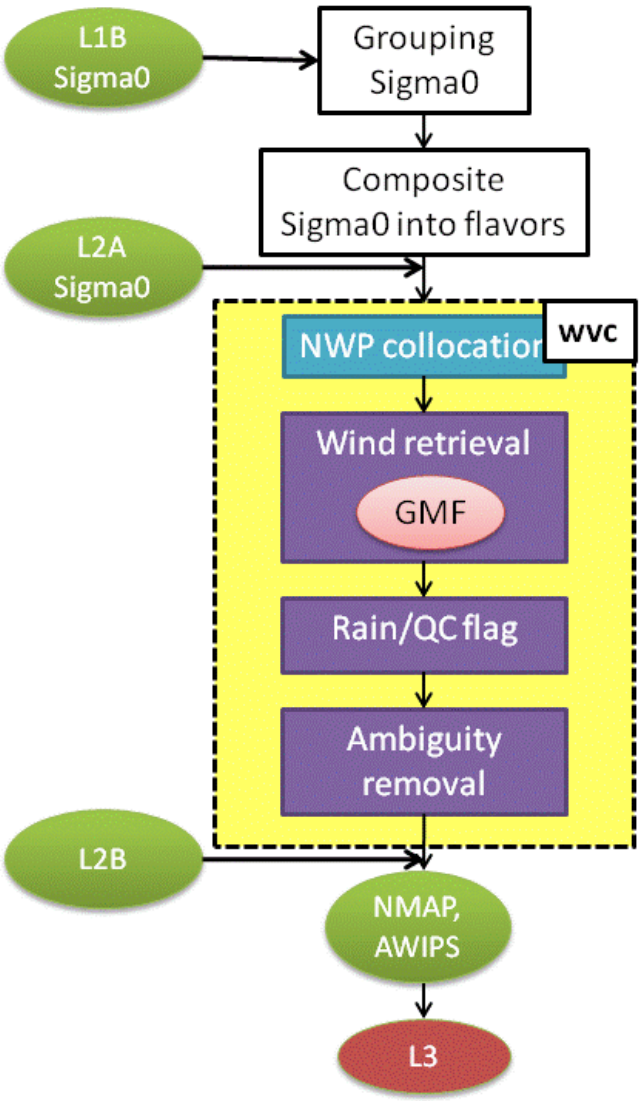
Operational ASCAT wind product detects STORM force wind. One wind warning category lower than the actual winds.



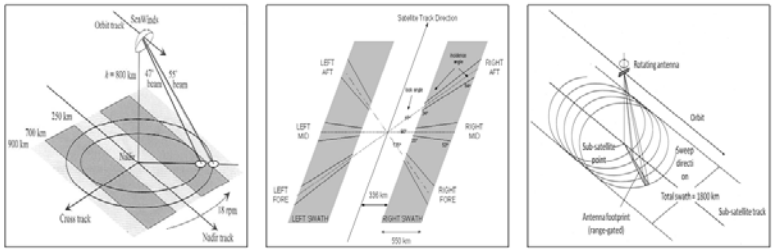


QuikSCAT & New ASCAT wind products detects HF wind.

Development of NOAA's Scatterometer Wind Data Processor (SWDP)



Scatterometer Scanning Scheme



Rotating Pencil-Beam (4-flavors) | Fan-Beam (3-flavors) | Rotating Fan-Beam (multi-flavors)

