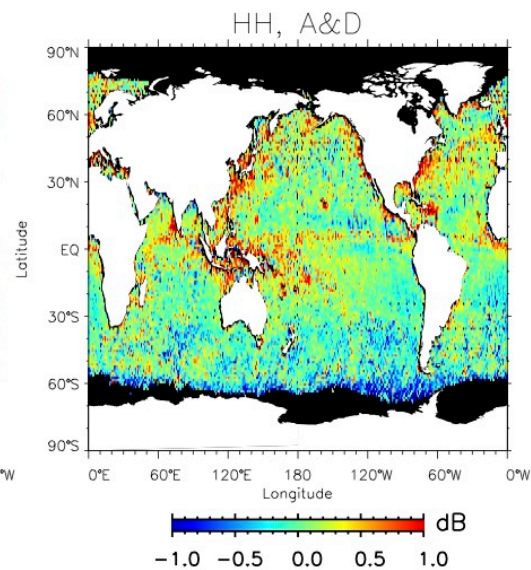
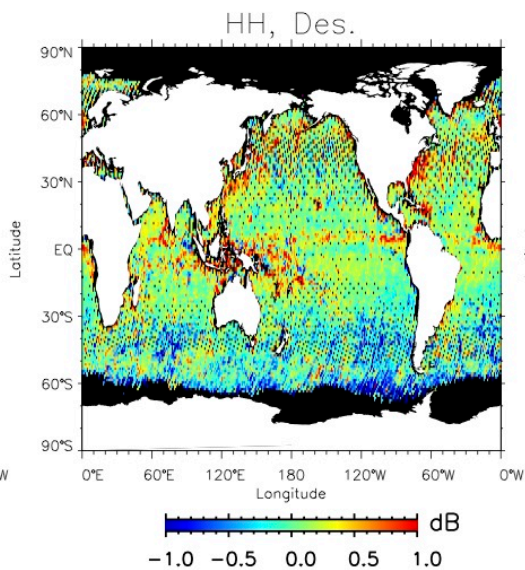
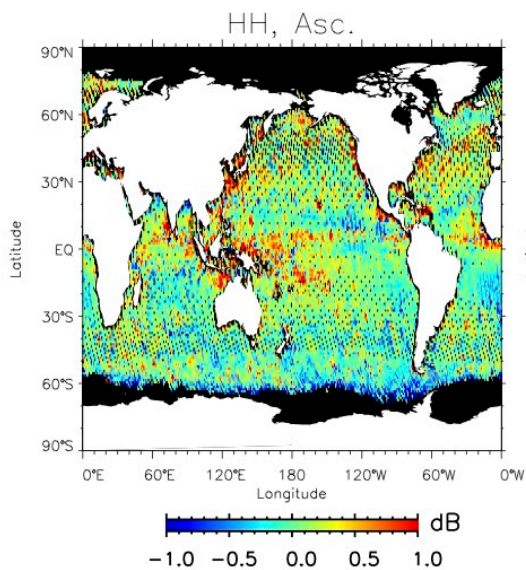
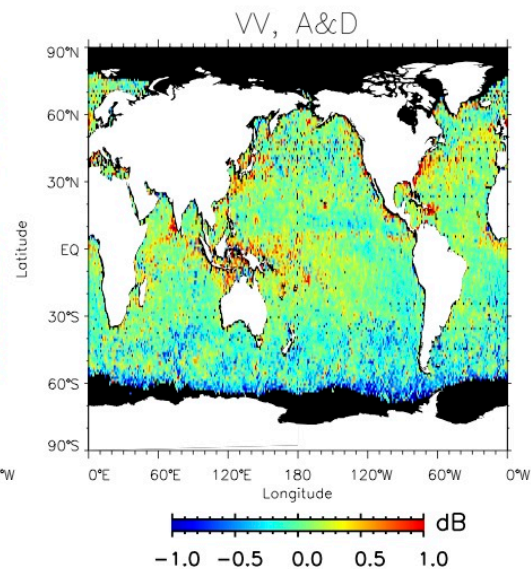
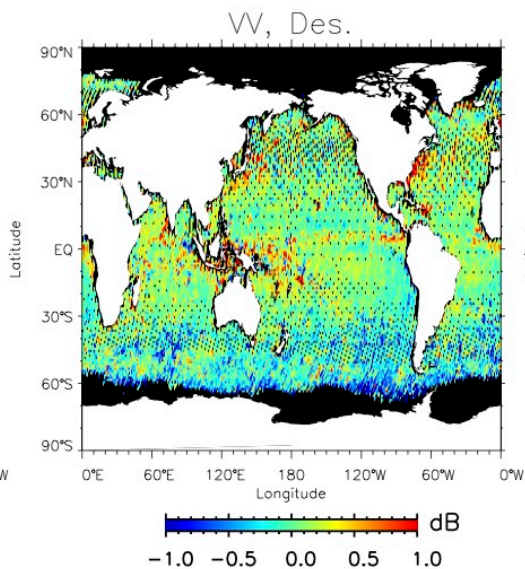
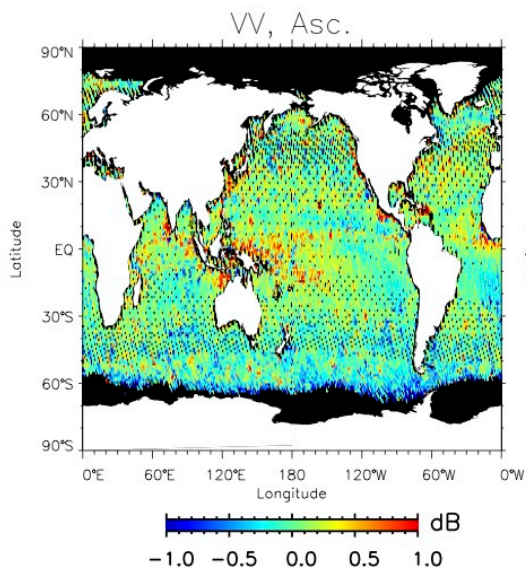


