This ppt file contains a subset of slides from the talk given at the International Ocean Vector Wind Science Team Meeting, May 2011 by L. Ricciardulli.

The slides show validation results for the currently offered RSS QSCAT data (Ku-2011 GMF) and the older RSS QSCAT data set (Ku-2001). Please be sure to look at the correct plots when assessing Ku-2011 errors.

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The New Geophysical Model Function for QuikSCAT: Implementation and Validation

Lucrezia Ricciardulli and Frank Wentz
Remote Sensing Systems, Santa Rosa, CA, USA

Outline:

- **GMF methodology**
- **New QSCAT wind speed and direction validation**
- **High winds**
- **Rain impact**
- **Uncertainty maps**

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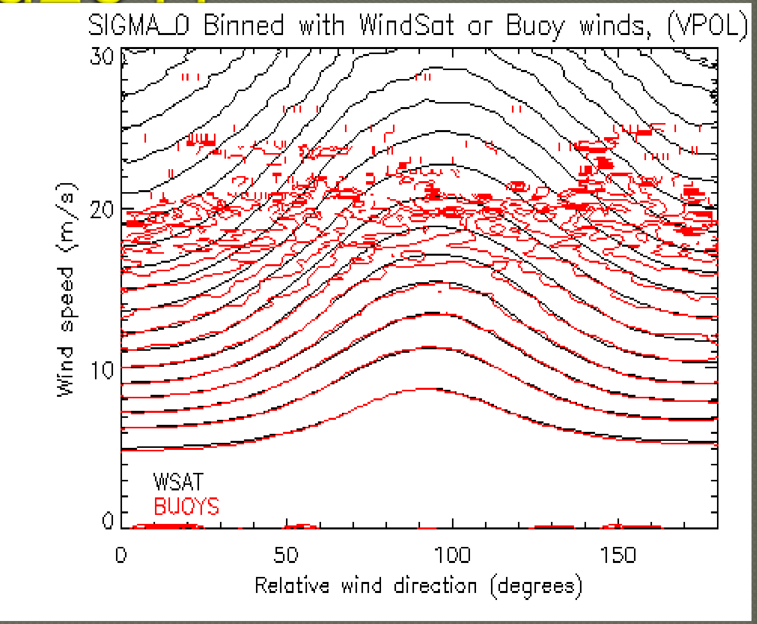
The New GMF: Ku2011

The Geophysical Model Function (GMF) relates the observed backscatter ratio σ_0 to wind speed w and direction φ at the ocean's surface

$$\sigma_0 \cong \sum_{i=0}^{N=5} A_i(w)_{pol} \cos(i\varphi_R)$$



- **To develop the new GMF we used 7 years of QSCAT σ_0 colocated with WindSat wind speeds (90 min) and CCMP (Atlas et al, 2009) wind direction.**
- **WindSat also measures rain rate, used to flag QSCAT σ_0 when developing GMF**
- **We had hundreds of millions of reliable rain-free colocations, with about 0.2% at winds greater than 20 m/s.**

Ku2011 versus Ku2001

The most significant changes between Ku2001 and Ku2011 are for A0 and A2 coeffs, above 15 m/s.

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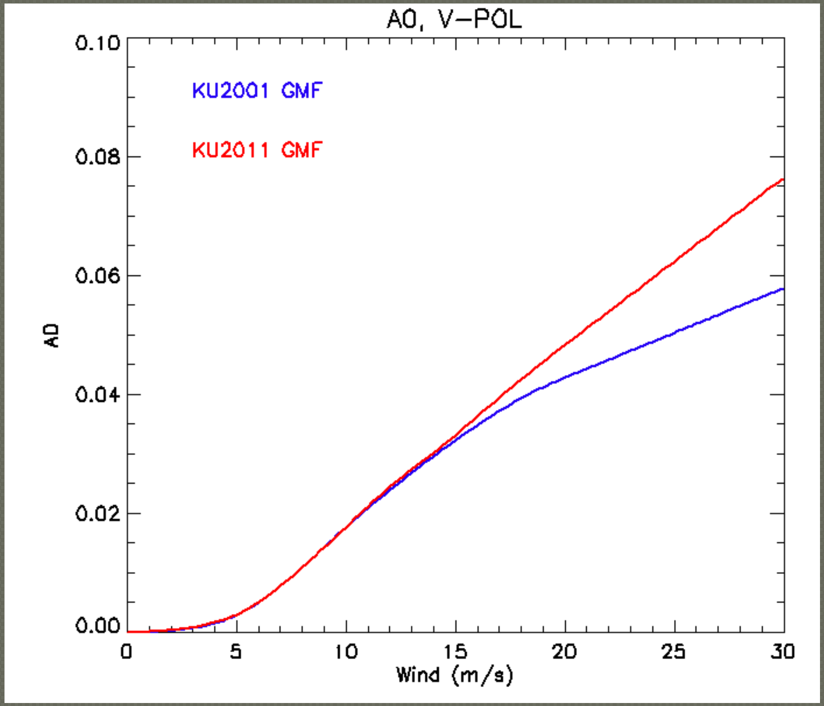
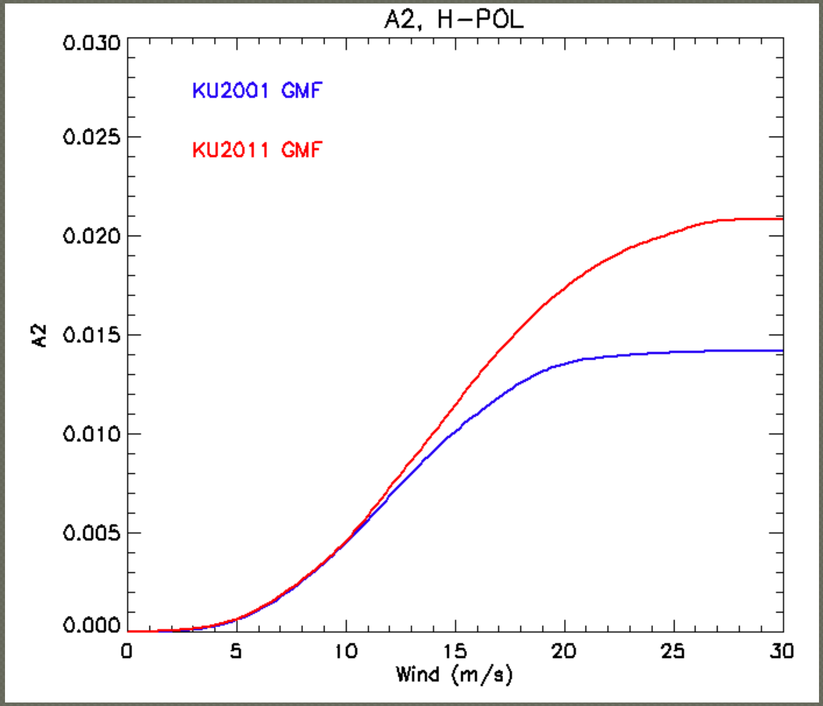
A0 VPOL

