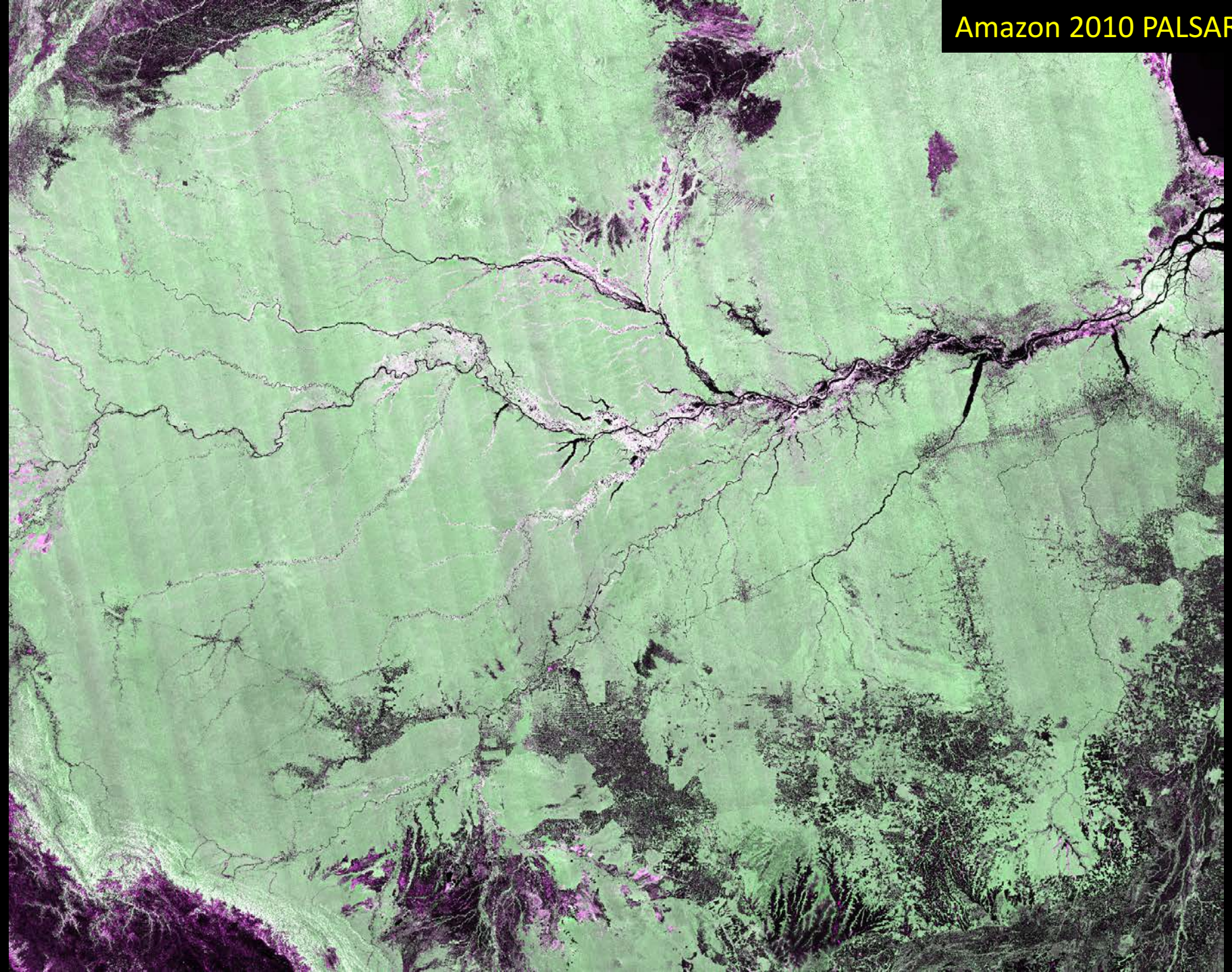


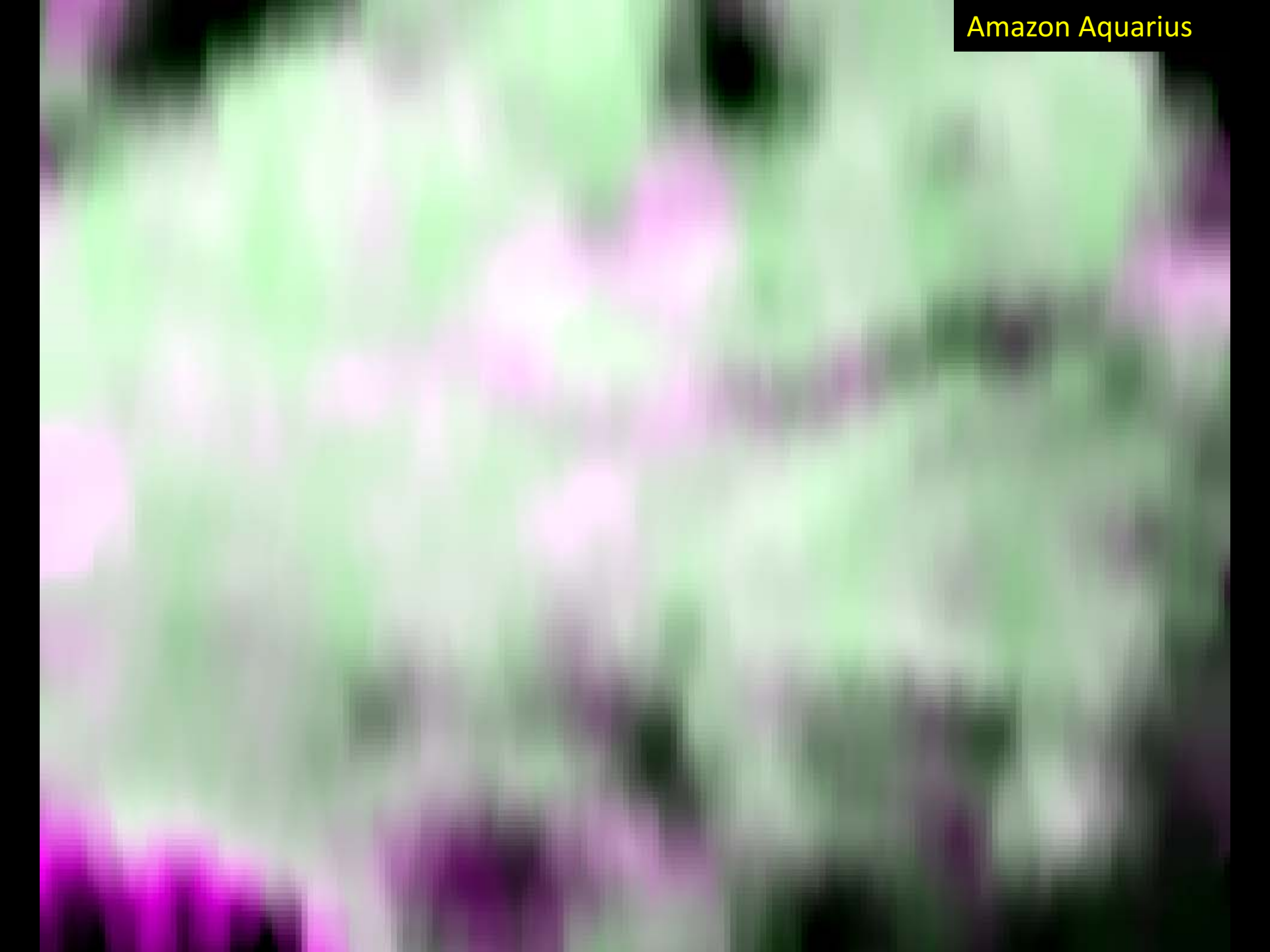
# Aquarius Radiometric Calibration V1.3.5 Data

