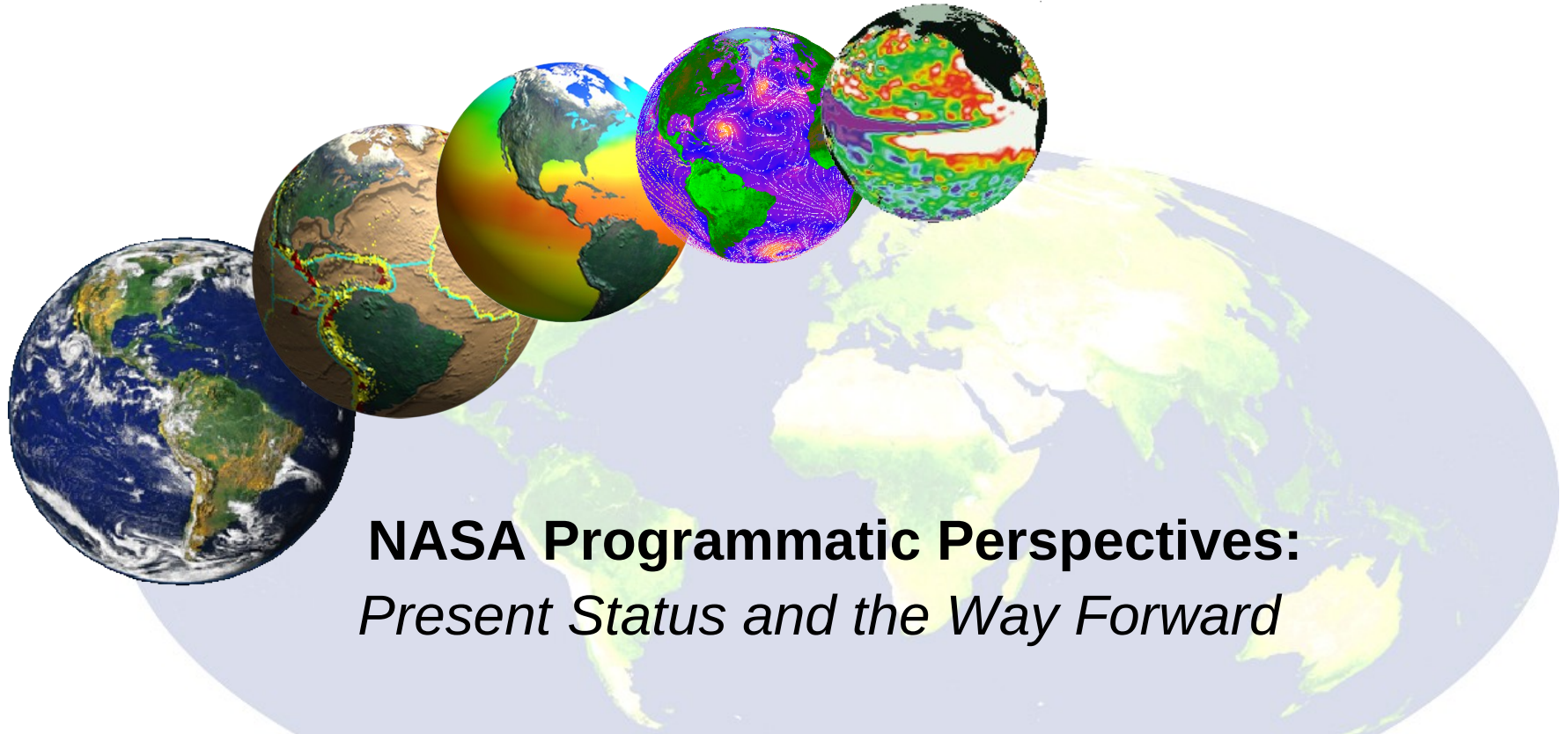


# 2011 International Ocean Vector Winds Meeting Annapolis, Maryland, 9-11 May 2011



## **NASA Programmatic Perspectives:** *Present Status and the Way Forward*

**Peter Hacker and Eric Lindstrom**  
**NASA Science Mission Directorate**  
**Earth Science Division**  
**9 May 2011**

# The Past Year: Events and Meetings



- 2010 International Ocean Vector Winds Science Team Meeting  
Barcelona, Spain, 18-20 May 2010
- New 4-year grants for NASA OVWST start summer 2010 to 2014
- NASA-NOAA-ISRO-EUMETSAT-KNMI collaborate on OSCAT-2 validation
- NASA-NOAA-JAXA-JPL meet on GCOM-W2 (DFS and AMSR) Dec. 2010
- First Oceansat-2 International AO Science Meeting  
Ahmedabad, India, 23-25 March 2011
- EUMETSAT/ESA Scatterometer Science Conference  
Darmstadt, Germany, 11-13 April 2011
- NASA Senior Review (extended missions including QuikSCAT), May 2011

***Present Status:    OVW Science Team in place;  
Scatterometers in orbit;  
Ongoing research activities;  
Funding for another 3 years  
(\$17.8 million for 4 years) .***



# NASA OVWST: Six Themes

## (Broad range of topics)

- Research on the multiyear time series of QuikSCAT and SeaWinds standard backscatter and vector wind products, improve estimates, reduce biases. (atm, ocean, interdis, climate)
- Geophysical analyses that exploit the frequent sampling or that combine observations from multiple wind sensors including QuikSCAT;
- Advanced techniques that quantify the accuracy of measurements and products;
- Advanced products that have increased temporal resolution, spatial resolution, and/or accuracy, based on Ku-band data and other measurements and models;
- Intercalibrated Ku-band and C-band or passive microwave observations to understand physical processes related to rain and the ocean surface;
- Assimilation and analysis techniques to improve the impact and effectiveness of scatterometer and vector wind measurements for operational uses (weather, hazards, climate forecasts).