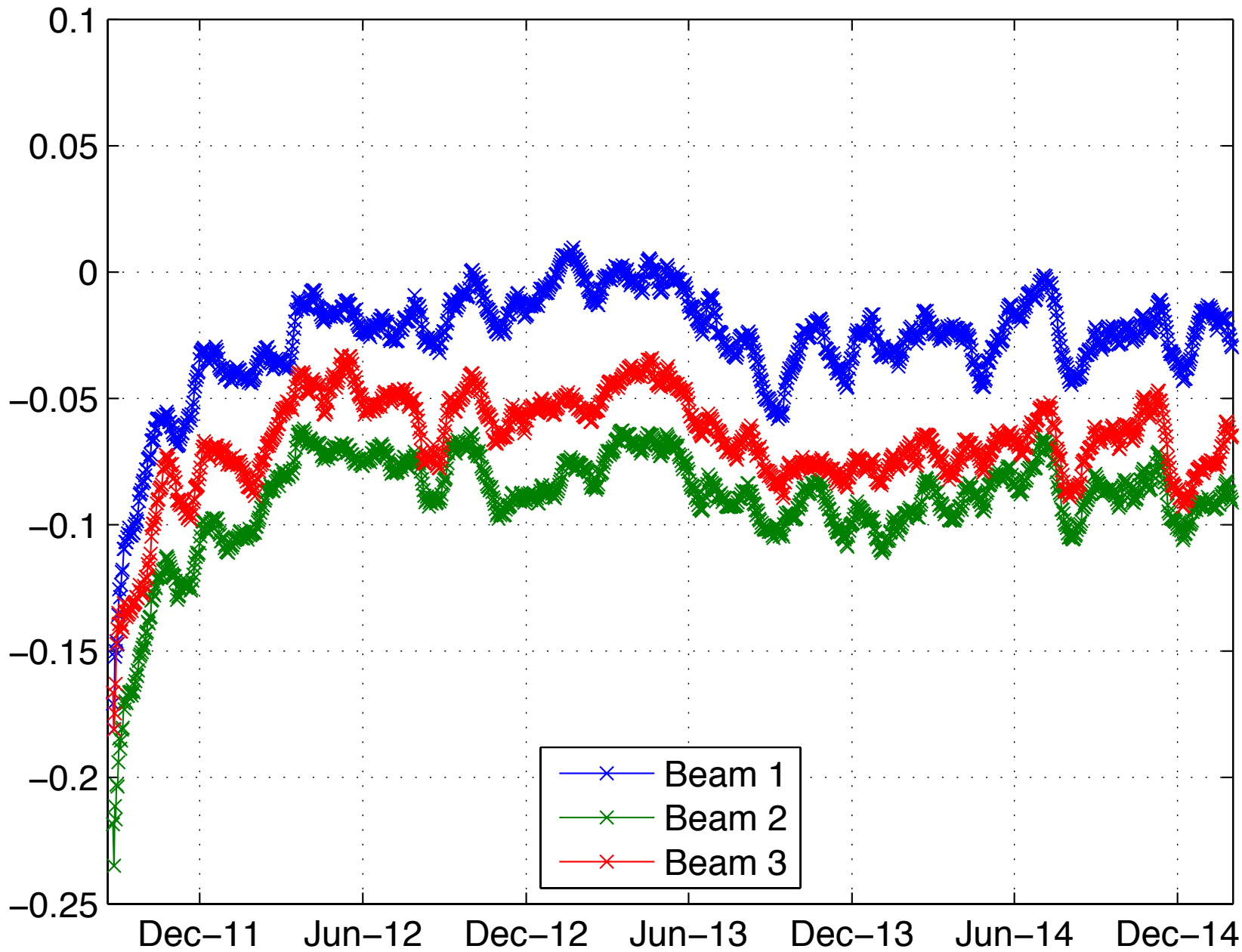
# Aquarius Scatterometer Calibration and RFI Status

Alex Fore, Simon Yueh, Wenqing Tang, Akiko Hayashi  
March 2015 Cal / Val Meeting, Santa Rosa  
Jet Propulsion Laboratory, California Institute of  
Technology

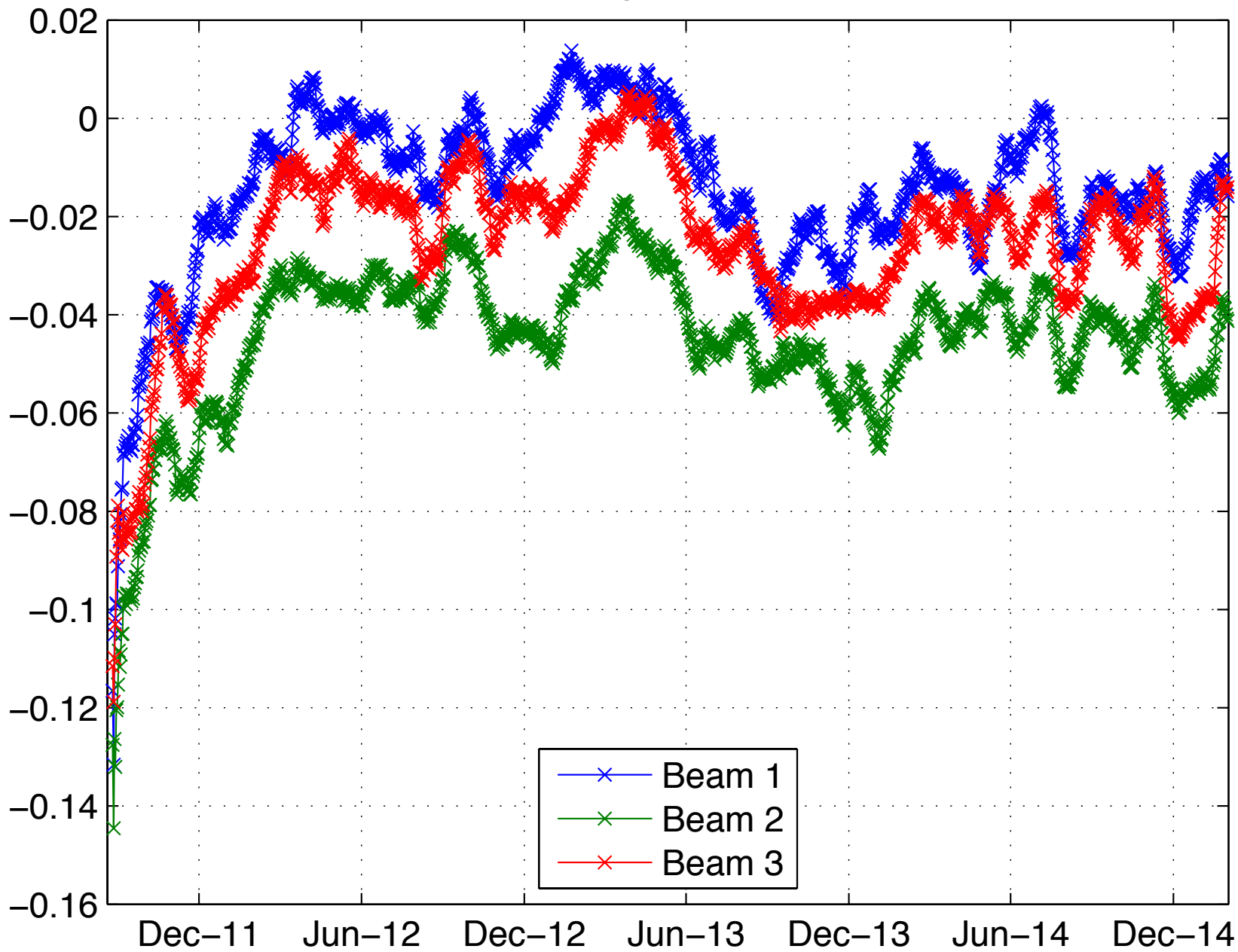
201412 Measured - Model(RC) (dB)



Delta Sigma0 HH [dB]