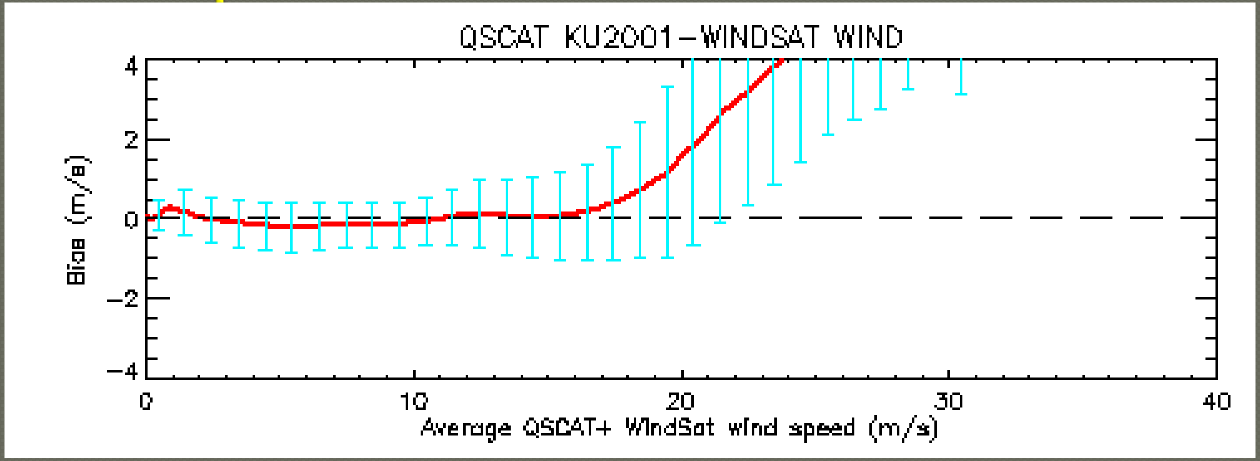
A2 HPOL





QSCAT VALIDATION: 5 yr statistics, global Comparison with WindSat

Ku2001



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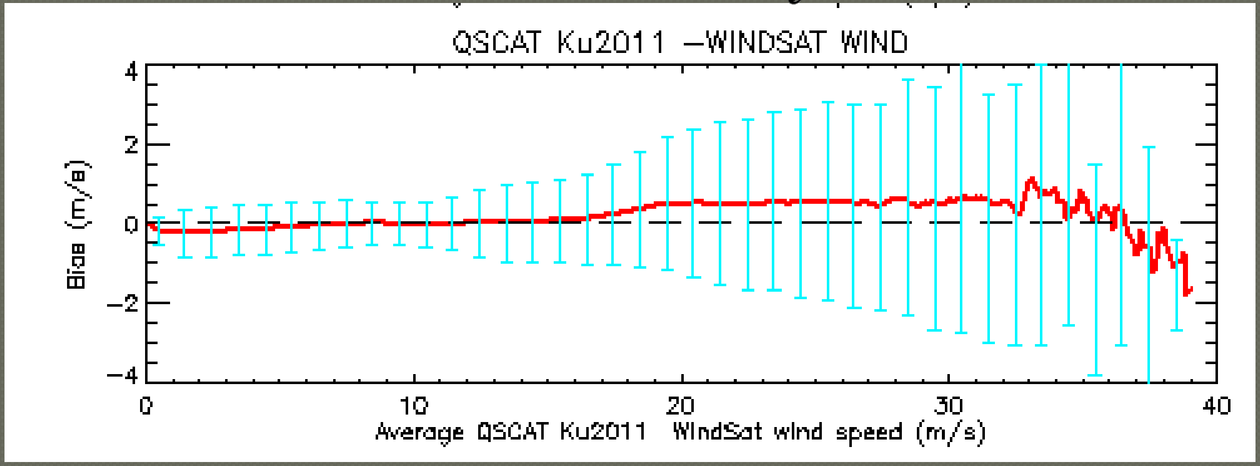
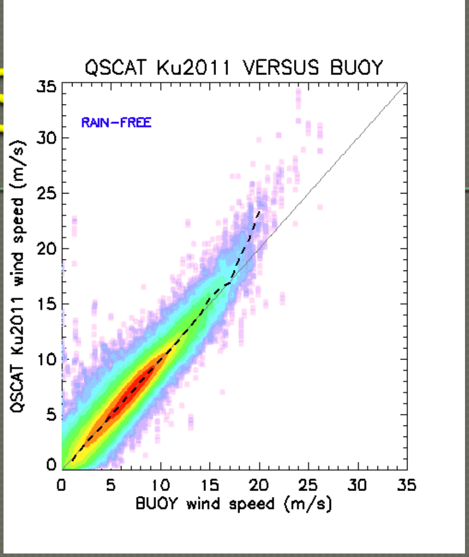
Ku2011