# Welcome to New Science Team Members



*Ted Durland/OSU and Tom Farrar/WHOI*  
(with Dudley Chelton)

Covariability of wind and sea surface height in the tropical Pacific

*Melanie Fewings/UCSB*  
(with Libe Washburn, Clive Dorman, Tim Liu, Ralph Milliff)

Satellite and land-based remote sensing of atmospheric wind relaxations and the oceanic response in the California Current Large Marine Ecosystem

*Larry O'Neill/OSU*  
(with Tracy Haack/NRL)

Seasonal Variability of the Mesoscale Coupling of Wind Stress and Sea Surface Temperature over Mid-Latitudes

# Status of QuikSCAT

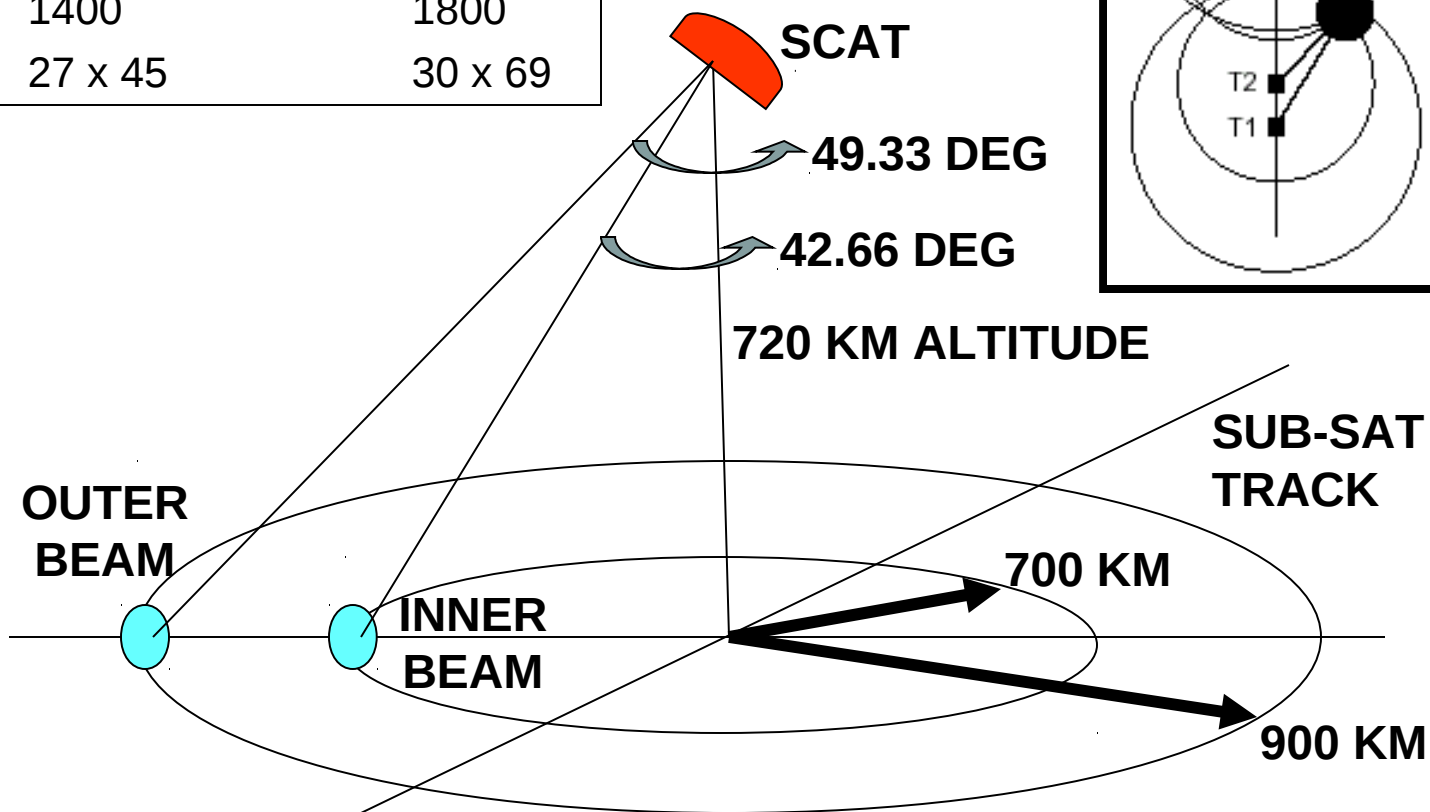
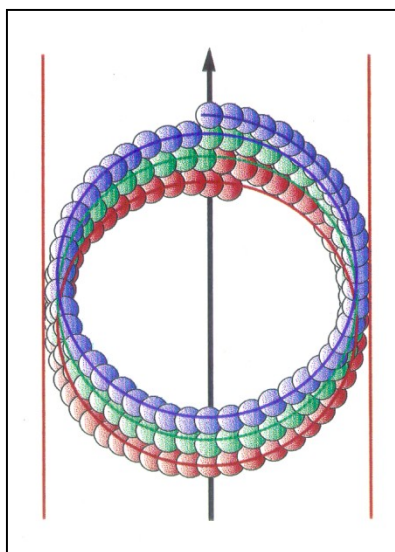
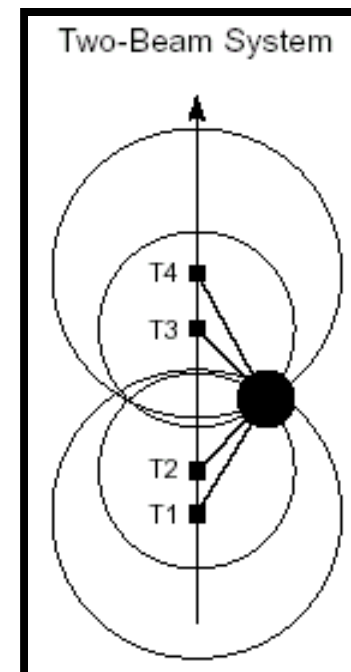