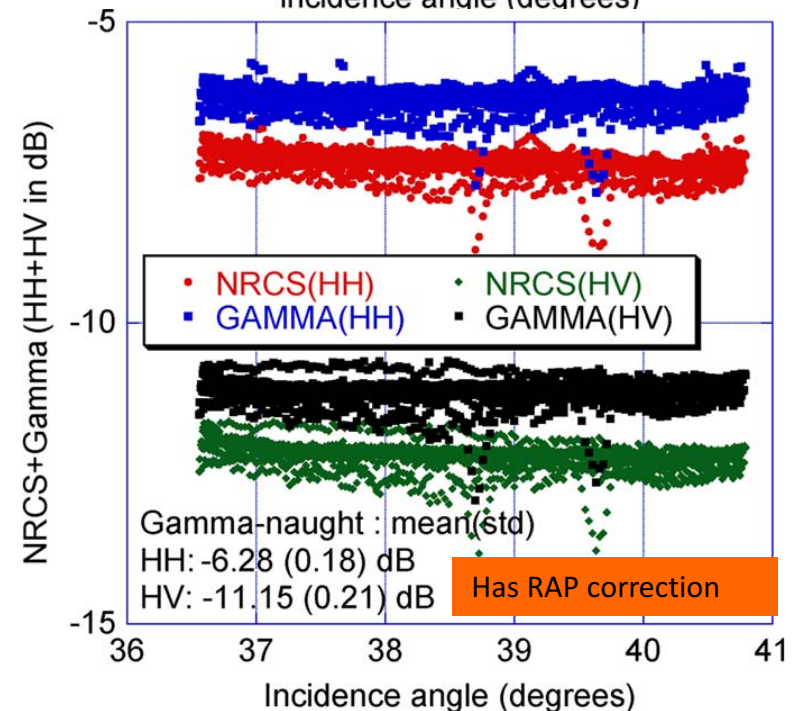
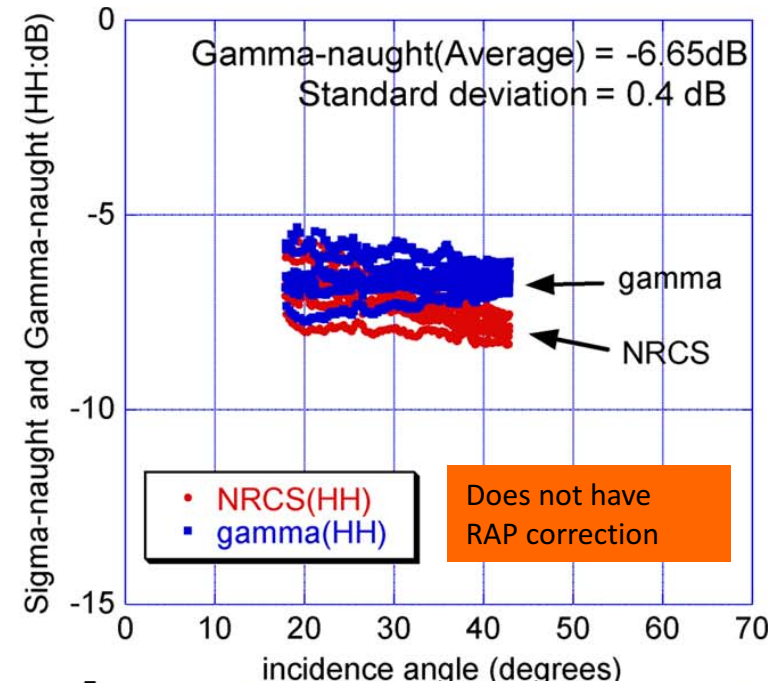
Delta Sigma0 VV [dB]



# 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!**



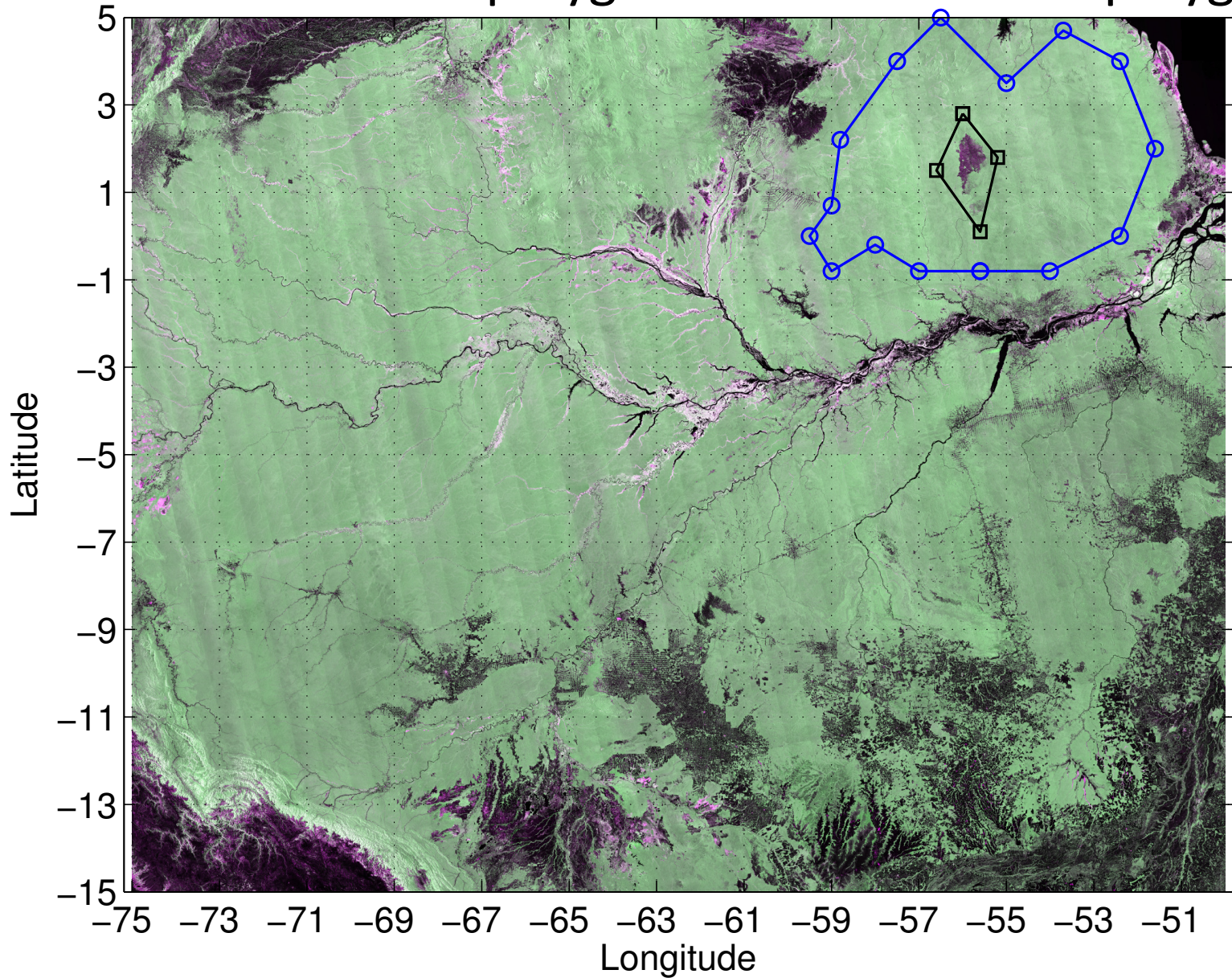
\*M. Shimada, O. Isoguchi, T. Tadono, and K. Isono. Palsar radiometric and geometric calibration. Geoscience and Remote Sensing, IEEE Transactions on, 47(12):3915 – 3932, dec. 2009 (Images from this source)

