Aquarius Radiometric Calibration
V1.3.9 Data

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Aquarius Cal/Val Workshop
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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!

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RAP correction is range antenna pattern correction
PALSAR found \( \gamma_0^{\text{HH}} = -6.28 \text{ dB} \) and \( \gamma_0^{\text{HV}} = -11.15 \text{ dB} \).

Histograms of Aquarius \( \gamma_0 \) for the three beams.
Bias compared to PALSAR
PALSAR values: HH: -6.28 dB; HV: -11.15 dB

<table>
<thead>
<tr>
<th>Asc / Dec</th>
<th>Beam 1</th>
<th>Beam 2</th>
<th>Beam 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>All HH</td>
<td>-0.05</td>
<td>-0.04</td>
<td>0.01</td>
</tr>
<tr>
<td>Ascending HH</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.04</td>
</tr>
<tr>
<td>Descending HH</td>
<td>-0.08</td>
<td>-0.03</td>
<td>0.09</td>
</tr>
<tr>
<td>All VV</td>
<td>-0.10</td>
<td>-0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Ascending VV</td>
<td>-0.07</td>
<td>-0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Descending VV</td>
<td>-0.12</td>
<td>0.00</td>
<td>0.02</td>
</tr>
<tr>
<td>All HV</td>
<td>0.00</td>
<td>0.01</td>
<td>0.04</td>
</tr>
<tr>
<td>Ascending HV</td>
<td>0.03</td>
<td>0.08</td>
<td>0.00</td>
</tr>
<tr>
<td>Descending HV</td>
<td>-0.03</td>
<td>0.13</td>
<td>0.09</td>
</tr>
</tbody>
</table>

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.

<table>
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<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Ratio [dB]</td>
<td>0.58</td>
<td>0.04</td>
<td>-0.66</td>
</tr>
</tbody>
</table>
Summary

• Aquarius / PALSAR bias over land: (HH, VV, HV)
  – Beam 1: (-0.05, -0.10, 0.00)
  – Beam 2: (-0.04, -0.02, 0.01)
  – Beam 3: (0.01, 0.01, 0.04)
  – No significant ascending / descending bias observed over Amazon.

• Aquarius / PALSAR bias over ocean:
  – Beam 1: +0.58 dB
  – Beam 2: +0.04 dB
  – Beam 3: -0.66 dB
  – Not consistent with land estimates for HH.