Fore, Alex

Aquarius Cal/Val Workshop

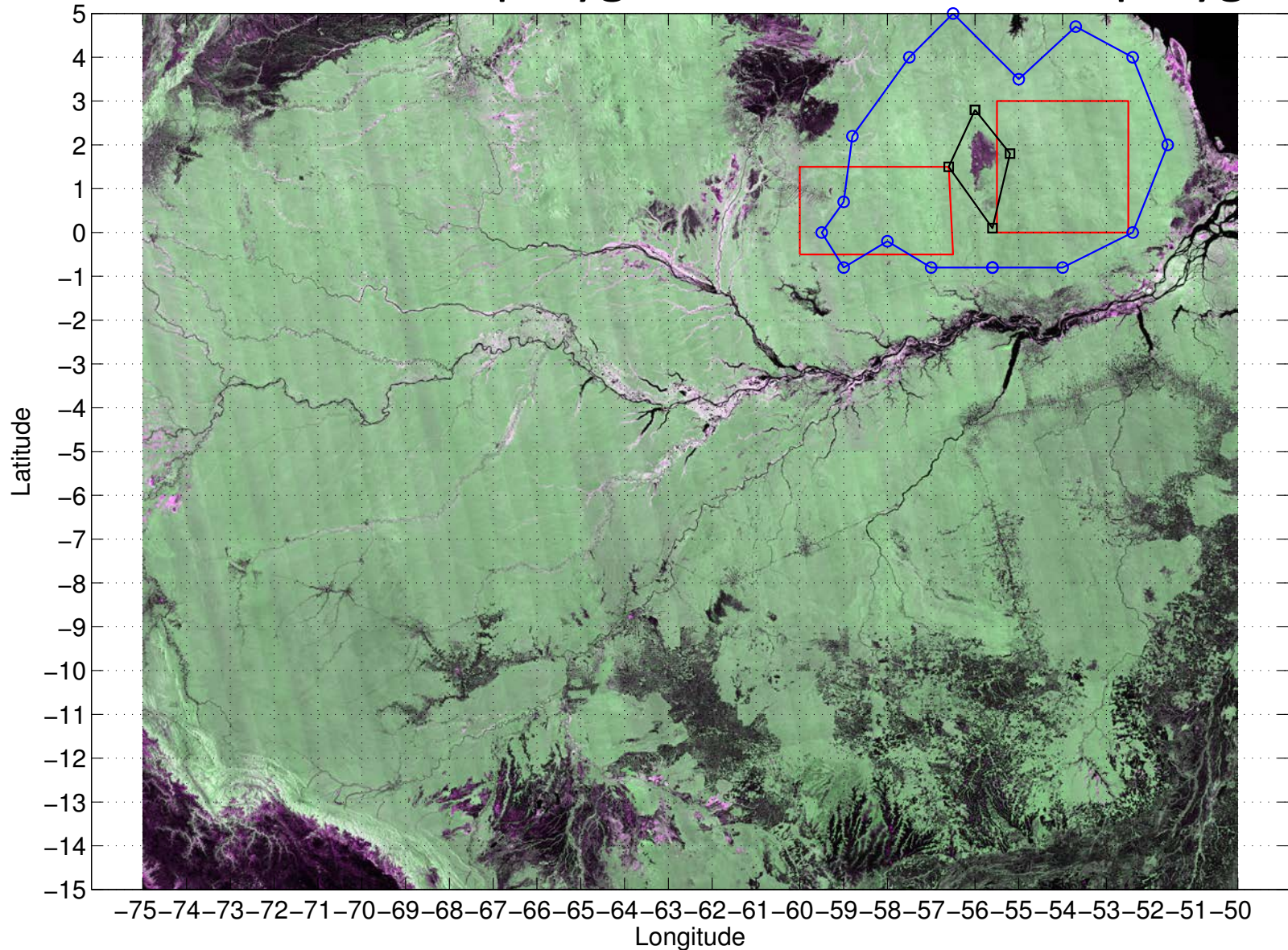
Oct 30<sup>th</sup> 2012





# Regions used in $\gamma_0$ Analysis

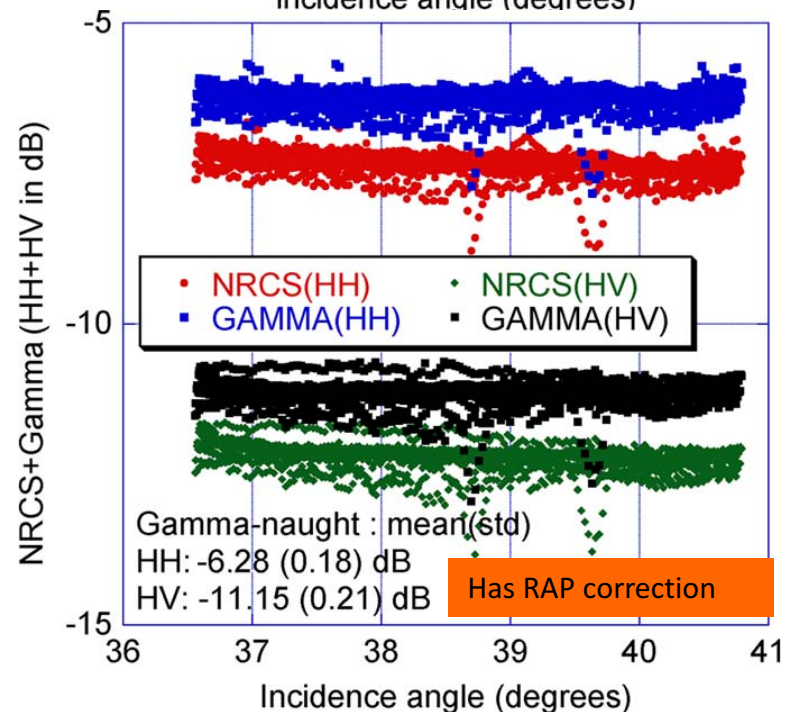
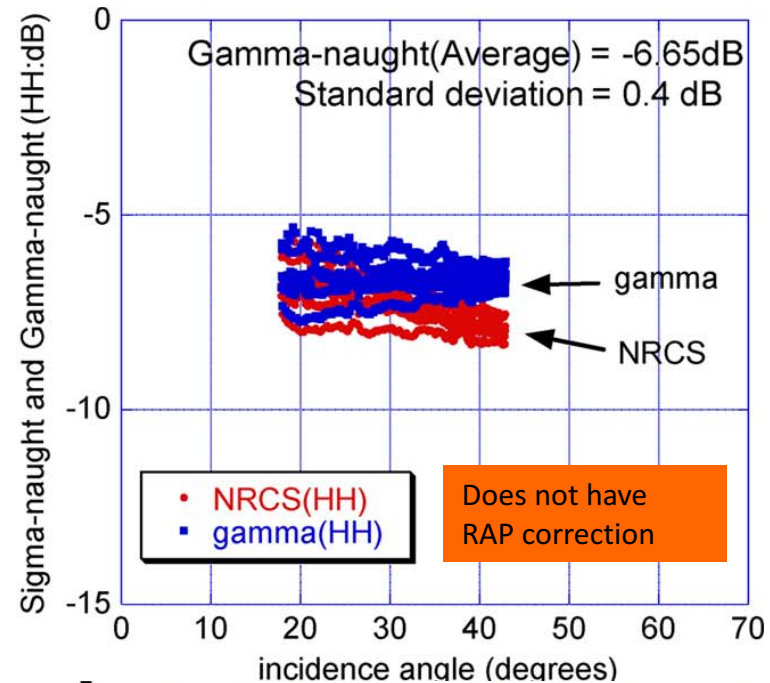
Include data in blue polygon that not in black polygon



# Amazon $\gamma_0$

$$\gamma_0 = \frac{\sigma_0}{\cos(\theta_{inc})}$$

- PALSAR found  $\gamma_0$  values in the Amazon stable across 20-45 degrees in incidence angle\*
  - Wet-dry seasonal difference of  $\sim 0.27$  dB\*\*
  - Wet season is approx. Nov-April.
- Best estimates are:
  - HH  $\sim -6.28$  dB (std 0.18)
  - HV  $\sim -11.15$  dB (std 0.21)
  - **Not clear which season this is from!**