\*\*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

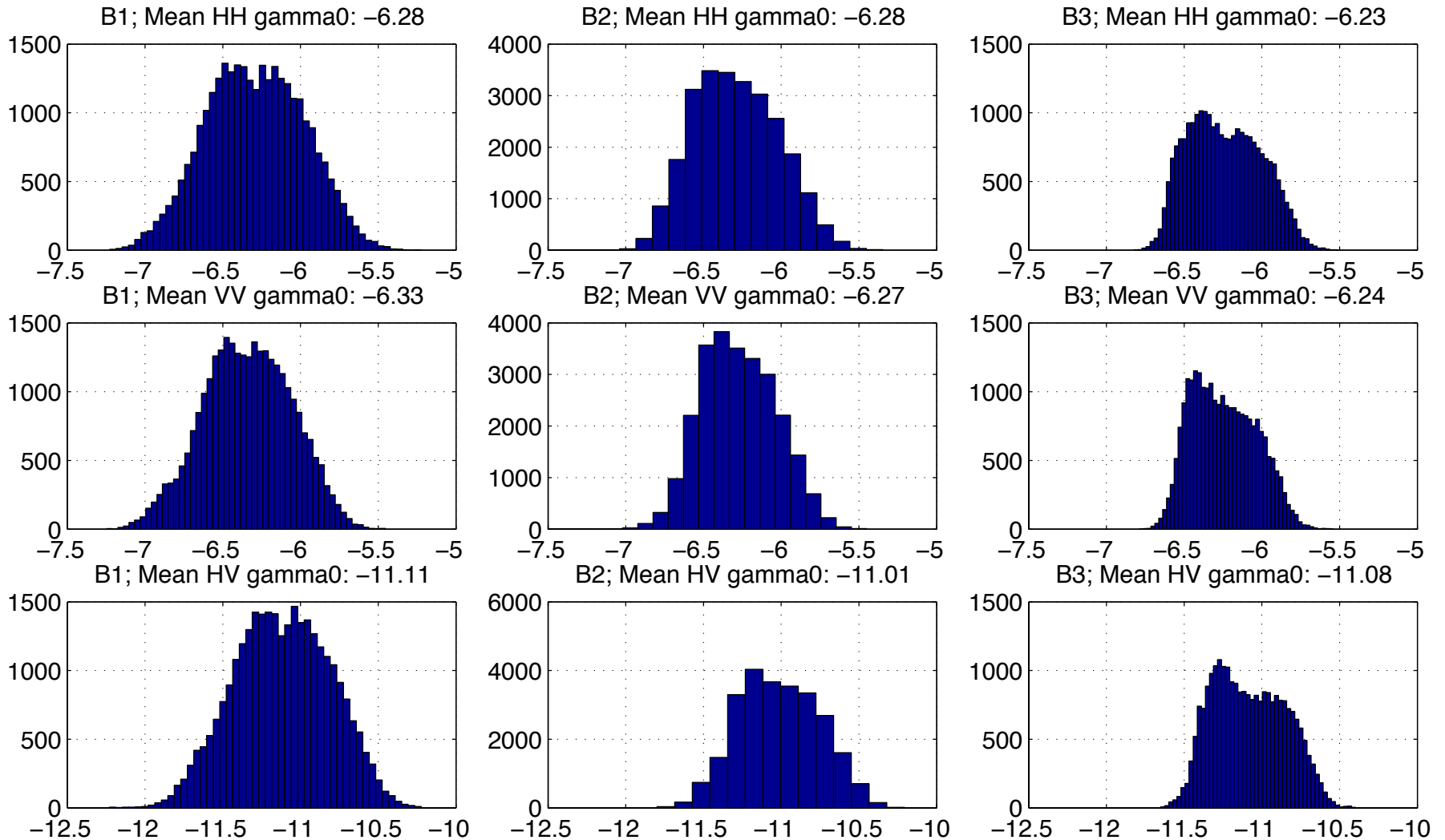
# Regions used in $\gamma_0$ Analysis

Include data in blue polygon that not in black polygon

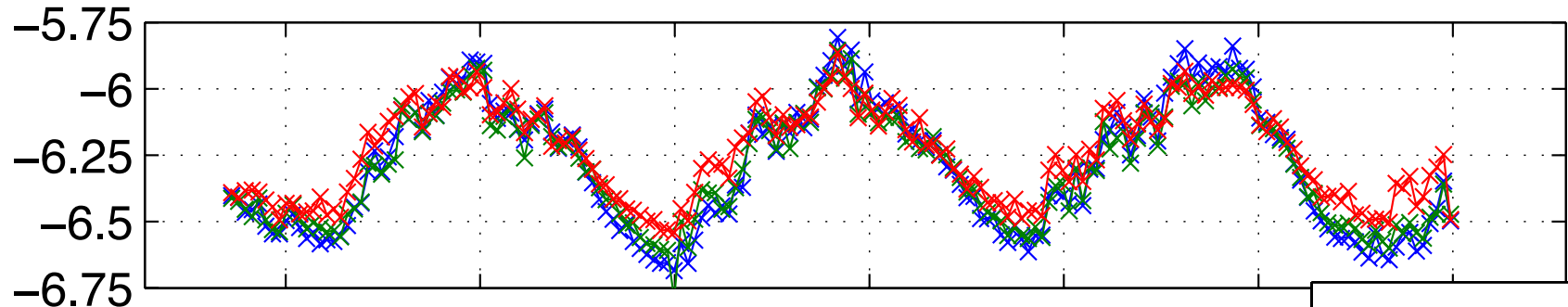


# PALSAR Found $\gamma_0^{\text{HH}} = -6.28$ dB and $\gamma_0^{\text{HV}} = -11.15$ dB

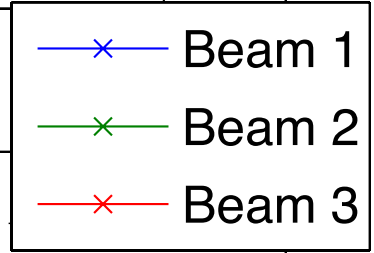
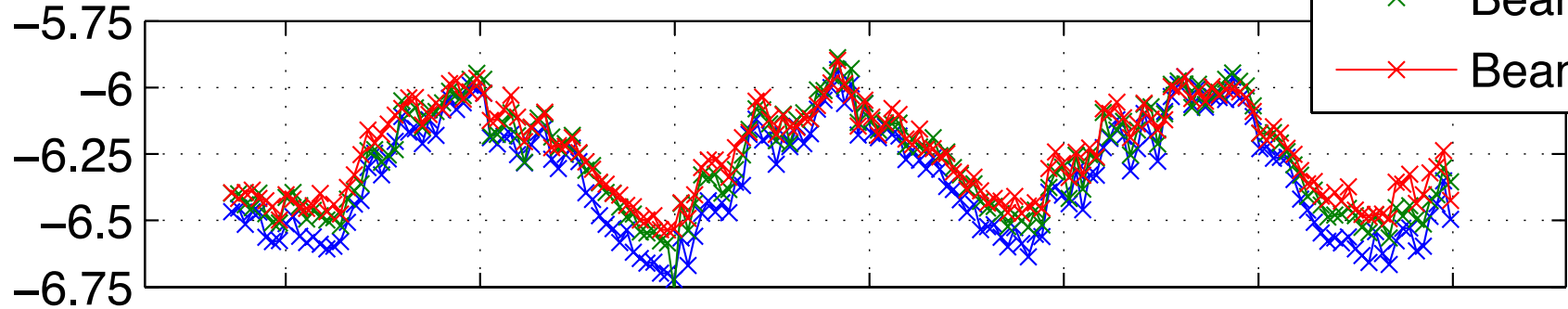
## Histograms of Aquarius $\gamma_0$ For the Three Beams



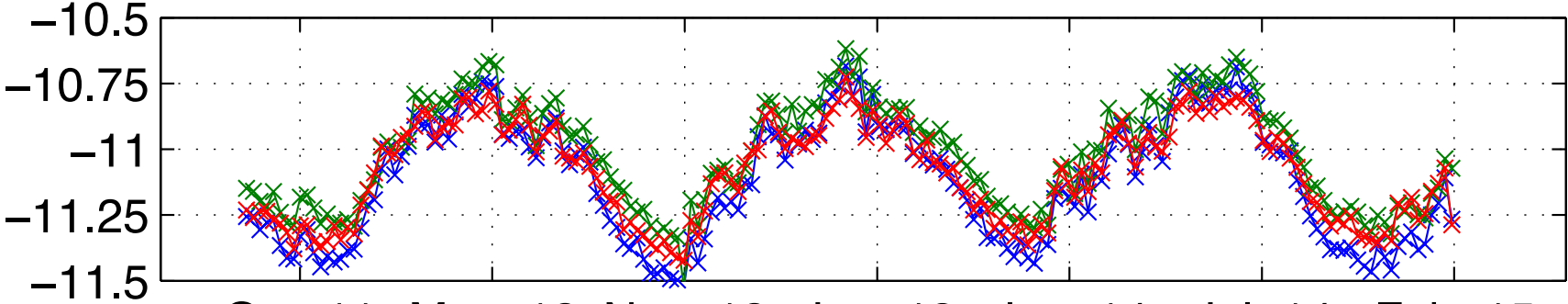
Amazon Gamma 0 HH [dB]