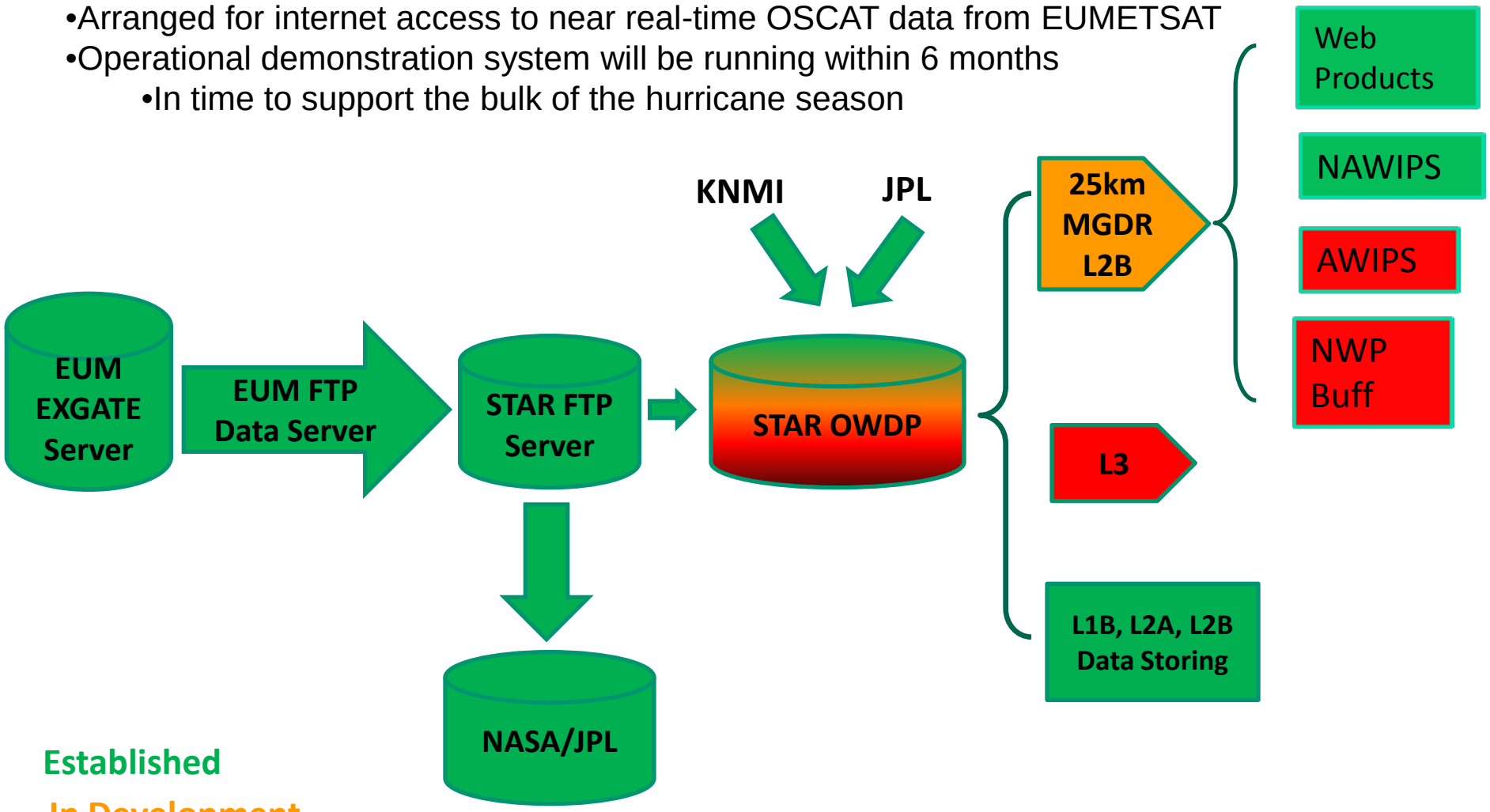
- SWDP would be capable of processing scatterometer wind measurements from both single and double frequency scatterometers as well as rotating and stick antenna designs

- NOAA SWDP will satisfy unique NOAA user's operational product requirements and quality monitoring

- First phase work will target to support NOAA OSCAT Data exploitation and operational dissemination project
  - Processor to be in semi-operational phase by July 2011
  - L1B to L2A processor development finished

STAR Ocean Winds Team
Proposed OSCAT Demonstration Data Flow

- Progress being made despite ESPC IT freeze
- Arranged for internet access to near real-time OSCAT data from EUMETSAT
- Operational demonstration system will be running within 6 months
  - In time to support the bulk of the hurricane season



Established

In Development

Development not Started

Milestone Status

number completed in Q1 and Q2

- 0 early
- 3 on time
- 2 late

Issues and concerns: NOAA's programmatic decision to cede the QuikSCAT follow-on mission may impact some existing milestones

Funding Status and Issues

Status of processing / moving money via MOUs, contracts, grants, and/or procurements.