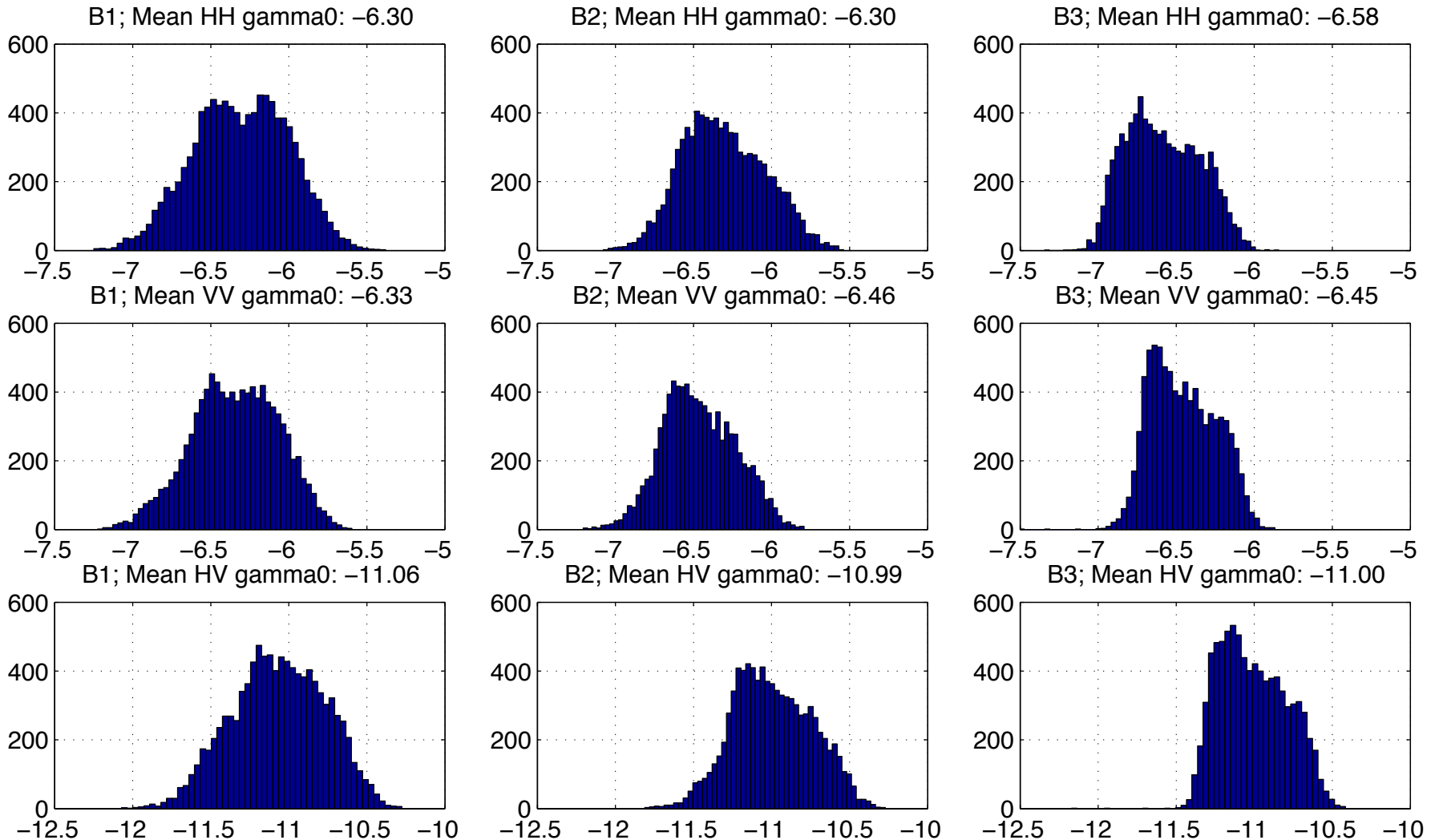
\*M. Shimada, O. Isoguchi, T. Tadono, and K. Isono. Palsar radiometric and geometric calibration. Geoscience and Remote Sensing, IEEE Transactions on, 47(12):3915 – 3932, dec. 2009 (Images from this source)

\*\*M. Shimada. Long-term stability of I-band normalized radar cross section of amazon rainforest using the jers-1 sar. Canadian Journal of Remote Sensing, 31(1):132–137, 2005.

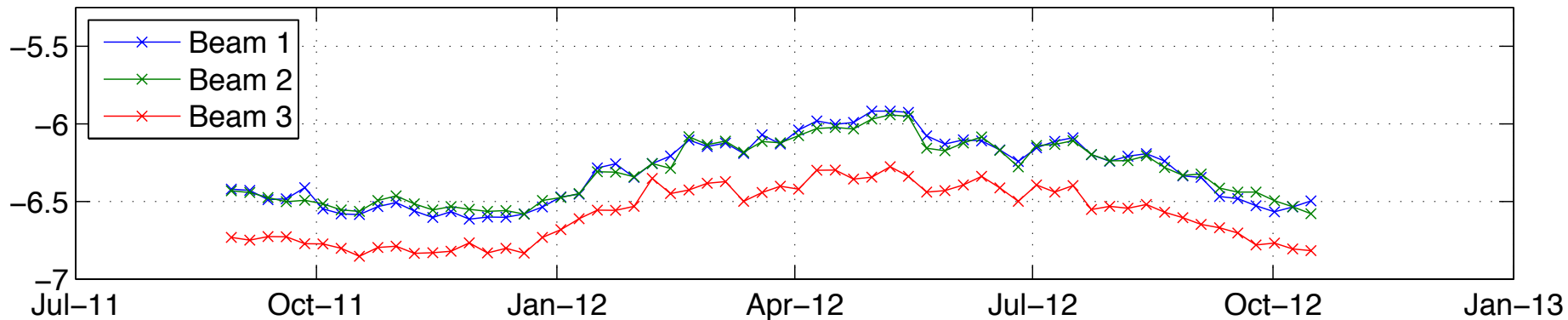
RAP correction is range antenna pattern correction