Amazon Gamma 0 VV [dB]



Amazon Gamma 0 HV [dB]



Oct-11    May-12    Nov-12    Jun-13    Jan-14    Jul-14    Feb-15



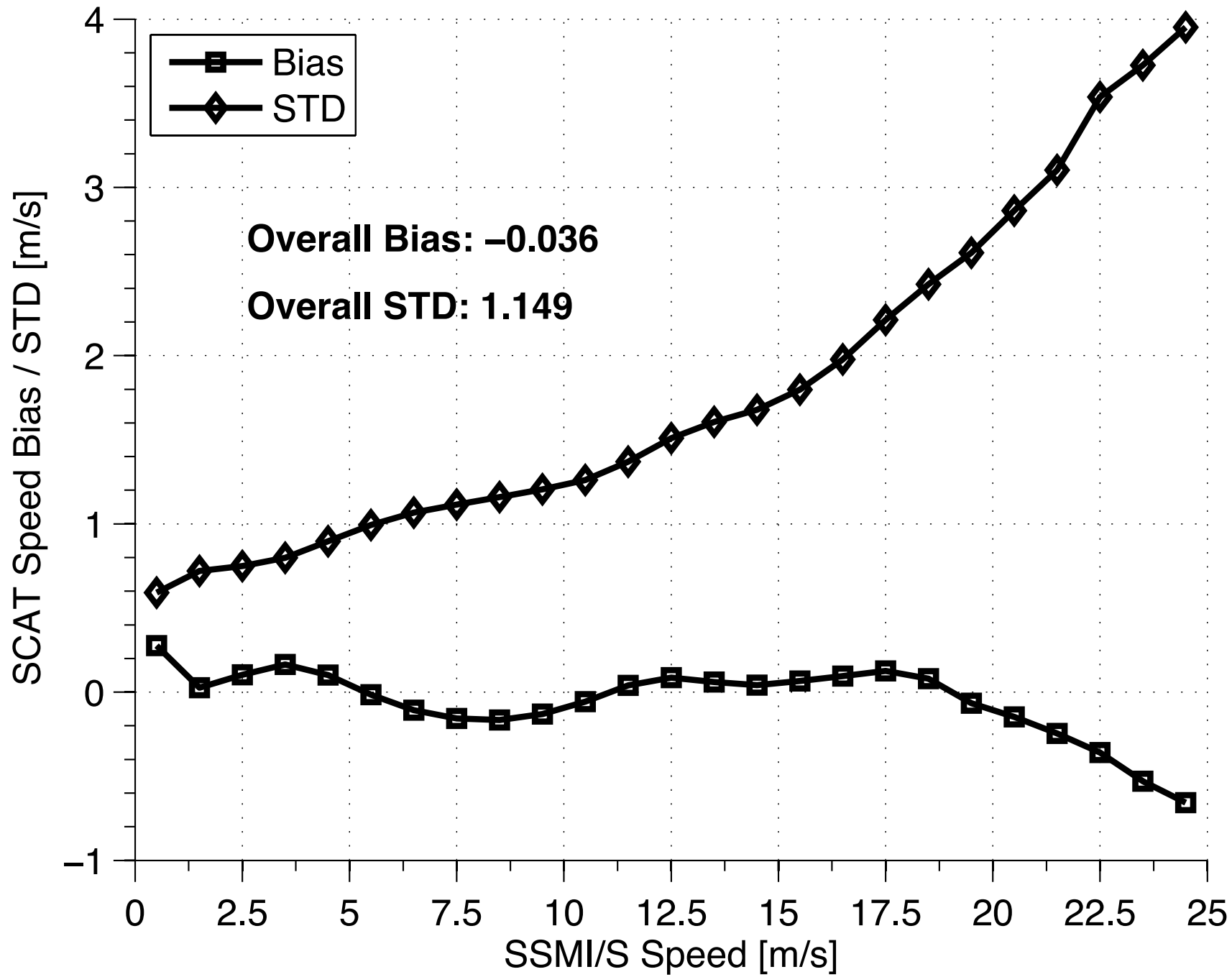
# Bias compared to PALSAR

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

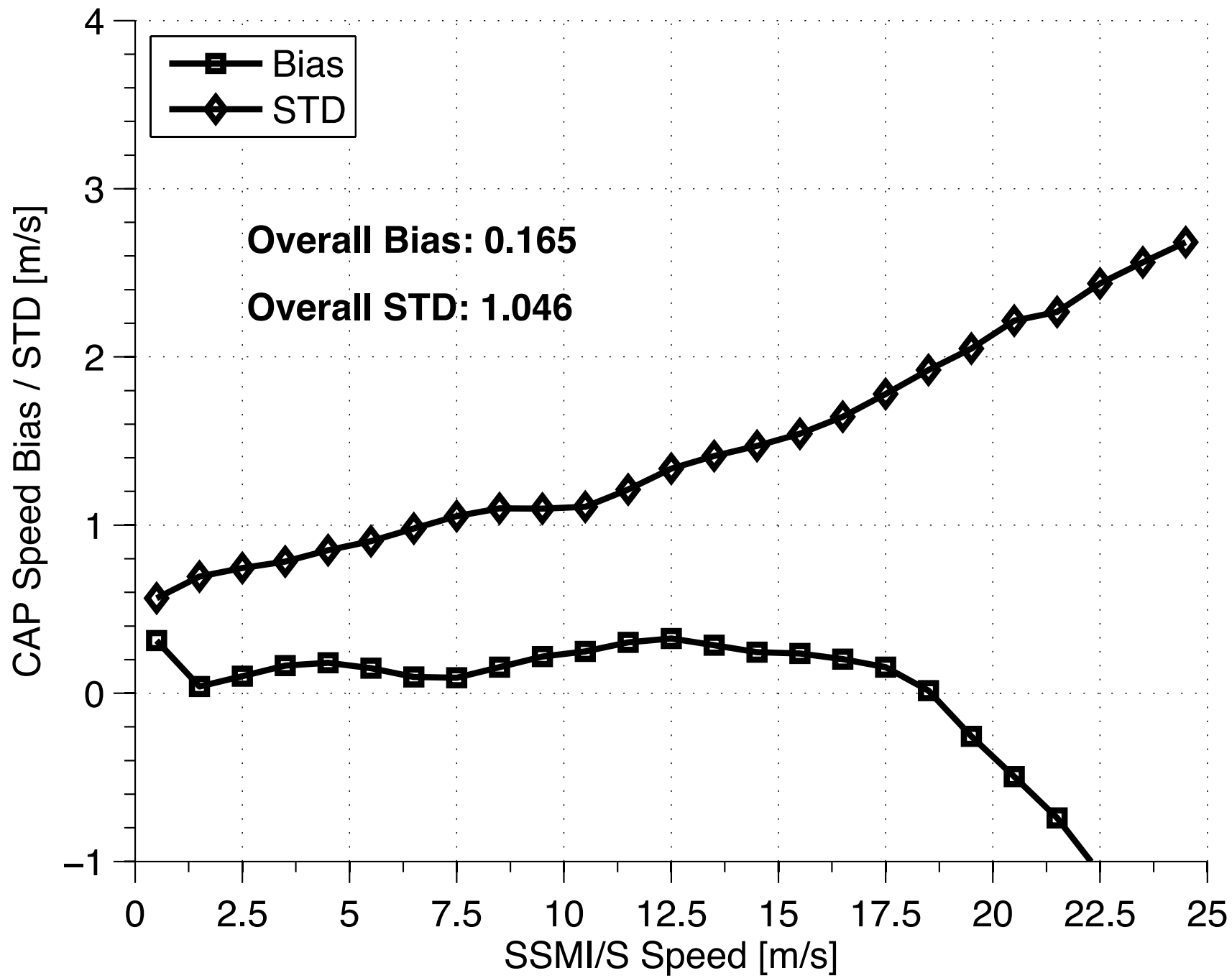
Asc / Dec	Beam 1	Beam 2	Beam 3
All HH	0.00	0.00	0.05
Ascending HH	0.03	0.00	0.03
Descending HH	-0.03	0.01	0.13
All VV	-0.05	0.01	0.07
Ascending VV	-0.03	0.00	0.03
Descending VV	-0.08	0.03	0.06
All HV	0.04	0.14	0.07
Ascending HV	0.07	0.13	0.03
Descending HV	0.02	0.16	0.13