VALIDATION WITH BUOYS



- 200 buoys, global, quality-controlled
- Rain-free observations only
- 1 hour, 50 km colocations
- QSCAT orbital data; 5 yrs

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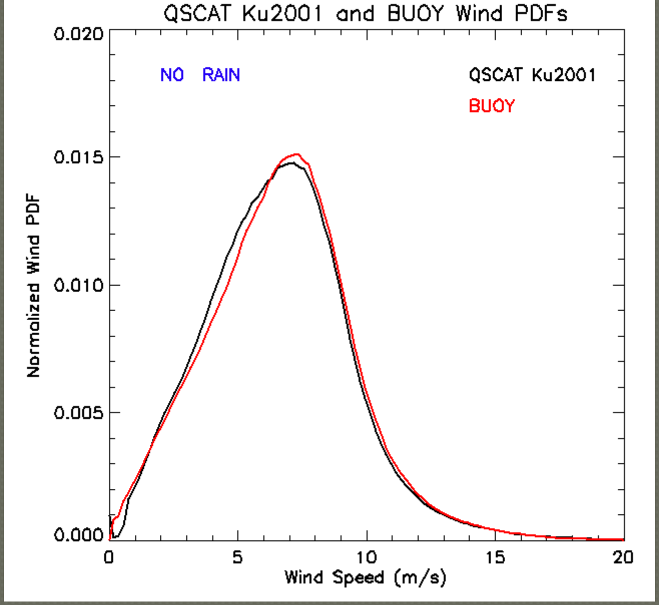
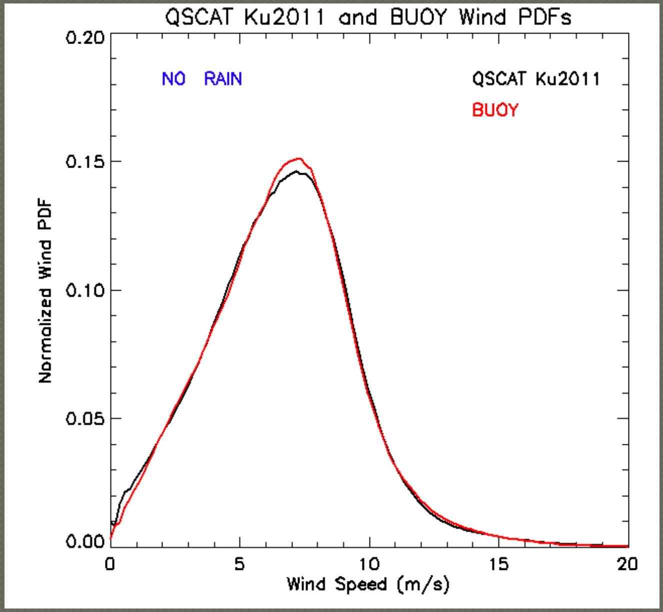
Ku2001