# PALSAR Found $\gamma_0^{\text{HH}} = -6.28$ dB and $\gamma_0^{\text{HV}} = -11.15$ dB

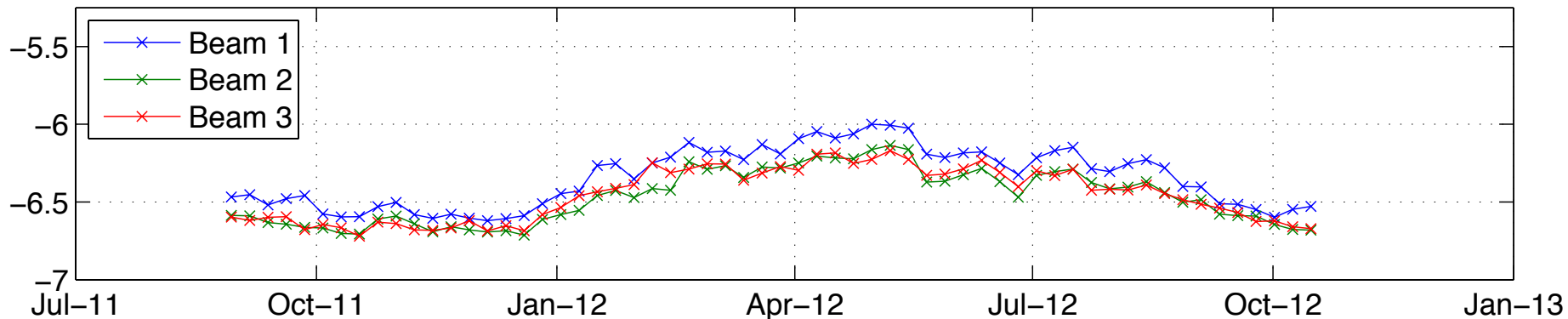
## Histograms of Aquarius $\gamma_0$ For the Three Beams



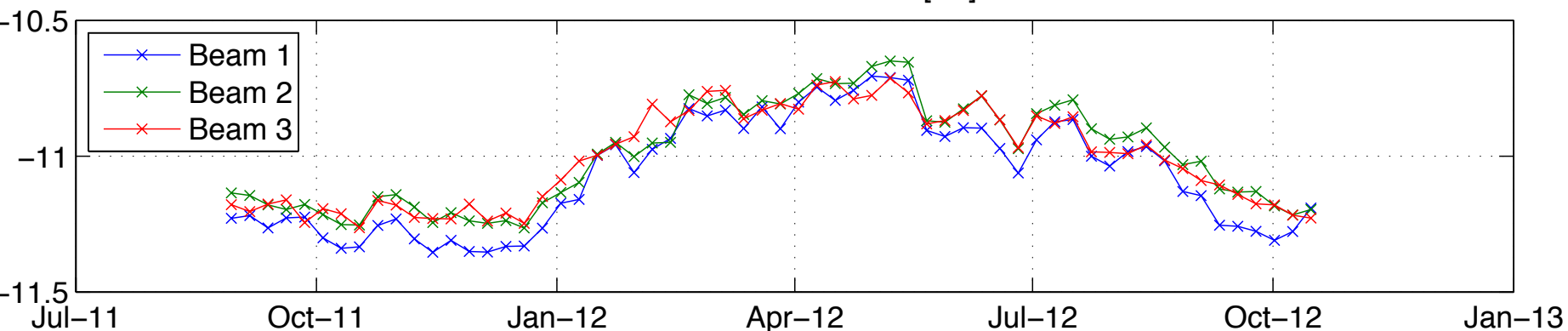
Amazon Gamma 0 HH [dB]



Amazon Gamma 0 VV [dB]



Amazon Gamma 0 HV [dB]



# Bias compared to PALSAR

PALSAR values: HH: -6.28 dB; HV: -11.15 dB

Asc / Dec	Beam 1	Beam 2	Beam 3
All HH	-0.02	-0.02	-0.30
Ascending HH	0.02	-0.04	-0.36
Descending HH	-0.05	0.01	-0.21
All VV	-0.05	-0.18	-0.17
Ascending VV	-0.03	-0.21	-0.19
Descending VV	-0.08	-0.15	-0.14
All HV	0.09	0.16	0.15
Ascending HV	0.12	0.14	0.14
Descending HV	0.07	0.19	0.16

