Aquarius Roughness Correction

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Outline

• Radiometer and Scatterometer model function
  – WS, SWH dependence

• Roughness correction approaches
L2 Salinity Retrieval Error

Bias (psu)  

Standard Deviation (psu)
Radiometer Wind Vector Dependence from NCEP

**Horn 1 – V-pol Excess TB**

**Horn 1 – H-pol Excess TB**
Wind Speed Sensitivity vs Incidence Angle

Aquarius Wind Speed Sensitivity

Linear Wind Speed Sensitivity (K/m/s)

Incidence Angle (deg)
Significant Wave Height

- Evaluated excess TB to wind speed relationship binned by altimeter SWH
Scatterometer Wind Vector Dependence

Horn 1 – sigma0-VV

Horn 1 – sigma0-HH
Scatterometer Model Function
Scatterometer/Excess TB Dependence

Horn-1 Mean Excess TB V-pol

Horn-1 Excess TB Std. Dev. V-pol

- Lowest residuals when scatterometer is viewing surface in the along-wind direction
- Highest residuals in cross-wind direction for high wind speeds
### Scatterometer/Excess TB Dependence Residuals

<table>
<thead>
<tr>
<th>Horn</th>
<th>$\Delta$TBV</th>
<th>$\Delta$TBH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Horn 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sigma0-VV</td>
<td>0.37 K</td>
<td>0.34 K</td>
</tr>
<tr>
<td>sigma0-HH</td>
<td>0.36 K</td>
<td>0.40 K</td>
</tr>
<tr>
<td><strong>Horn 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sigma0-VV</td>
<td>0.40 K</td>
<td>0.40 K</td>
</tr>
<tr>
<td>sigma0-HH</td>
<td>0.43 K</td>
<td>0.41 K</td>
</tr>
<tr>
<td><strong>Horn 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sigma0-VV</td>
<td>0.43 K</td>
<td>0.44 K</td>
</tr>
<tr>
<td>sigma0-HH</td>
<td>0.42 K</td>
<td>0.41 K</td>
</tr>
</tbody>
</table>

*Note: The table above shows the excess TB ($\Delta$TB) residuals for different horns and polarization configurations (sigma0-VV, sigma0-HH). The residuals are given in Kelvin (K).*
Correction Approaches

- Evaluating several correction approaches

Scatterometer GMF (WS, WD)

Radiometer GMF (WS, WD)

Rad-Scat GMF ($\sigma_o$, WD)

NCEP WD, WS

Excess TB

TBspec

SSS Retreival

SSS

Excess TB
SSS Residuals – Horn 1

L2 SSS Residual vs Wind Speed an Direction

Sigma-0 to Excess TB Correction Alg. Residuals