Ku2011





GLOBAL BIAS AND STANDARD DEVIATION: RAIN-FREE QSCAT-VALIDATION WINDS

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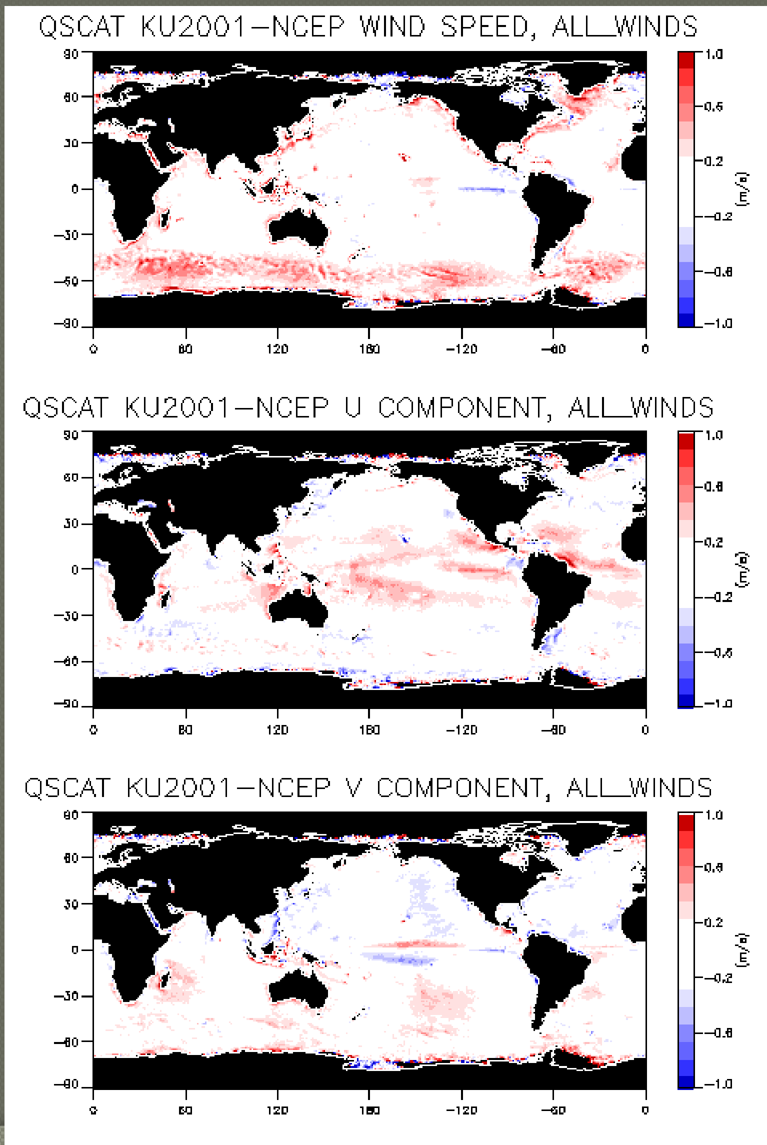
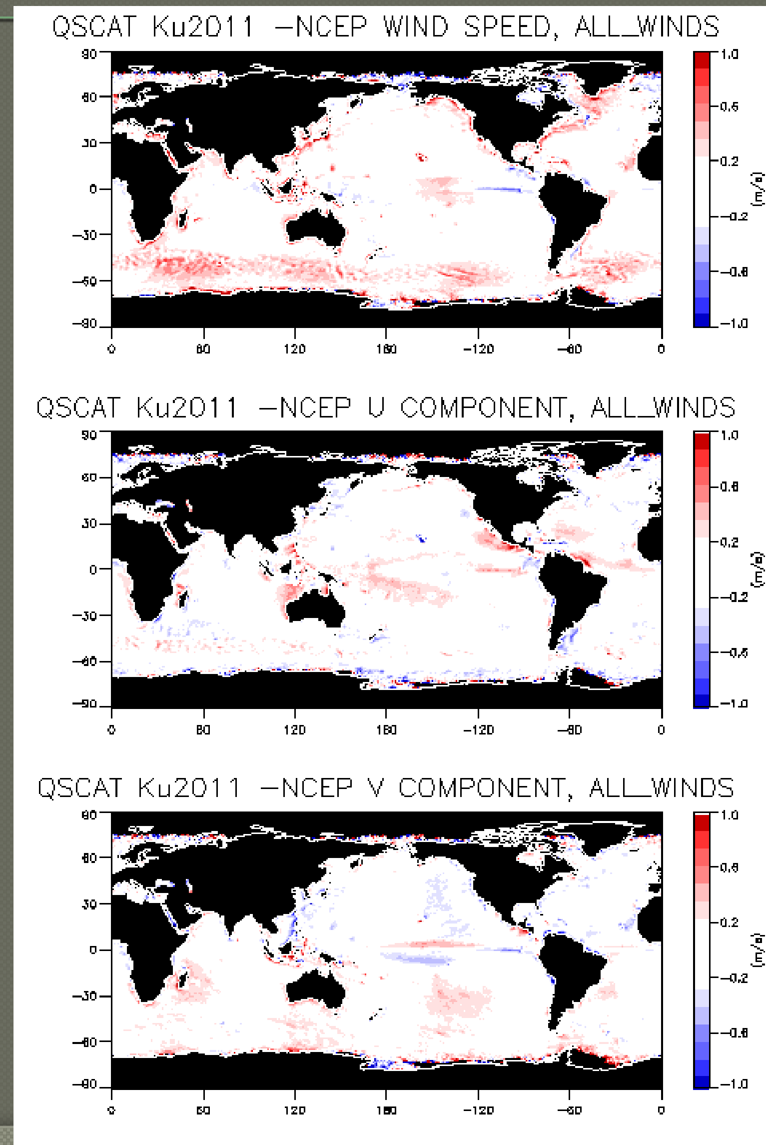
Ku2011-val	BIAS (m/s)	ST DEV (m/s)
BUOY	0.01	0.88
WINDSAT	-0.04	0.65
SSMI V6	-0.04	0.89
NCEP	0.10	0.95
ECMWF	0.44	1.08