*No significant ascending / descending difference*

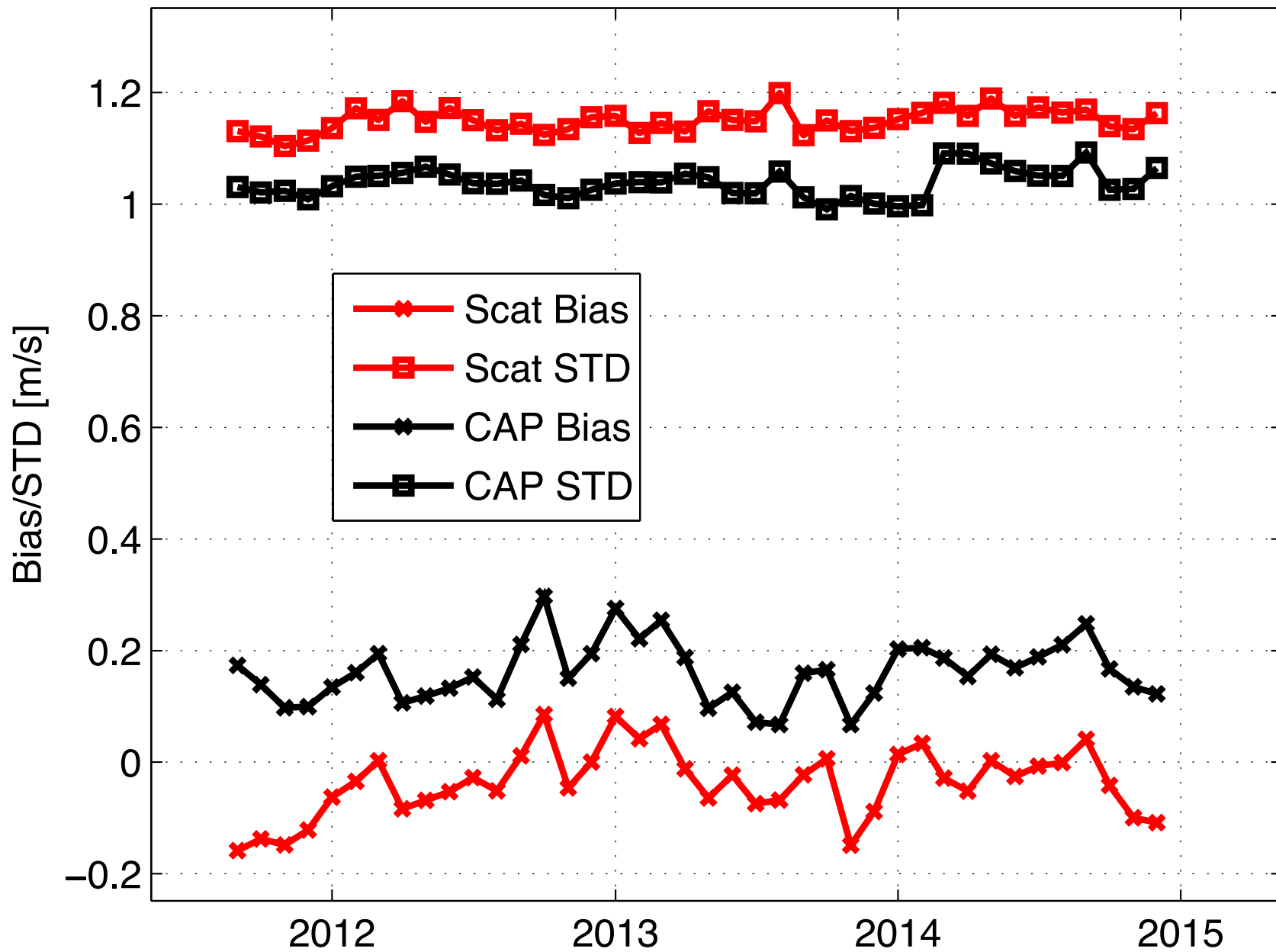
# SCAT Speed compared to SSMI/S



# CAP Speed compared to SSMI/S



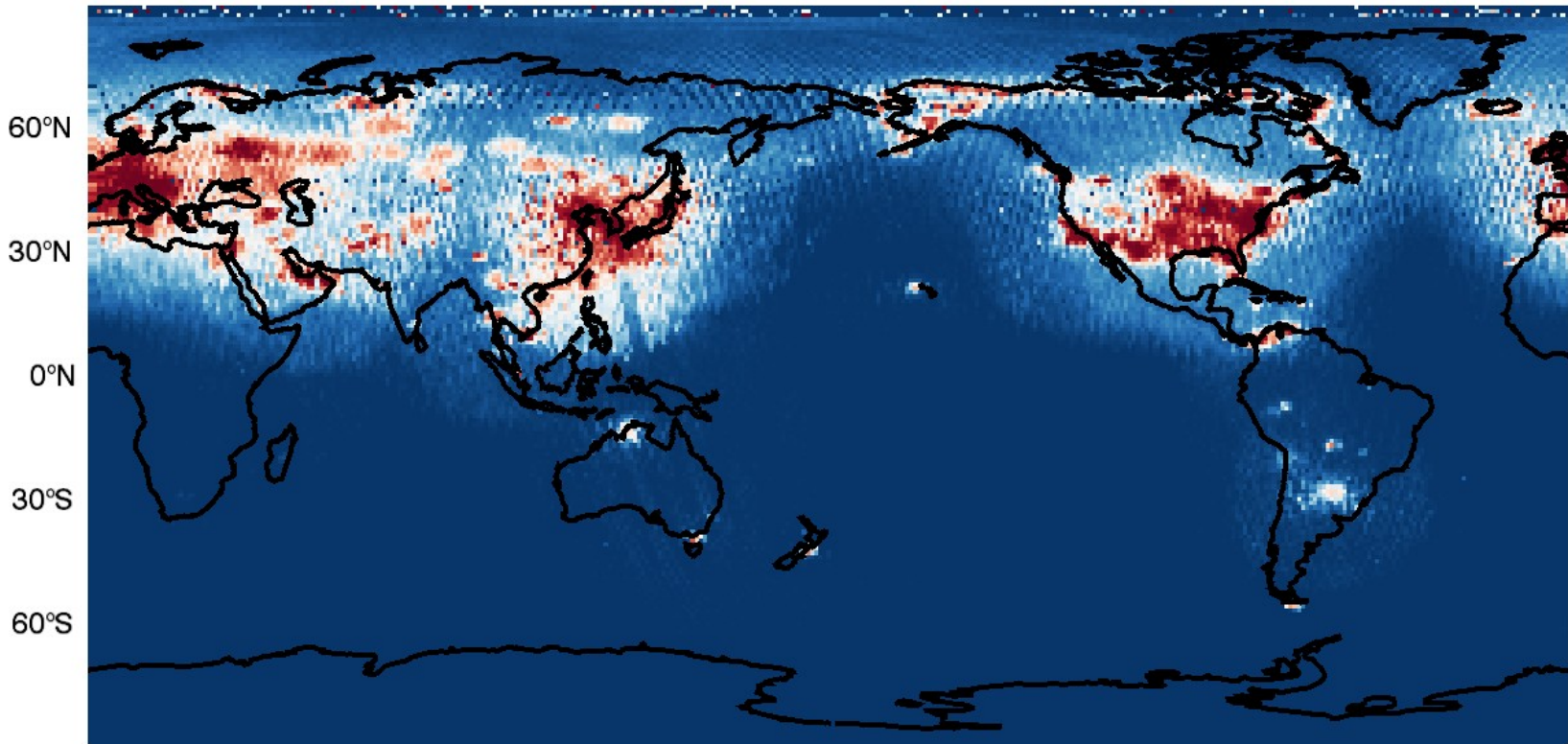
Wind Speed Bias/STD as compared to SSMI/S



