Simulating new DWL concepts for ISS science missions.

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Outline

• Background on prior OSSEs
• Realistic OSSEs
• OAWL, Double Edge and Coherent subsystems
• Shot patterns for ISS orbit
• Data product charts
• Summary of preliminary results
<table>
<thead>
<tr>
<th></th>
<th>Pulse Energy:</th>
<th>Aperture:</th>
<th>PRF:</th>
<th>EAP:</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAWL</td>
<td>1.22 J (0.55 J @ 0.355 um)</td>
<td>0.7 m (1.54 m²)</td>
<td>50 Hz</td>
<td>93.94 (42.35)</td>
</tr>
<tr>
<td>OAWL Double Edge</td>
<td>1.22 J (0.55 J @ 0.355 um)</td>
<td>0.7 m (1.74 m²)</td>
<td>50 Hz</td>
<td>93.94 (42.35)</td>
</tr>
<tr>
<td>WISSCR Coherent</td>
<td>0.25 J</td>
<td>0.5 m (.79 m²)</td>
<td>10 Hz</td>
<td>1.98</td>
</tr>
<tr>
<td>WISSCR Double Edge</td>
<td>0.8 J (0.36 J @ 0.355 um)</td>
<td>0.5 m (.79 m²)</td>
<td>100 Hz</td>
<td>63.2 (28.44)</td>
</tr>
</tbody>
</table>
Upper Troposphere

OAWL (background mode) Sigma0 at 11 km

OAWL Double Edge (background mode) Sigma0 at 11 km

WISSCR Coherent (background mode) Sigma0 at 11 km

WISSCR Double Edge (background mode) Sigma0 at 11 km

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Latitude (deg)

Longitude (deg)

[Graphs showing data distribution across different longitudes and latitudes]
Marine PBLs

OAWL (background mode) Sigma0 at 0.0-0.5 km

Lat. (deg)

Long. (deg)

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OAWL Double Edge (background mode) Sigma0 at 0.0-0.5 km

Lat. (deg)

Long. (deg)

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WISSCR Coherent (background mode) Sigma0 at 0.0-0.5 km

Lat. (deg)

Long. (deg)

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WISSCR Double Edge (background mode) Sigma0 at 0.0-0.5 km

Lat. (deg)

Long. (deg)

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\( \text{sigma0 (m/s)} \)

- 3 to 5
- 1 to 3
- 0 to 1

Legend
OAWL with Clouds
Backscatter Mode: Background

OAWL without Clouds
Backscatter Mode: Background
OAWL with Clouds
Backscatter Mode: Enhanced

OAWL without Clouds
Backscatter Mode: Enhanced
OAWL Double Edge with Clouds
Backscatter Mode: Background

OAWL Double Edge without Clouds
Backscatter Mode: Background
OAWL Double Edge with Clouds
Backscatter Mode: Enhanced

OAWL Double Edge without Clouds
Backscatter Mode: Enhanced
WISSCR Coherent with Clouds
Backscatter Mode: Background

WISSCR Coherent without Clouds
Backscatter Mode: Background
WISSCR Coherent with Clouds
Backscatter Mode: Enhanced

WISSCR Coherent without Clouds
Backscatter Mode: Enhanced
WISSCR Double Edge with Clouds
Backscatter Mode: Background

WISSCR Double Edge without Clouds
Backscatter Mode: Background
WISSCR Double Edge with Clouds
Backscatter Mode: Enhanced

WISSCR Double Edge without Clouds
Backscatter Mode: Enhanced
Summary of preliminary results

• The EAPs for the OAWL and companion DE detector are higher than those for the WISSCR concepts.
• The vertical coverage of quality “aerosol winds” for the OAWL system is much greater than that for the WISSRC coherent system. (EAP ratio ~ 50 (20))
• The vertical coverage of the DE systems in the mid and upper troposphere are comparable for both mission scenarios.
• The coherent system (WISSCR) is the better PBL wind observing system while the OAWL provides the better quality aerosol winds in the mid and upper troposphere.