Comparison of QuikSCAT and ASCAT Spatial Variability

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Overview

• Motivation
• Methodology
• 25 km winds
• 12.5 km winds
• Summary
Motivation

• Typical comparisons involve colocated data from in situ measurements, atmospheric models or between satellites.

• Freilich and Chelton (1986) pointed out the importance of intermediate spatial scale winds.

• Are the spectral densities similar?
Methodology

- Sort winds by region
- Apply standard QC flags
- Discard along-track data with any gaps present
- Compute power spectrum
- Compute average power at each spectral bin
Regions
Region I 45°– 25°S 25 km
Region II 25°– 5°S 25 km
Region III 5°– 25°N 25 km
Region IV 25°– 45°N 25 km
Mid-Latitude 12.5 vs 25 km

QS

AS

CSTARS
Tropics 12.5 vs 25 km

QS

AS
## Summary April 2009

<table>
<thead>
<tr>
<th>Data set</th>
<th>Region</th>
<th>Zonal exponent</th>
<th>Meridional exponent</th>
<th>Mean ratio</th>
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</thead>
<tbody>
<tr>
<td>QS 25.0 km</td>
<td>I</td>
<td>-2.09 ± 0.01</td>
<td>-2.12 ± 0.01</td>
<td>1.97</td>
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<tr>
<td>AS 25.0 km</td>
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<td>AS 12.5 km</td>
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<td>-1.94 ± 0.02</td>
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<tr>
<td>QS 25.0 km</td>
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<td>AS 25.0 km</td>
<td>IV</td>
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<td>1.67</td>
</tr>
</tbody>
</table>
Summary

• 25 km
  – Good agreement in spectral density at mid-latitudes (regions I&IV)
  – Larger differences in the tropics (regions II&III)
• 12.5 km
  – Similar results in mid-latitudes
  – QuikSCAT had slightly more energy at higher wavenumbers
  – ASCAT meridional winds had more energy at wavelengths above 50 km and less energy below 50 km
• Relative standard deviations were typically higher in the tropics and wavelengths below 50 km
Future work

• Cross-track spectrum analysis
• Temporal variability
• SAR winds
• Investigate tropical discrepancies
Thank you.