- *The QuikSCAT antenna stopped rotating in November 2009, and winds over a large swath cannot be estimated.*
- *The SeaWinds radar continues to operate normally and is collecting calibrated sigma0 measurements.*
- *The new QuikSCAT mission goal is to provide a facility for cross-calibration of multiple Ku-band scatterometers to a known, well calibrated source, enabling climate data consistency.*
- *We have collected over 1 year of data at the ISRO OSCAT angles.*

# OCEANSAT-2 SCATTEROMETER

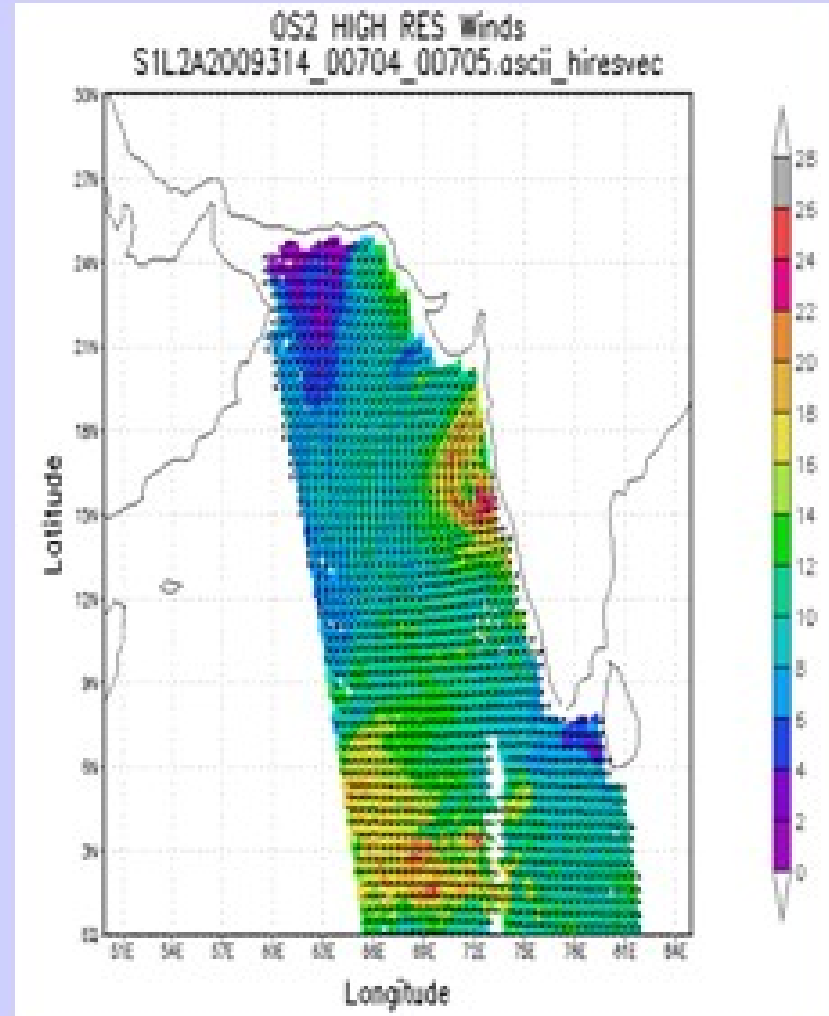
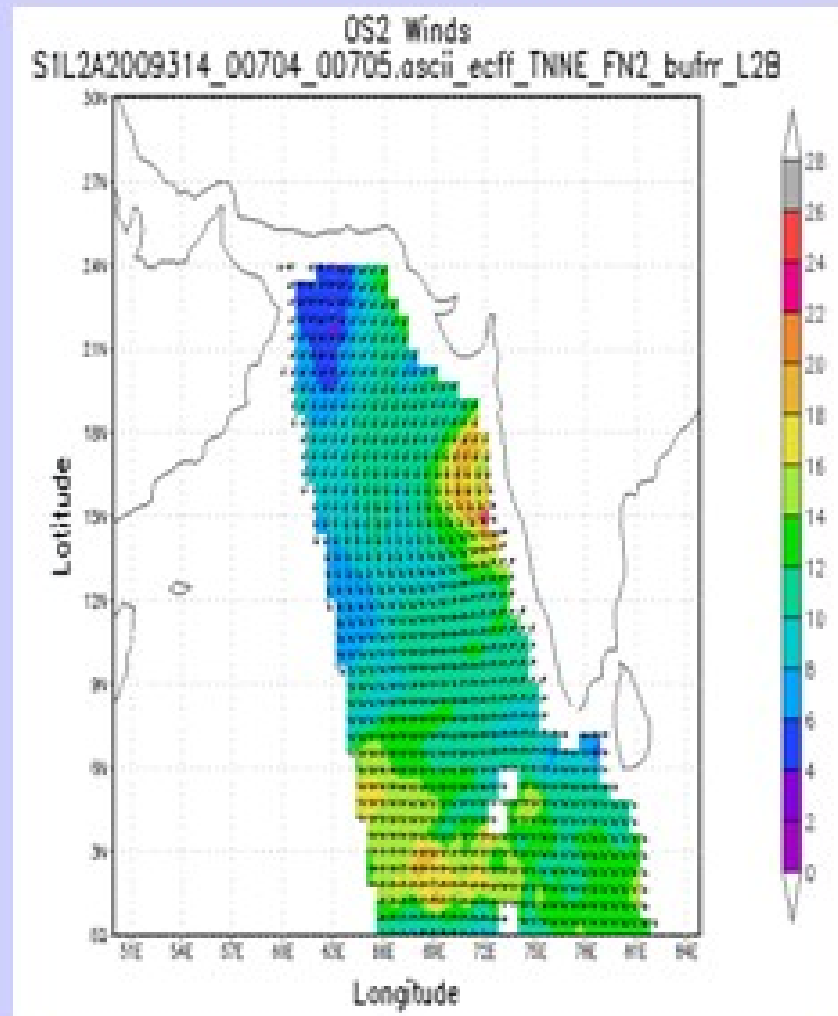
B S Gohil  
ISRO