*No significant ascending / descending difference*



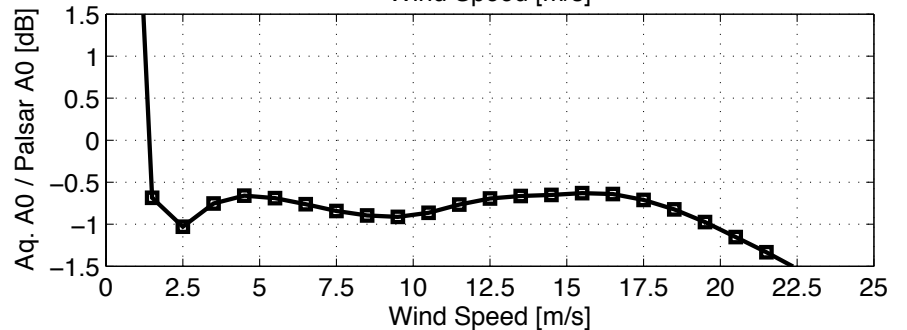
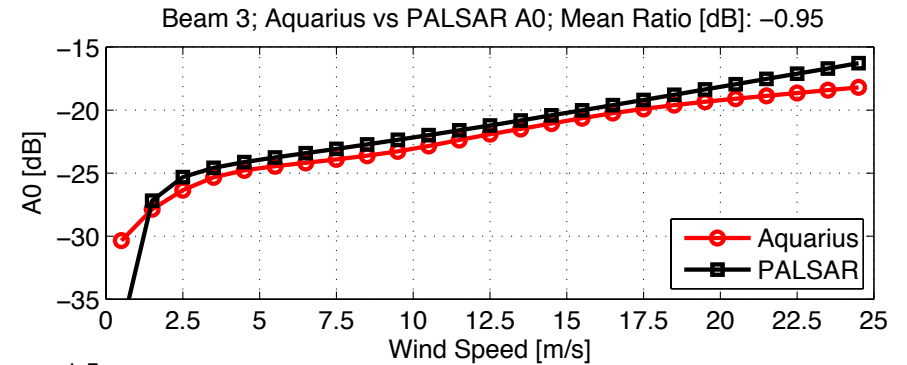
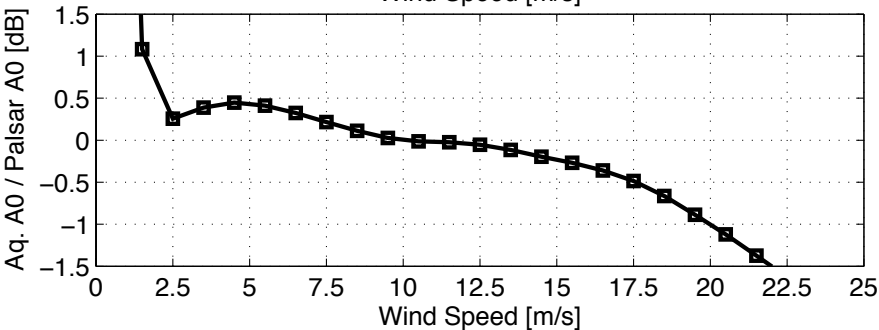
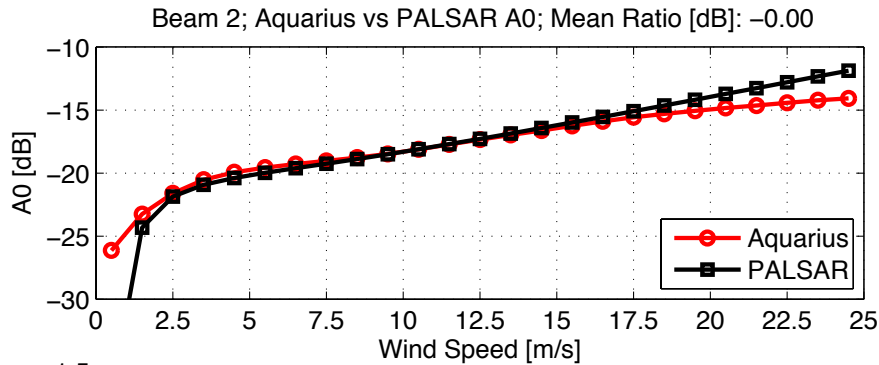
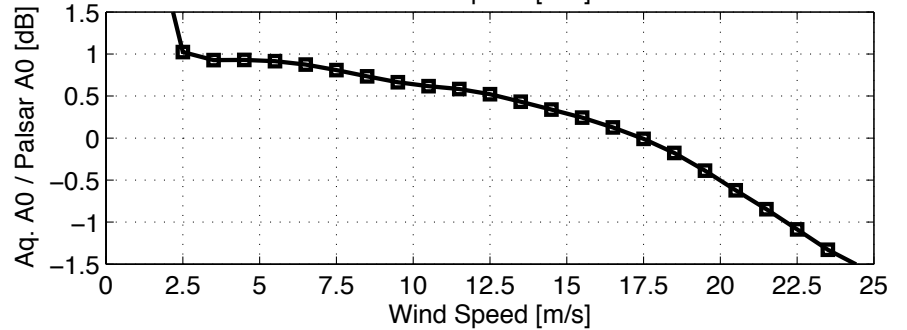
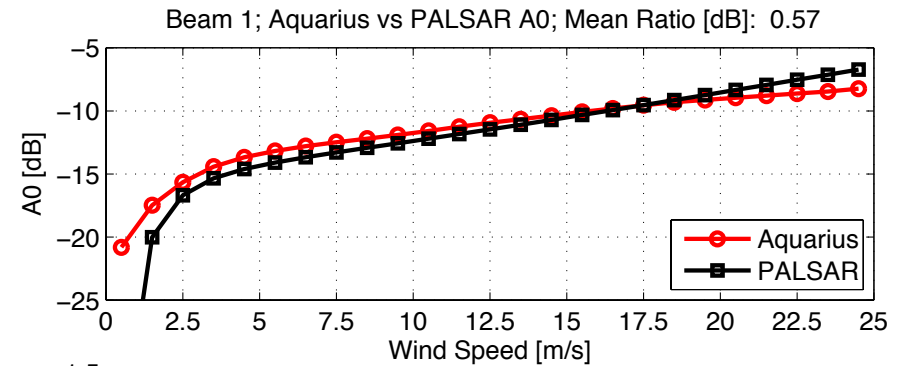
# Ocean Comparison