Regional biases compared to NCEP

Ku2001-NCEP



Ku2011-NCEP



WIND SPEED

U

V

HIGH WINDS VALIDATION: AIRCRAFT

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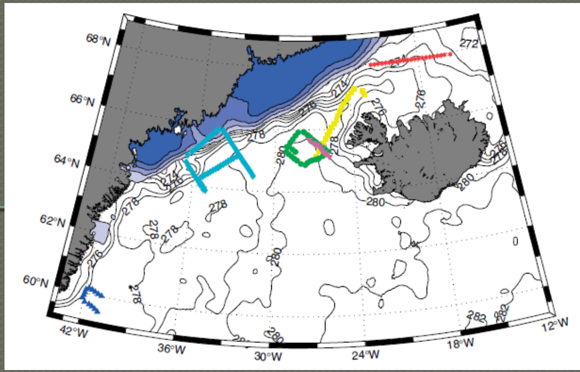
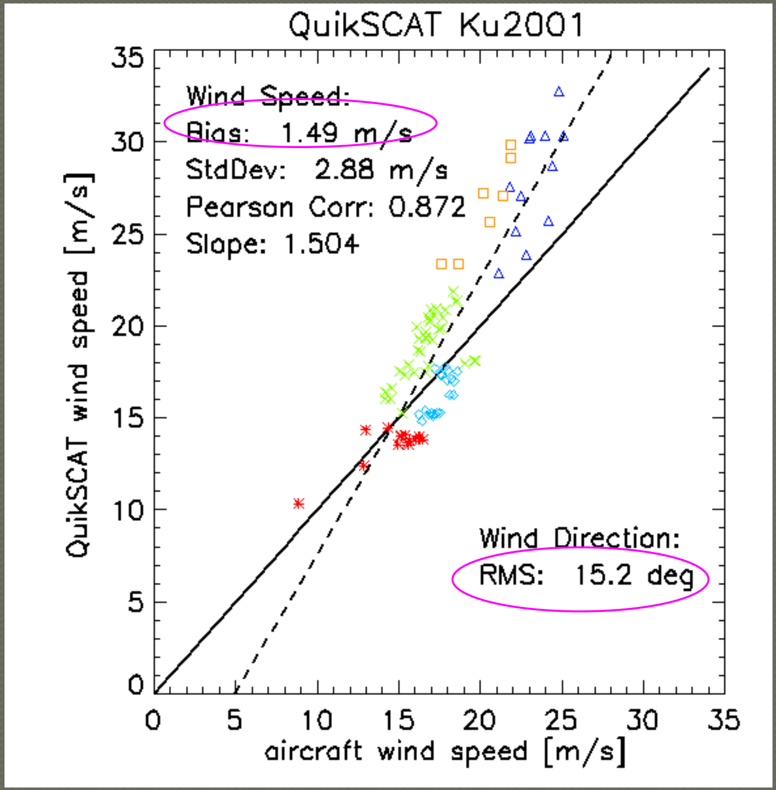
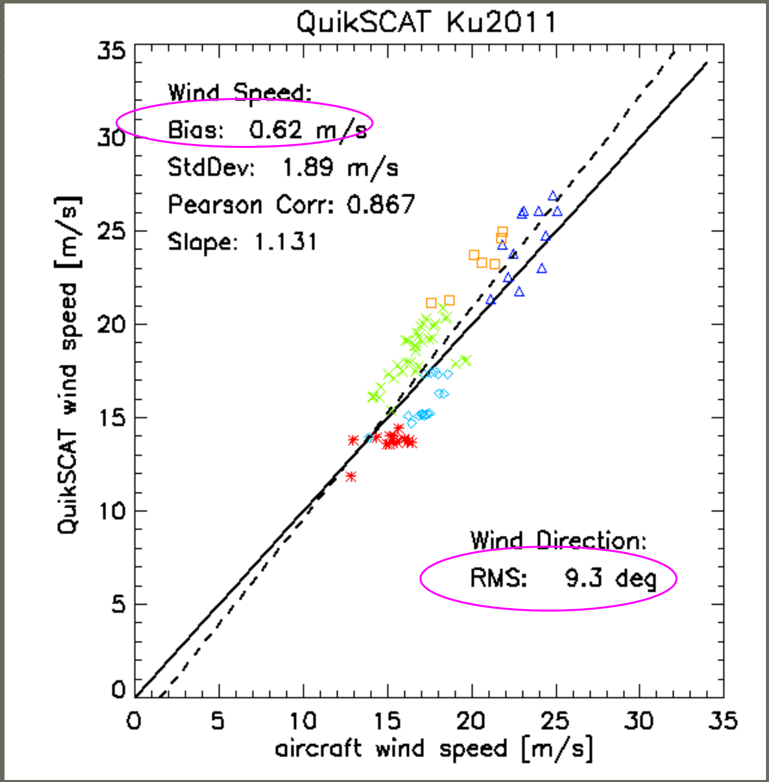
Aircraft turbulent probe observations taken during the Greenland Flow Distortion Experiment (GFDex), Feb and Mar 2007 (Renfrew et al, QJRMS 2009).







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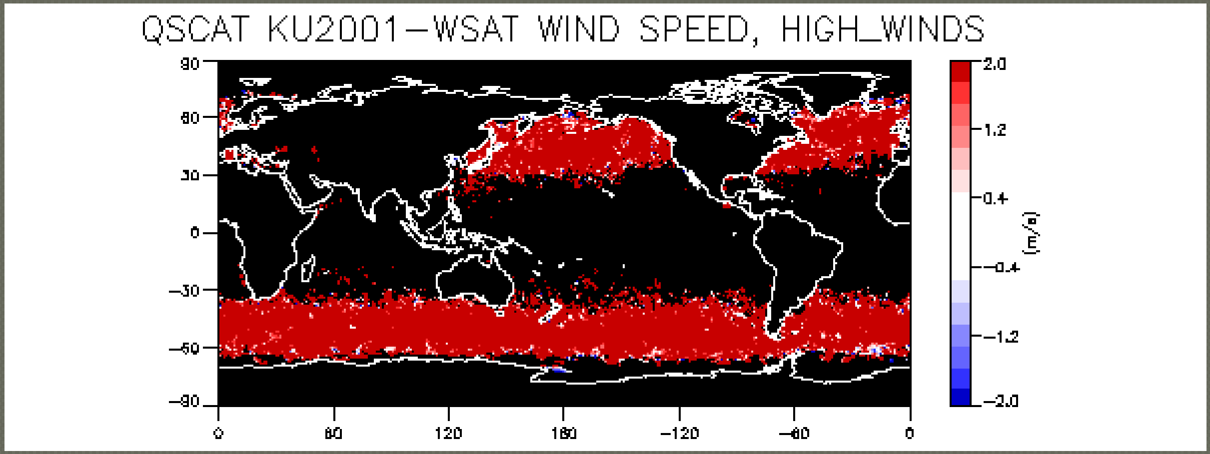
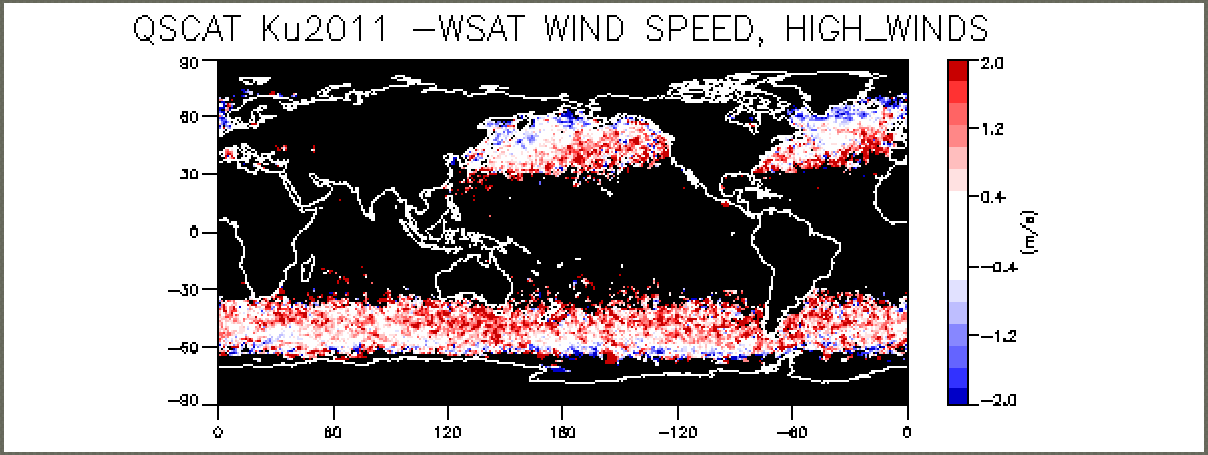
HIGH WINDS: GLOBAL MAP QSCAT-WINDSAT

