SeaPRISM Operations at the COVE Site

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Introduction

- History and Logistics of the COVE SeaPRISM cimel.
- Basic Statistics on the number of measurements collected by the SeaPRISM cimel.
- Tower effect problems when the SeaPRISM is located on the flight deck.
- Fire events affected SeaPRISM cimel measurements as well as measurements from other spectral instruments.
- COVE chlorophyll-a (Chla) measurements resemble bay area locations than open ocean locations.
CERES Ocean Validation Experiment (COVE)

http://cove.larc.nasa.gov

Coordinates:
36.90 N
75.71 W
South-side of Tower

SW corner of Flight Deck
HISTORY

• SeaPRISM Cimel - Located on Tower, Sept. 2005 - Sep. 2006
• SeaPRISM Cimel - Located on Flight deck, Sept. 2006 - May 2010
• SeaPRISM Cimel - Located on Tower top, May 2010 - Dec. 2010
• SeaPRISM Cimel - Located on Flight deck, Dec. 2010 - Present

### Number of OC Measurements by L1.0, L1.5 and L2.0

<table>
<thead>
<tr>
<th>Year</th>
<th>Lev1.0</th>
<th>Lev1.5</th>
<th>Lev2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>21</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>302</td>
<td>240</td>
<td>193</td>
</tr>
<tr>
<td>2007</td>
<td>216</td>
<td>186</td>
<td>134</td>
</tr>
<tr>
<td>2008</td>
<td>313</td>
<td>211</td>
<td>134</td>
</tr>
<tr>
<td>2009</td>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2010</td>
<td>18</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>34</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2079</strong></td>
<td><strong>911 (43.8%)</strong></td>
<td><strong>703 (33.8%)</strong></td>
</tr>
</tbody>
</table>

### Number of OC measurements by location (FD or TWR)

<table>
<thead>
<tr>
<th>Location</th>
<th>FD</th>
<th>TWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lev1.0</td>
<td>743</td>
<td>168</td>
</tr>
<tr>
<td>Lev1.5</td>
<td>563</td>
<td>140</td>
</tr>
<tr>
<td>Lev2.0</td>
<td>386</td>
<td>79</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2079</strong></td>
<td><strong>1692 (81.4%)</strong></td>
</tr>
</tbody>
</table>
Comparison of the real refractive index for the two instruments indicates much better correlation when both instruments are located on the tower.

Lev. 1.5, SZA > 50, Scat Angles > 20

Real Refractive Index (Sea-Prism) - 675nm

Both Cimels On Tower (Real)

St.(Tower), Sea(Flightdeck) (Real)

\[ Y = 0.4277 + 0.6954x \]
\[ R^2 = 0.5971 \]
Residual SE = 0.0290 on 136 d.o.f.
n = 138

\[ Y = 0.5053 + 0.6508x \]
\[ R^2 = 0.3465 \]
Residual SE = 0.0464 on 145 d.o.f.
n = 147
Imaginary refractive index is well correlated when both instruments are located on the tower, but uncorrelated when one is on the tower and the other is on the flight deck.

Lev. 1.5, SZA > 50, Scat Angles > 20

\[ Y = 0.0004 + 0.5211x \]
\[ R^2 = 0.6437 \]
\[ \text{Residual SE} = 0.0025 \text{ on 136 d.o.f.} \]
\[ n = 138 \]

\[ Y = 0.0041 + 0.3486x \]
\[ R^2 = 0.0590 \]
\[ \text{Residual SE} = 0.0077 \text{ on 145 d.o.f.} \]
\[ n = 147 \]
Fish-eye Lens photo at flight deck location

COVE is clean in the winter months compared to summer months
• Great Dismal Swamp and Evans Road Fires

➡ Began early June 2008

• COVE was influenced by smoke for nearly all of June, 2008.

• Data ends around mid July, 2008 due to instrument failure.

- Fictive Organic Carbon is highly elevated
- Box plots are 2006 and 2007.
- Black lines are monthly medians for 2008.
In June-July 2008, smoke from North Carolina wildfires caused some anomalously high Chla retrievals for the SeaPRISM retrieval.

Line denotes when fires started in 2008.
• 6 years of clear sky Chla retrievals from SeaWIFS for 3 sites

• COVE Chla is comparable to the bay site (case 2) than open ocean site (case 1)

• False Color image of typical Chla retrieval from SeaWIFS instrument
Conclusions:

- Measurements of Ocean Color have been taken since September 2005.
- Most measurements of Ocean Color have been made at the flight deck location than the tower.
- Smoke can be troublesome for radiometric retrievals of Chla.
- Refractive index absorption retrievals are affected when the SeaPRISM is located on the flight deck.
- COVE’s Chla retrievals resemble bay water (case 2) more closely than open ocean (case 1).
Thank You
Thank You