ALTITUDE	720 KM (Nominal)	
FREQUENCY	Ku-BAND (13.5 GHz)	
CONFIG.	PENCIL-BEAM	
	INNER	OUTER
INC. ANG. (DEG)	49.0	57.6
POLARIZATION	HH	VV
SWATH (KM)	1400	1800
IFOV (KM)	27 x 45	30 x 69



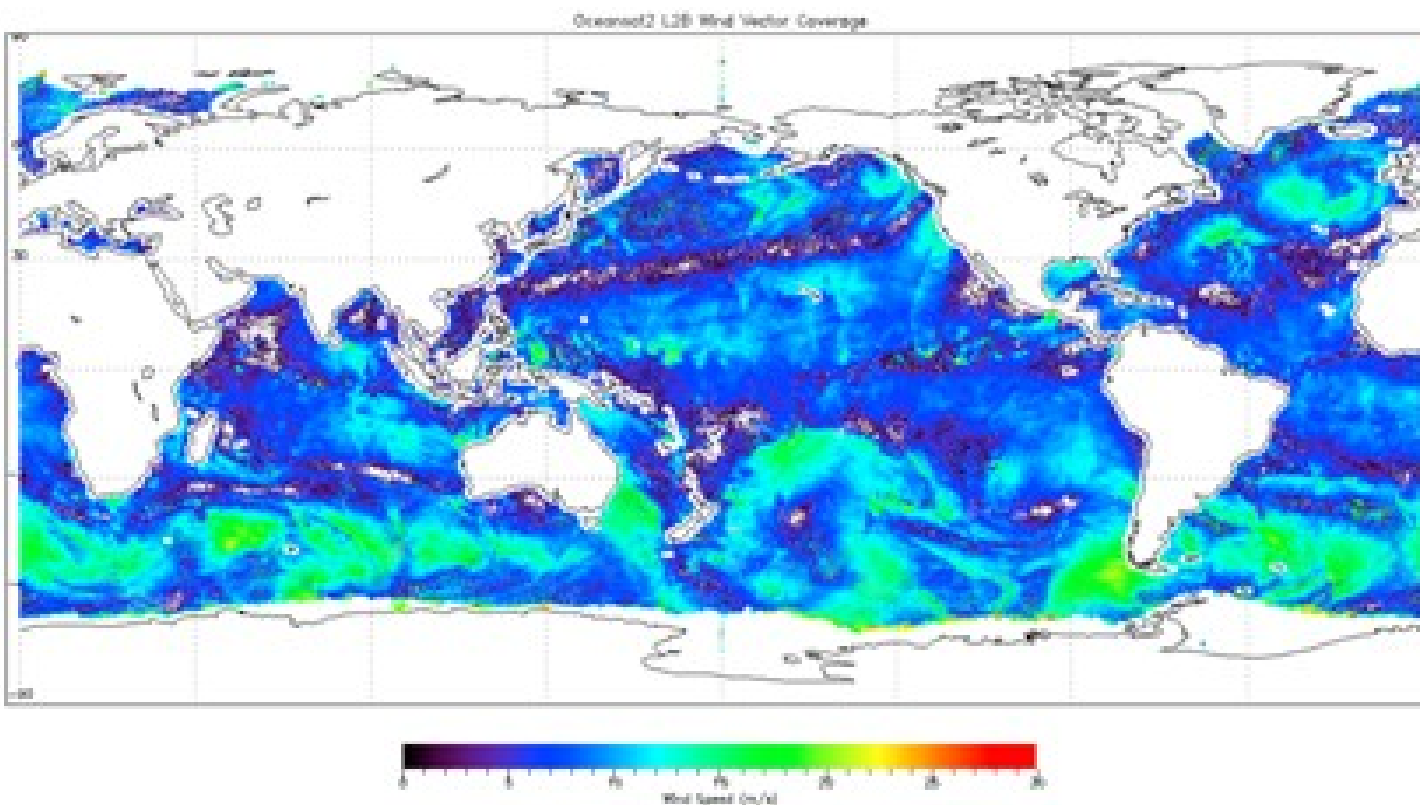


## Operational (L2B) & High-Resolution Winds from OSCAT (Phyan Cyclone: Nov 10, 2009: 19 GMT)



From B S Gohil, ISRO, talk

# Oceansat-2 L2B Wind Vectors 3-4 May 2011, Orbits 8509-8538



OSCAT data are flowing to KNMI, NOAA, JPL, others.  
Winds meet Oceansat-2 mission goals.  
Improvements are still needed for operational use and as a CDR.