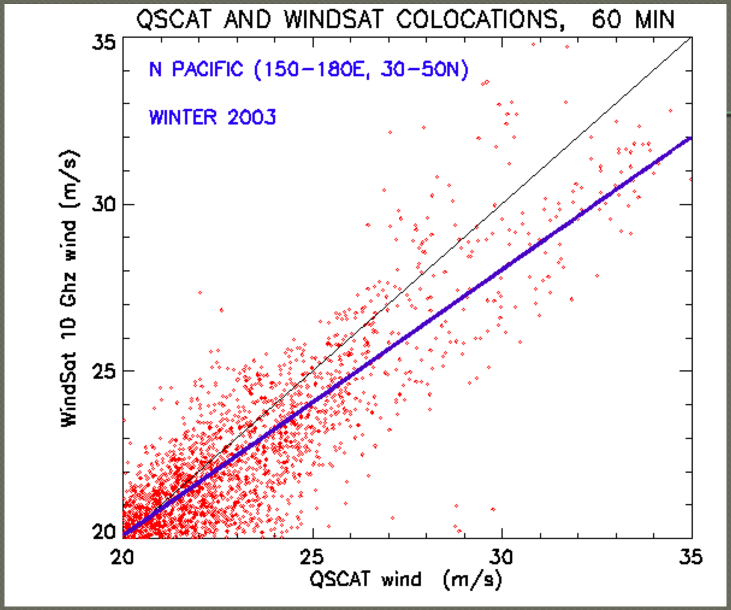
Ku2001

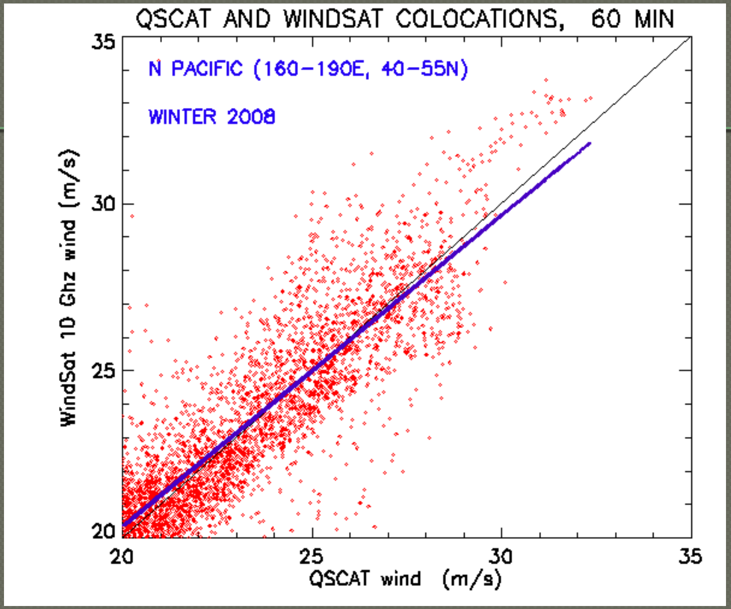


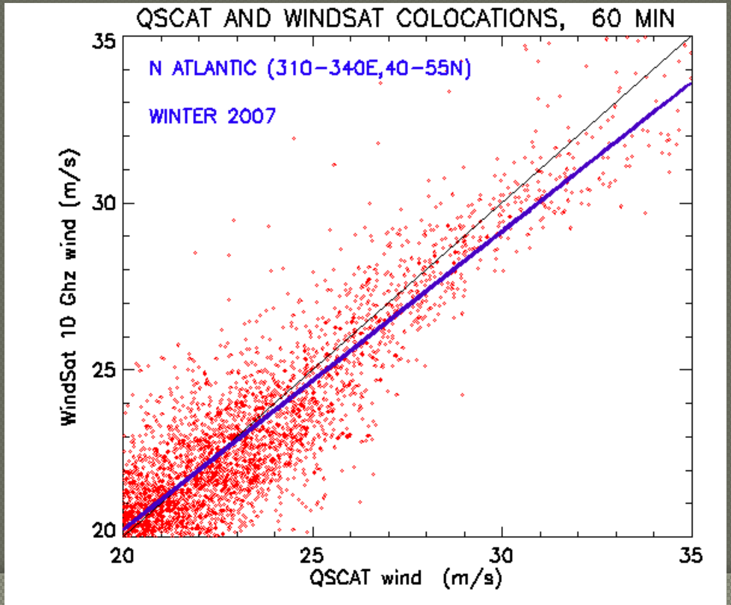
Ku2011

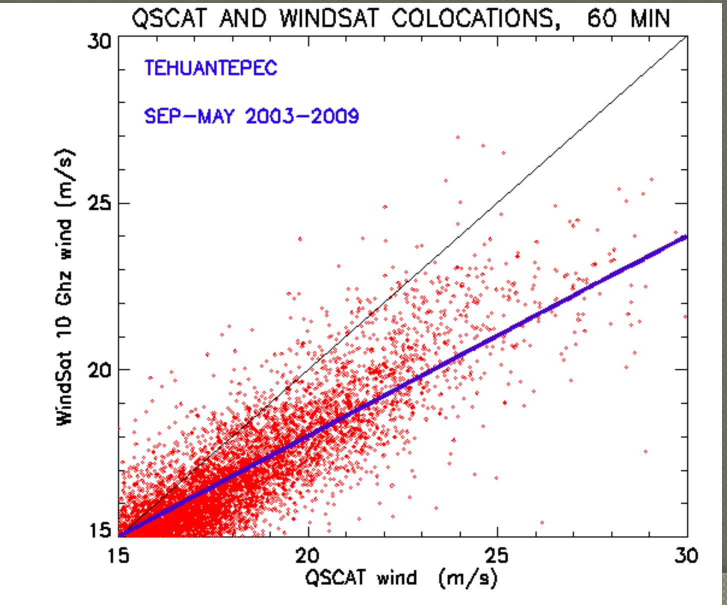


QSCAT VERSUS WINDSAT SWATH DATA