# RFI Flag is 10 or 11

2 or more samples of 8 removed from the block average

H-Pol Severe RFI SCAT\_Flag Count For 2012



60°E

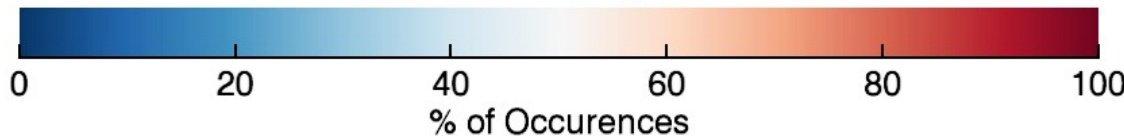
120°E

180°E

120°W

60°W

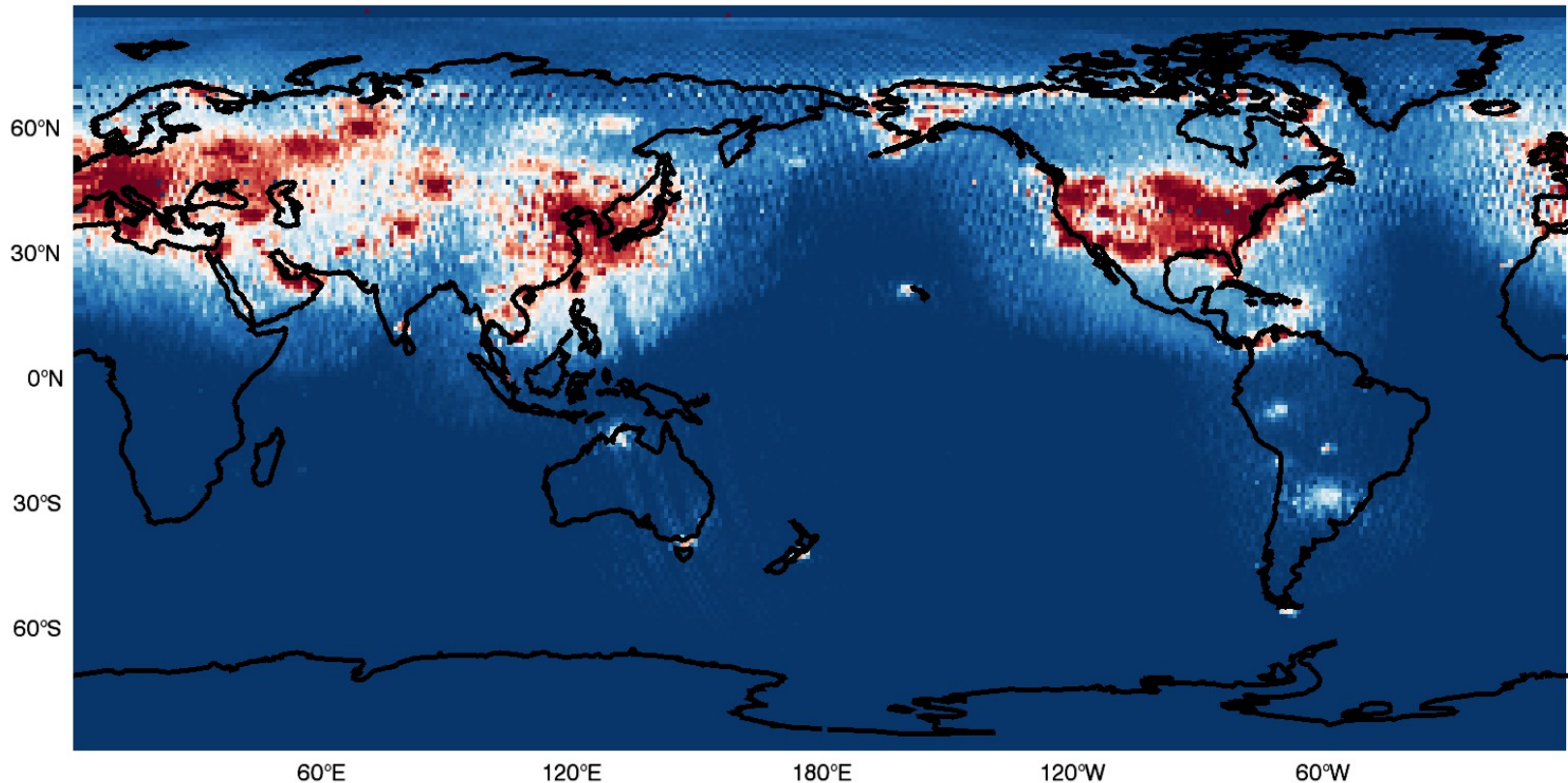
stdev = 21.020 avg = 11.061



# RFI Flag is 10 or 11

2 or more samples of 8 removed from the block average

H-Pol Severe RFI SCAT\_Flag Count For 2013



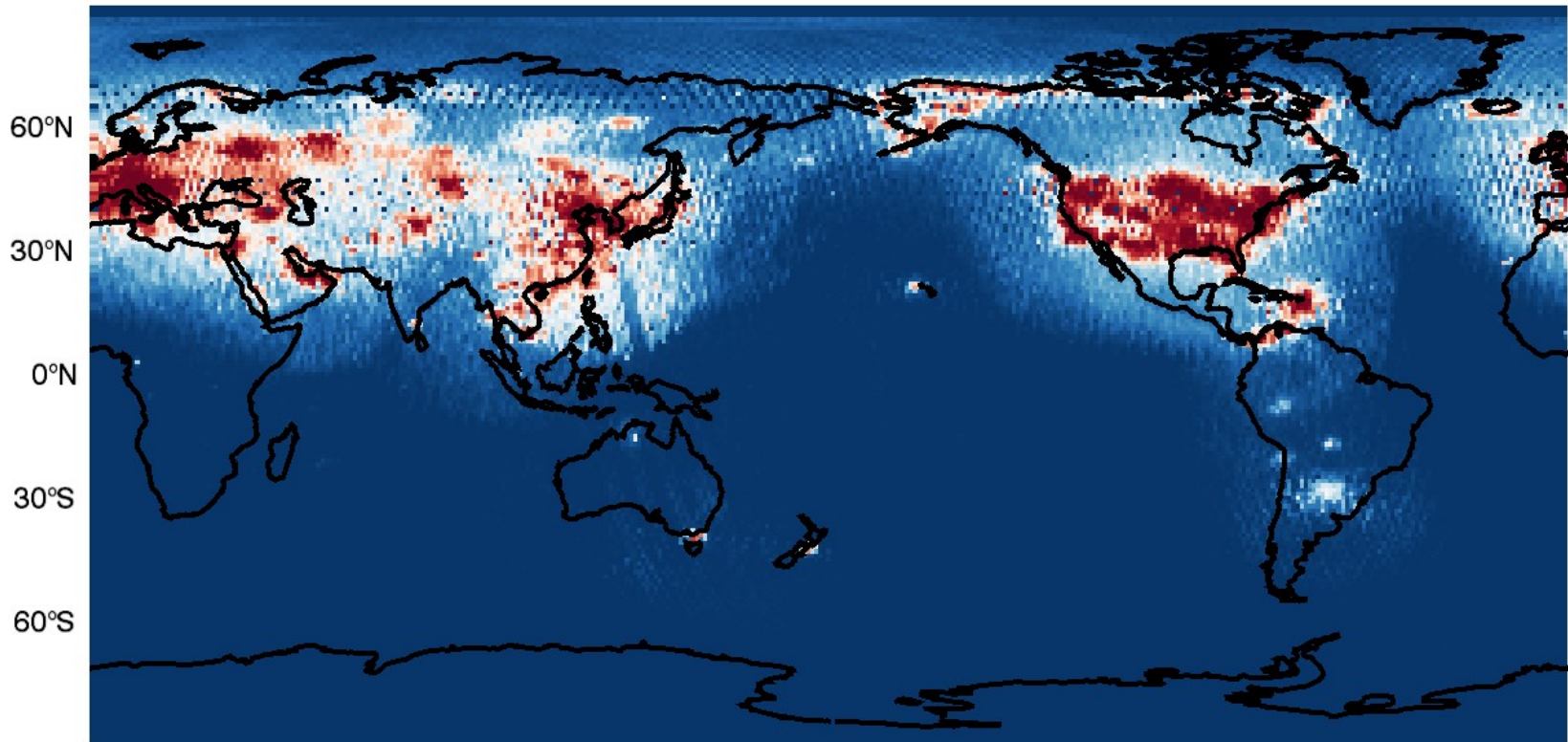
stdev = 22.161 avg = 11.723



# RFI Flag is 10 or 11

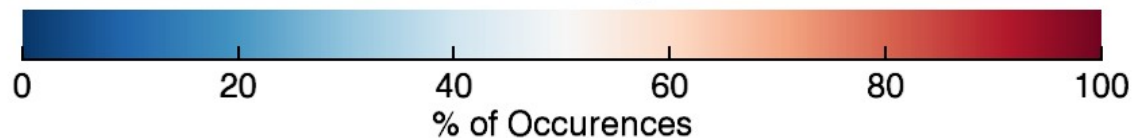
2 or more samples of 8 removed from the block average

H-Pol Severe RFI SCAT\_Flag Count For 2014