# EUMETSAT/ ESA Scatterometer Science Conference 2011

## *Plenary Session on Current and Past Missions-*

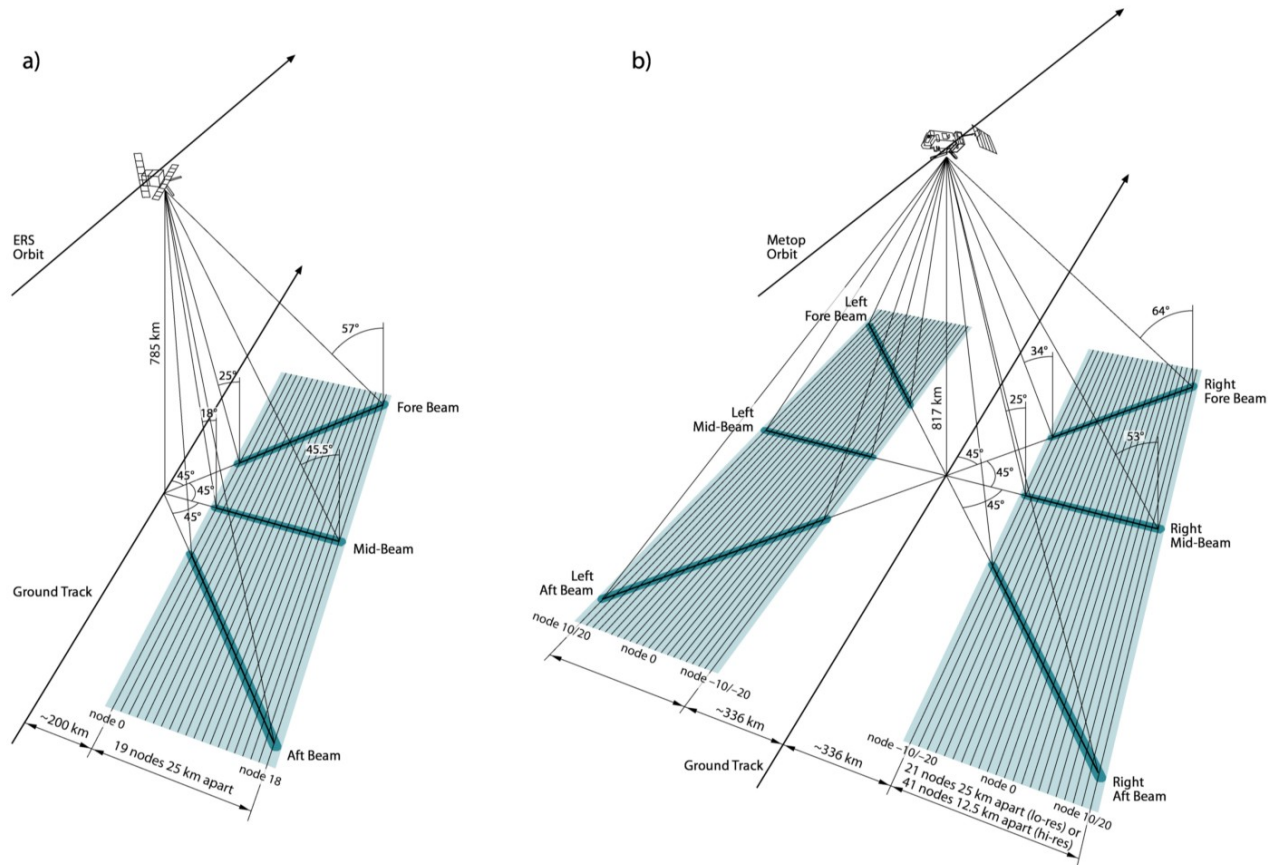
- ASCAT mission overview, Hans Bonekamp, EUMETSAT
- The importance of calibration and intercalibration for climate studies:  
The case of C-band scatterometry, Pascale Lecomte, ESA
- The climate consistency of QuikSCAT and ASCAT, Ernesto Rodriguez, JPL
- Current status of Oceansat-2 scatterometer, Kirti Padia, ISRO

## *Thematic Sessions-*

- Cal/Val & Processing: ASCAT, ERS-2, MetOp-A, Oceansat-2 (7 talks)
- Wind and Wind Stress (19 talks)
- Soil Moisture Retrievals and Applications (8 talks)
- Snow and Ice Retrievals and Applications (6 talks)
- Novel Applications and Future Missions (9 talks)