Most major procurements underway

Concerns include:
Stable long-term funding for team
Lack of a longer term contract vehicle (Scitech2 is still not usable)
IT HW/SW procurements have become overly cumbersome (NOAA links)

FY2012

Looking forward:

- New activities you will likely propose
  - Continue development and cal/val of OSCAT (QuikSCAT continuity)
  - Development of a NOAA specific ASCAT processor

- Issues / Challenges you see on the horizon

Funding for FY11 and FY12
Scitech 2 status and inability to utilize in FY11
Timing of FY12 funding availability

The increasing administrative burden to order simple IT HW/SW
(i.e., NOAA Links)

Continuing shift of having IT security dictate how we can utilize IT versus having the needs of the job dictate the IT solution

FY11/12 Schedule Highlights

Date	Description
27 May 2011	FY11 ORS budget sweep
01 Jun 2011*	FY12 ORS proposal submission deadline
07 Jun 2011	FY12 ORS proposal presentations – Day 1
08 Jun 2011	FY12 ORS proposal presentations – Day 2
15 Jul 2011	FY12 ORS allocation letters distributed
12 Aug 2011	Revised FY12 SOCD milestones / ORS proposal submission deadline
18 Nov 2011	*Revised FY12 ORS allocation letters distributed (Only if necessary; pending FY12 Federal Budget enacted)*
09 Dec 2011	*Revised milestones / ORS proposal resubmission deadline if allocations are reduced*

FY12 ORS Proposal Presentation Schedule

Time	Tuesday (7 June 2011)	Wednesday (8 June 2011)
10:00 – 11:30	Ocean Surface Winds Paul Chang	CoastWatch / OceanWatch Kent Hughes
11:30 – 1:00	Sea Surface Height Eric Leuliette	
1:00 – 1:30	Lunch	Lunch
1:30 – 3:00		
3:00 – 4:30		Allocation Meeting Branch Chiefs, Paul D, Marilyn

FY12 ORS Proposal Template

- Major changes from last year's ORS proposal format:
  1. Programmatic linkages
  2. Milestones

FY12 ORS Proposal Template

- Programmatic Linkages (NGSP / SEE)
  - Goals
    1) Coasts
       - Resiliency, Planning & Management, Transportation, Water Quality & Human Health, and Arctic Access
    2) Oceans
       - Ecosystems, Marine & Coastal Species, Healthy Habitats, and Fisheries
    3) Climate
       - Scientific Understanding, Potential Impacts for Policy Decisions, Mitigation & Adaptation, and Climate-literate Public
    4) Weather
       - High-impact Events, Freshwater Resource Management, Transportation, Air & Water Quality, and U.S. Economy

FY12 ORS Proposal Template

- Programmatic Linkages (NGSP / SEE)
  - Enterprises
    1) Science and Technology
       - Research, Integrated Earth Observing Systems, and Integrated Environmental Modeling System
    2) Engagement
       - Public Outreach/Education, Regional Stakeholders, International Partnerships
    3) Administration
       - NOAA Workforce, IT Infrastructure, Facilities, and Business Systems & Management Processes

FY12 ORS Proposal Template

- Milestones
  - All funding sources, not just ORS
  - Additions to format:
    - NGSP Programmatic Linkages
      - All milestones
    - STAR Performance Measures
      - Not necessarily all milestones; only where applicable
  - Reporting / Tracking
    - Monthly reports

FY12 ORS Proposal Template

- Milestones

Milestone	POC	Target Month	Elev Level	Fund Src	Perf Meas	Goal / Enterp	Obj*
Milestone 1	Pichel	Nov	NESDIS	PSDI	R2O	Coasts	P&M
Milestone 2	Eakin	Feb	NESDIS	CRCP	Pub	Climate	M&A
Milestone 3	Wang	May	STAR	NASA	Pub	S&T	IEOS
Milestone 4	Hughes	Aug	SOCD	ORS		S&T	IEOS

FY12 ORS Proposal Template

- Budget / Spend Plans
  - 100% Level
    - Based on FY11 ORS allocation letter
    - Account for reductions, if any, outlined in your FY11 ORS allocation letter
- FY2008 ORS allocation
  - ~6% less than FY2010's allocation
  - Be prepared for the possibility of a 5-10% decrease in FY2012

FY12 ORS Proposal Template

- SOCD Performance Measures

Performance Measure	# in FY2012
Number of new products …	# - what, when
Number of products transitioned…	
Number of algorithms delivered…	
Number of operational data streams…	
Number of new experimental…	
Number of invited oral presentations…	
Number of web pages…	
Number of externally funded…	

Miscellaneous

- FY11 ORS Budget Sweep
  - May 27, 2011 (Friday)
  - Requests for unexpended funds must be submitted in writing to your Branch Chief by this date; however, limited, if any, funds are expected to be available.
- Science Team 5-yr Plans
- Q & A