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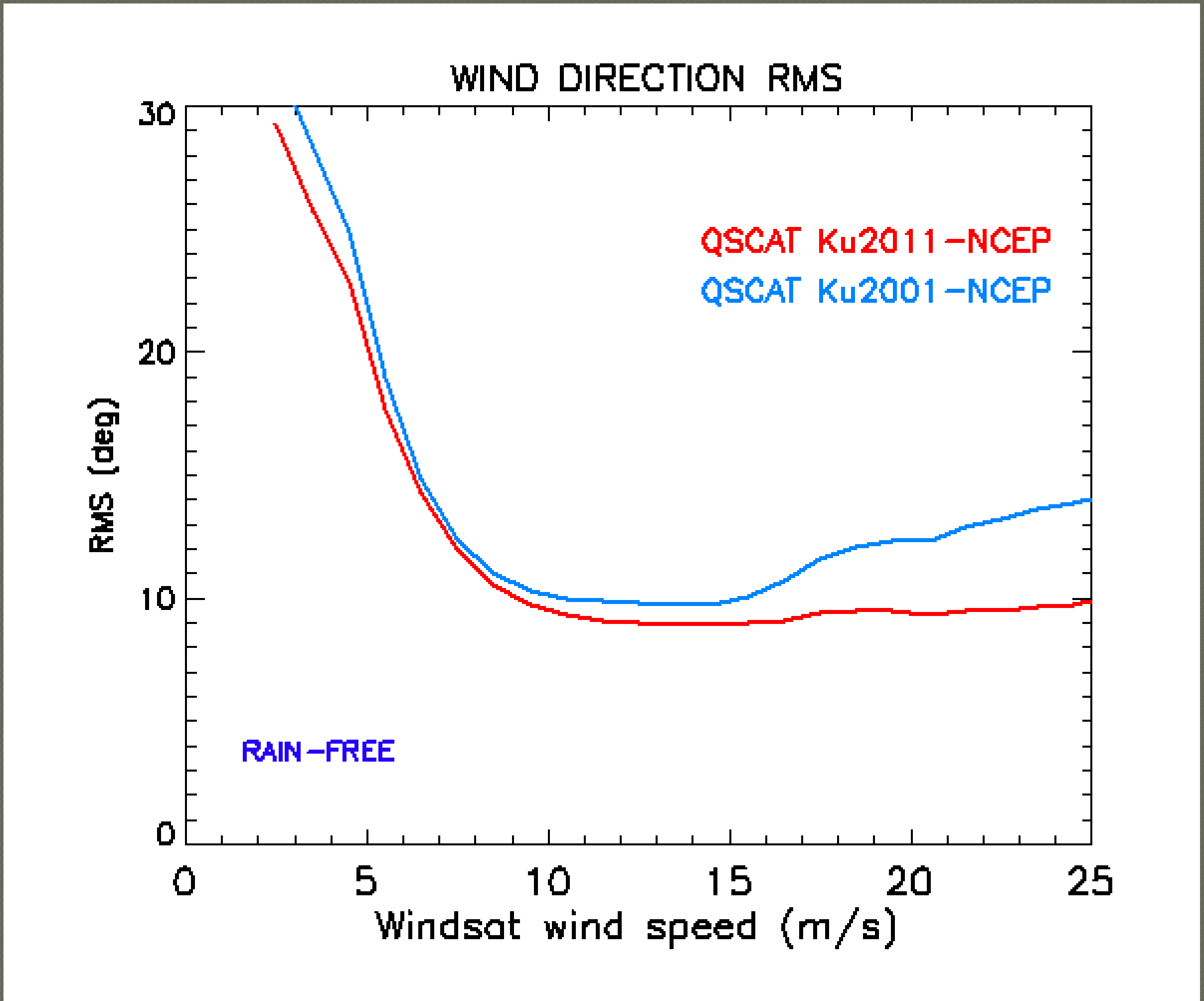
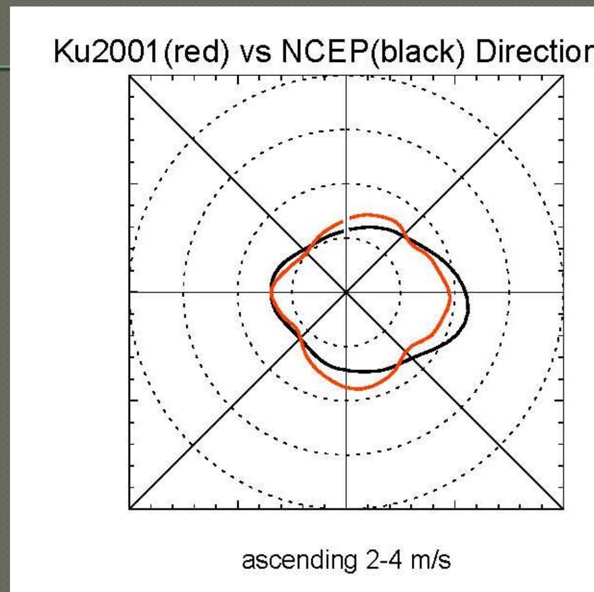
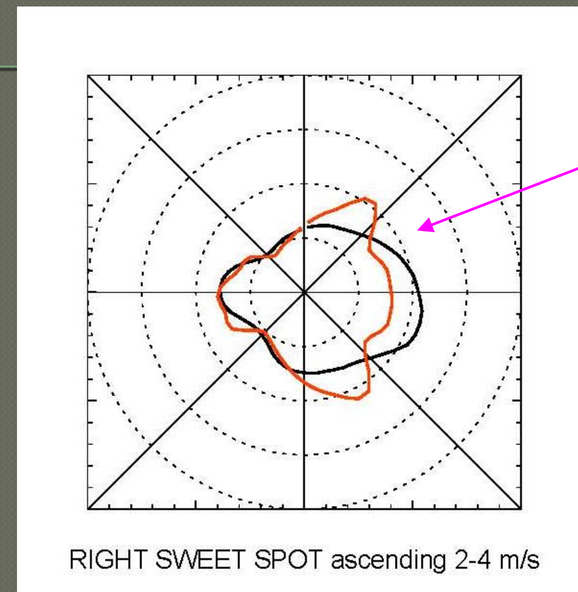
WIND DIRECTION VALIDATION