## Aquarius HH / PALSAR HH

Plot of PALSAR HH GMF (black square) and our Aquarius HH GMF (red o).

-Compute wind speed PDF weighted mean ratio of Aquarius GMF divided by PALSAR GMF.

Beam	1	2	3
Mean Ratio [dB]	0.57	0	-0.95



# Summary

- Over land:
  - No significant ascending / descending bias observed over Amazon.
- Over Ocean:
  - Not consistent with land estimates
- Recommendation
  - Scale Beam 3 HH by +0.3 dB
  - Scale Beam 2,3 VV by +0.2 dB

# Mean $\gamma_0$ Values

## Bias compared to PALSAR in ( )

	Beam 1	Beam 2	Beam 3
Aquarius HH	-6.30 (-0.02)	-6.30 (-0.02)	-6.58 (-0.30)
Aquarius VV	-6.33 (-0.05)	-6.46 (-0.21)	-6.45 (-0.20)
Aquarius HV	-11.06 (+0.09)	-10.99 (+0.16)	-11.00 (+0.15)

PALSAR values: HH: -6.28 dB; HV: -11.15 dB

I believe that most PALSAR data was taken on ascending passes (10pm ascending node)

# Mean $\gamma_0$ Values

## Bias compared to PALSAR in ( )

	Beam 1	Beam 2	Beam 3
Ascending HH	-6.26 (+0.02)	-6.32 (-0.04)	-6.64 (-0.36)
Descending HH	-6.33 (-0.05)	-6.27 (+0.01)	-6.49 (-0.21)
All HH	-6.30 (-0.02)	-6.30 (-0.02)	-6.58 (-0.30)
Ascending VV	-6.31 (-0.03)	-6.49 (-0.21)	-6.47 (-0.19)
Descending VV	-6.36 (-0.08)	-6.43 (-0.15)	-6.42 (-0.14)
All VV	-6.33 (-0.05)	-6.46 (-0.18)	-6.45 (-0.17)
Ascending HV	-11.03 (+0.12)	-11.01 (+0.14)	-11.01 (+0.14)
Descending HV	-11.08 (+0.07)	-10.96 (+0.19)	-10.99 (+0.16)
All HV	-11.06 (+0.09)	-10.99 (+0.16)	-11.00 (+0.15)

PALSAR values: HH: -6.28 dB; HV: -11.15 dB  
 I believe that most PALSAR data was taken on  
 ascending passes (10pm ascending node)