60°E 120°E 180°E 120°W 60°W

stdev = 21.851 avg = 11.578

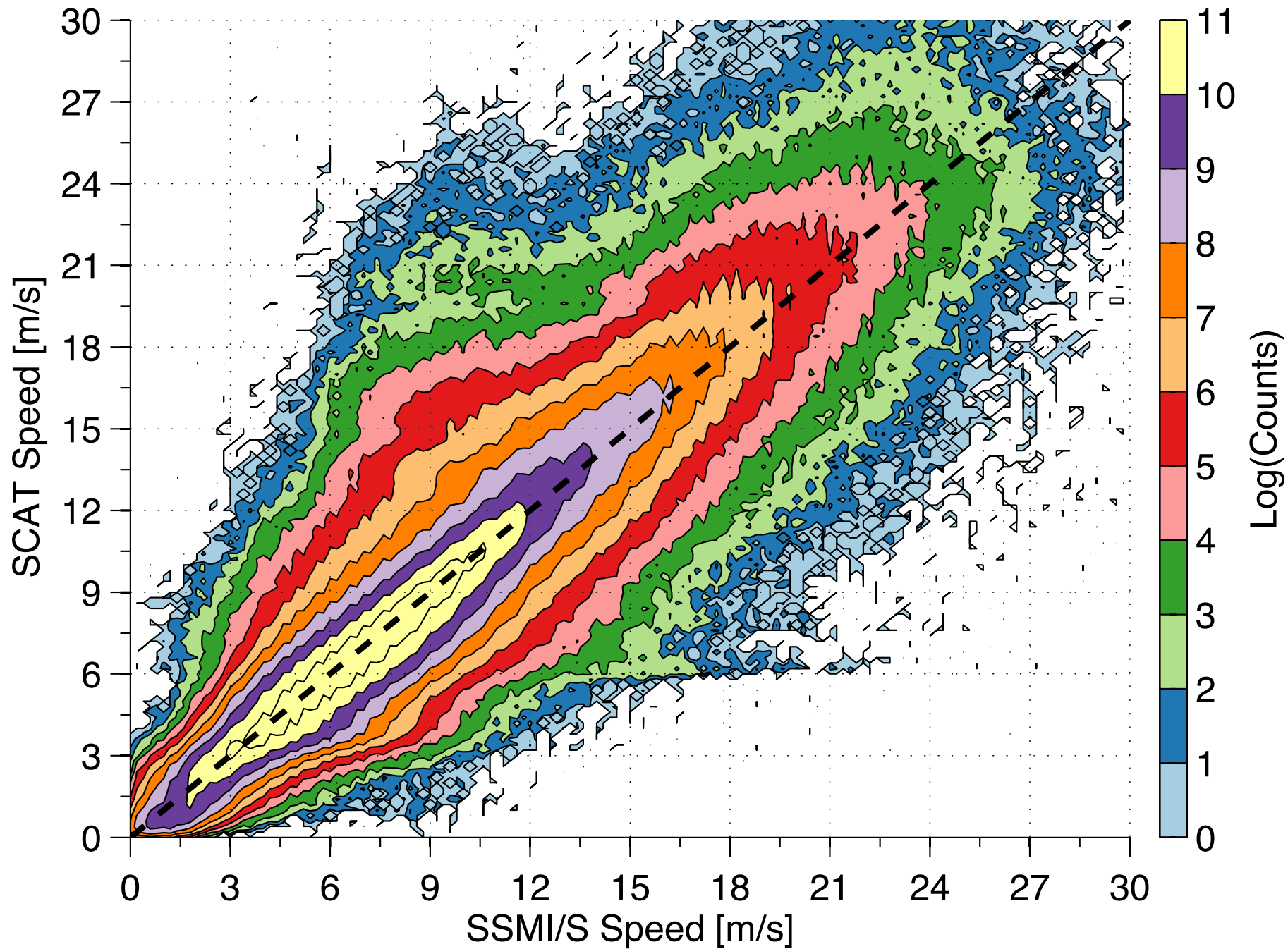


# Summary

- Aquarius continues to provide a well-calibrated source of L-band backscatter
  - It has been extremely stable over 3 years of operation
  - It will provide a reference calibration for new missions such as SMAP
- Aquarius has proven an L-band scatterometer can provide quality ocean winds
- Aquarius scatterometer RFI mitigation statistics did not change much from 2013 to 2014, but there was some large change in the western US from 2012 to 2013.



# Histogram of SCAT vs SSMI/S Speed



# Histogram of CAP vs SSMI/S Speed