DIRECTIONAL HISTOGRAMS: LOW WINDS

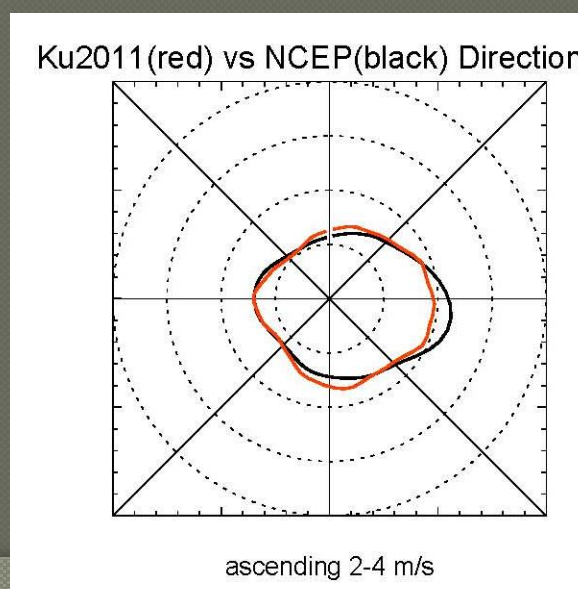
Ku2001
NCEP

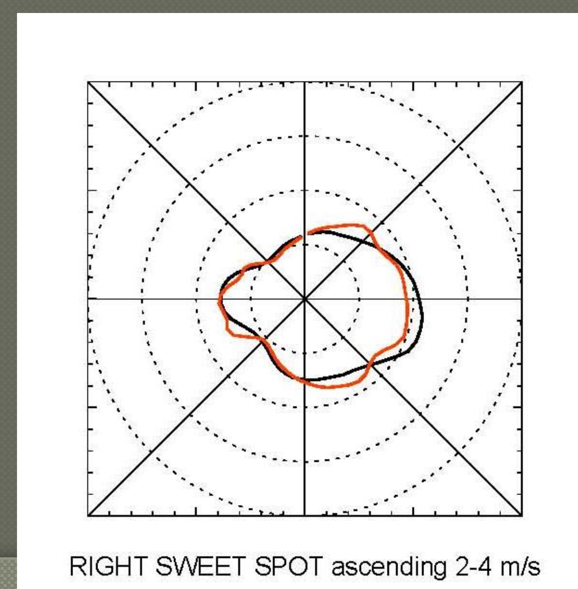




Two lobes

Ku2011
NCEP

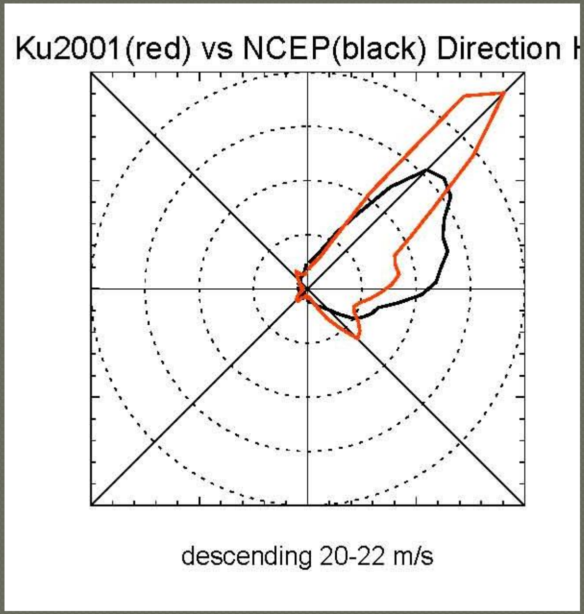


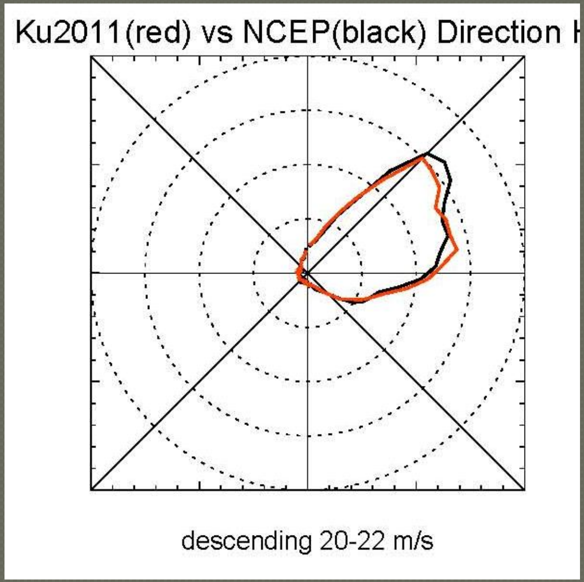


DIRECTIONAL HISTOGRAMS: HIGH WINDS

Ku2001
NCEP

Ku2011
NCEP





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