***ASCAT data are a great resource for research and applications.***

# European Scatterometer Heritage



ERS SCAT

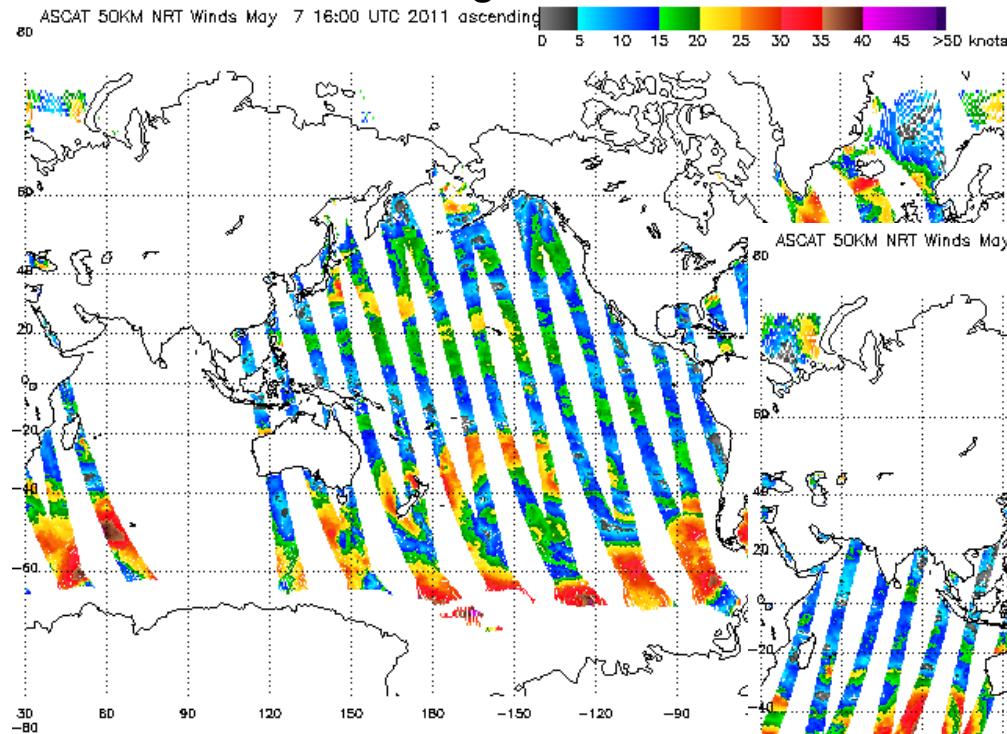
MetOp-A ASCAT

From Maurice Borgeaud



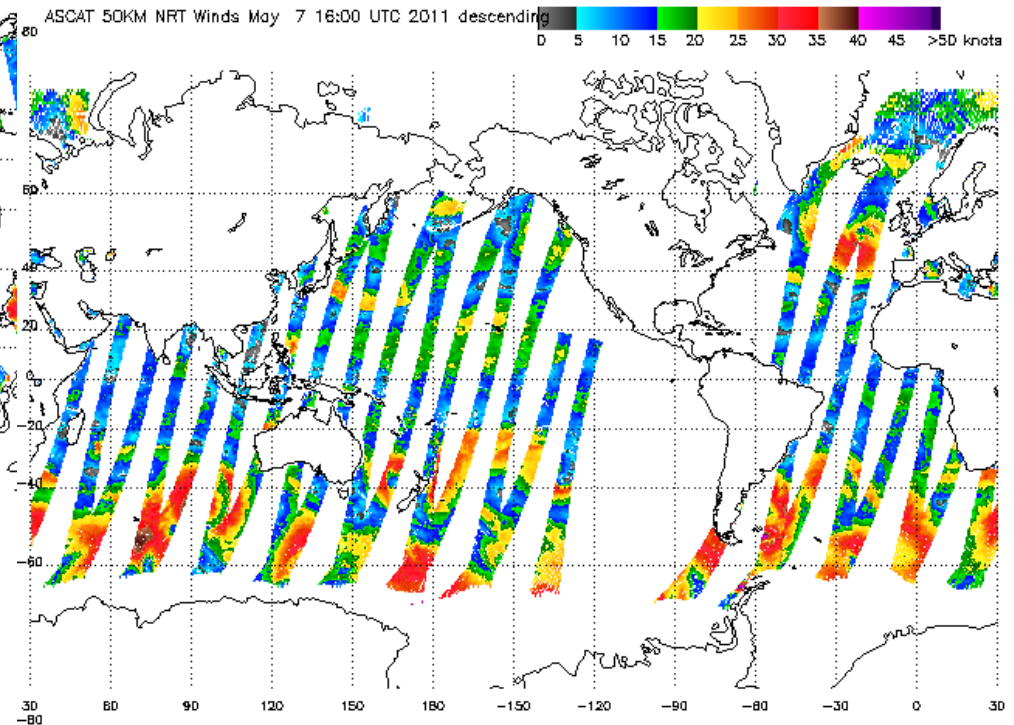
# ASCAT Swath Data 7 May 2011

## Ascending NRT Winds



Data are available from:  
KNMI, NOAA, PODAAC/JPL

## Descending NRT Winds





# Ultra-High Resolution (UHR) Products

## David Long's Group, BYU

(pushing forward the potential utility of scatterometer data)

- ASCAT C-band data from KNMI, NOAA are 12.5 km and 25 km (6.25 km at KNMI).
- High signal to noise of ASCAT enables good quality UHR winds at 2.5 km resolution.
- Tradeoffs between noise and resolution.
- UHR winds are available closer to the coast and cover a wider swath.
- Ongoing research on simultaneous wind and rain retrieval (UHR SWR retrieval).
- Owen and Long, 2011a and b.

### *NASA Scatterometer Climate Record Pathfinder (SCP) project-*

- Enhanced resolution SZF products used for land, vegetation, ice/snow and extent of large oil spills.

# BYU ASCAT UHR Hurricane Observation Example

Parma (rev 15334, 23  
Oct 2009)

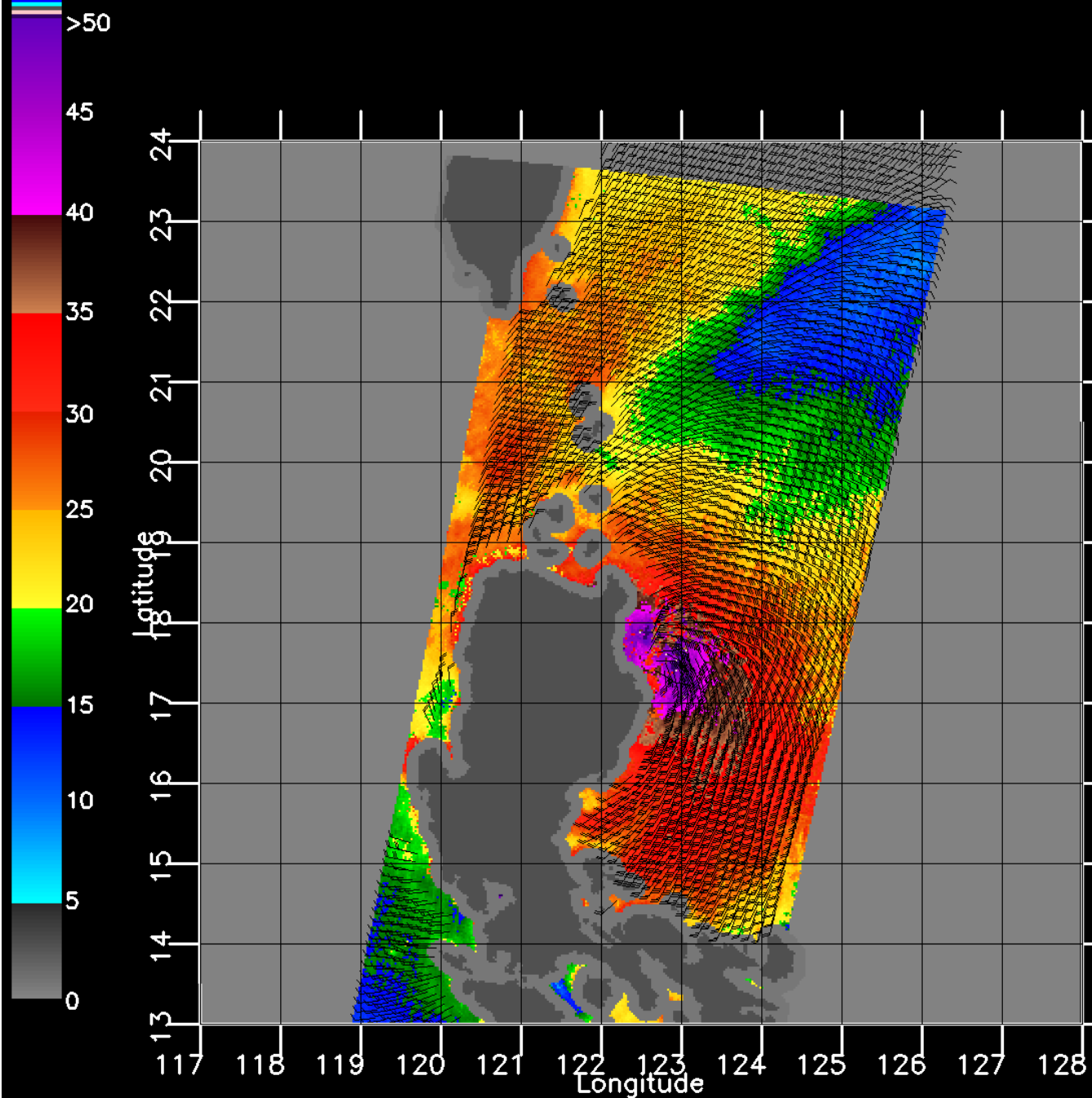
Color is UHR wind speed.

Barbs are 12.5 km  
speed/direction.

UHR: higher speeds,  
closer to coast,  
wider swath.

Desirable product for near-  
shore, high resolution,  
ocean models.

Lots of activity at the OST-  
ST and coastal group  
meetings in Portugal in  
2010.



BYU 15334\_PARMA\_1003\_0024.WRave2.nc





## Lisan Yu, WHOI (Value of the CDR)

- Global ocean surface wind fields from microwave radiometers and scatterometers, July 1987 to 2008;
- Objectively Analyzed air-sea Flux (OAFlux) product;
- Global daily ocean vector wind analysis on 0.25-degree resolution.

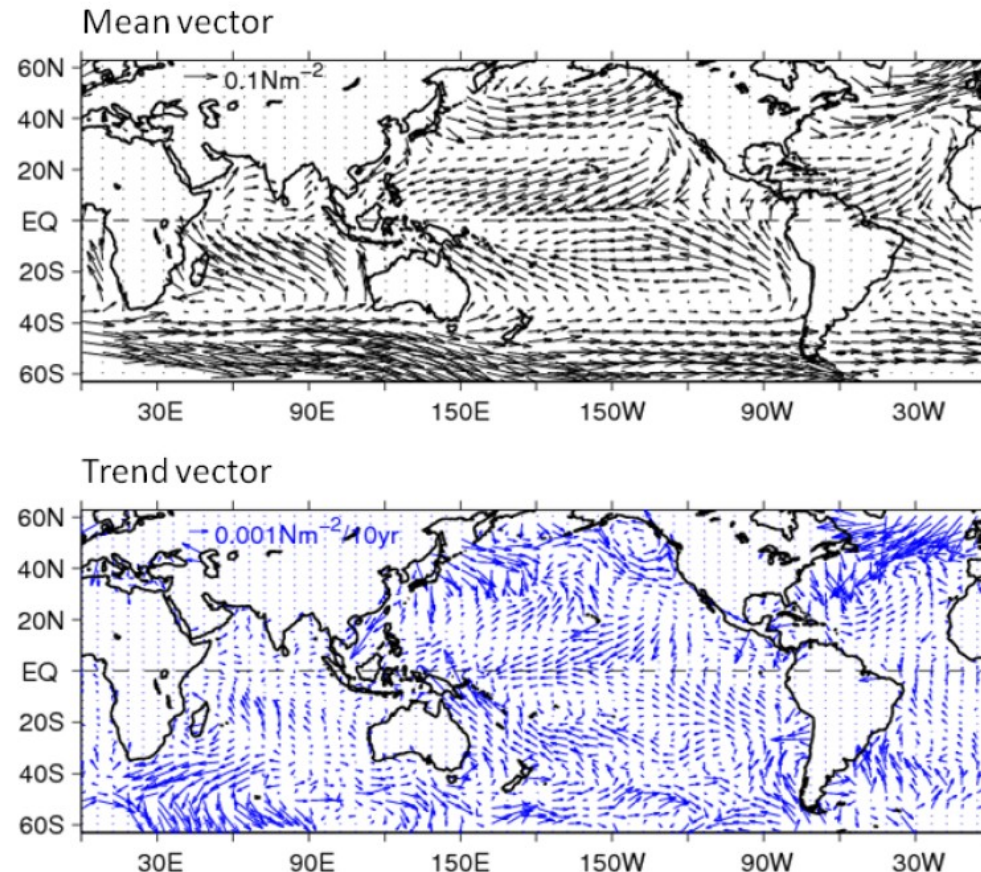


Fig.4 OAFlux wind stress vectors averaged over the period 1987-2008 (top) and the linear trend vectors derived from the annual mean time series 1988 to 2008 (bottom).

# Trends and Co-Variability in SSH and Wind Stress (Lisan Yu)



- Linear trends in AVISO SSH, 1993-2008 (background color);
- Mean wind stress vectors (black);
- OAFlux wind stress trend vectors (red).

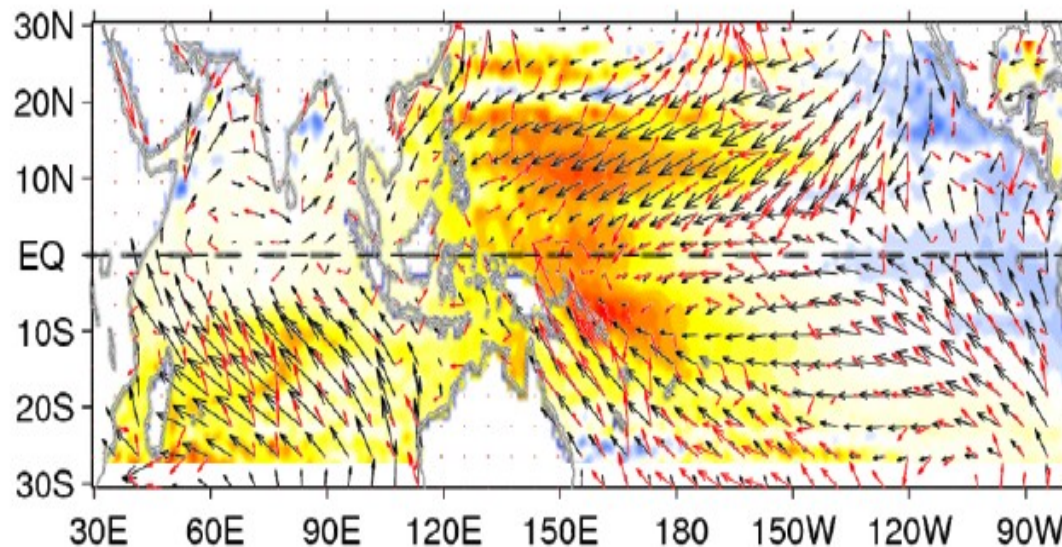


Fig.7 Linear trends in AVISO SSH for the period 1993-2008 (background colors) superimposed with trend vectors OAFlux wind stress for the period 1988-2008 (vectors in red) for the tropical Indian and Pacific Oceans. For reference, the mean wind stress vectors are shown in black.



# NASA needs from Science Team Members or



## How you can help the IOVWST (and NASA)

- Deliver scientific breakthroughs and well-cited publications.
- Keep NASA and the rest of the Science Team informed of scientific breakthroughs and publications.
- Actively attend and support Science Team meetings.
- Respond as needed to requests from the Project Scientist and Team Leader for scientific and technical input.
- *Please Submit Annual Reports ASAP.*
- *If possible, include a PowerPoint slide with figure and text showing an interesting recent result (based on a publication is most desirable but not necessary).*



***Our Special Thanks to:  
Meeting Organizers, and  
Participants.***

***We look forward to  
a productive meeting.***

***Thank you!***

# BACKUP SLIDES

# NASA OVW Science Team



Science Teams are organized around a **measurement/parameter** rather than around a mission.

Ocean Vector Winds (OVWST) was re-competed in 2009-

- 20 proposals selected
- \$17.8 M for 4 years (starting in 2010)
- 2 projects by ST leaders (M. Bourassa and E. Rodriguez)
- Ernesto Rodriguez, QuikSCAT Project Scientist, JPL
- Mark Bourassa, OVWST Team Leader, FSU
- Robert Gaston, QuikSCAT Project Manager, JPL
- Eric Lindstrom, QuikSCAT and OVW Program Scientist, NASA HQ

**EUMETSAT/ ESA Scatterometer  
Science Conference 2011  
Novel Applications and Future Missions (9 talks)**



- Post-EPS wind scatterometer concept development status  
Chung-Chi Lin, ESA/ESTEC
- On performance measures for spaceborne wind sensors  
Maria Belmonte Rivas, National Centre for Atmospheric Research
- System description and performance of the scatterometer of CFOSAT satellite  
Xiaolong Dong, Center for Space Science and Applied Research, Chinese A.S.
- QuikSCAT follow-on-activities in the US  
Paul Chang - NOAA/NESDIS, Ernesto Rodriguez – JPL Jet Propulsion Laboratory
- The ESA MICROWAT Mission: Measuring contemporaneous high resolution ocean vector winds and sea surface temperature  
Craig Donlon – presented by Klaus Scipal ESA/ESTEC
- Interactions of AVHRR brightness temperatures and ASCAT sigma-Os  
Anne O'Carroll, EUMETSAT
- A synergic use of SAR Doppler shift and NRCS for ocean remote sensing applications  
Alexis Mouche, CLS Collecte Localisation Satellites
- Overview of the NASA Soil Moisture Active Passive (SMAP) mission  
Wade Crow USDA/ARS US Department of Agriculture/ Agricultural Research Service  
(presented by Ernesto Rodriguez – JPL )
- Improving global satellite soil moisture records by combining scatterometer and radiometer observations, Wouter Dorigo, Technische Universität Wien

# JPL Senior Review: QuikSCAT and Future Scatterometer Missions

