OSCAT @ NOAA: Update

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Motivation

OSCAT is a Ku-band rotating pencil beam scatterometer with similarities to QuikSCAT.

OSCAT has the potential to largely mitigate the negative impacts to operational weather forecasting and warning capabilities due to the loss of QuikSCAT.
NOAA has been receiving delayed (~24 hours) OSCAT data via ISRO FTP server since September 2010.

Timely OSCAT data flow from ISRO to EUMETSAT commenced in February 2011.

- Since then EUMETSAT has been receiving approximately 10-14 orbits per day in a timely fashion.
- In March 2011 timely OSCAT data flow began at NOAA via EUMETSAT dedicated FTP server.
- Since December 21st ISRO implemented final changes in their OSCAT NRT processor.

NOAA is currently receiving all three levels of OSCAT data: L1B, L2A and L2B.

- L2A and L2B (gridded @ 50 km WVC)

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Total expected orbits: 345

Total received orbits: 340 \(\Rightarrow 98.55\%\)

Total timely orbits (180 min): 316 \(\Rightarrow 91.59\%\)

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Courtesy of T. Heinemann EumetSat
NOAA OSCAT Wind Processor
The Overview

**Grid @25km**

**Grid @25km**

**Maximim likelihood retrieval algorithm**

**NWP**

**L1B Sigma0**

**Grouping Sigma0**

**L2A**

**Wind retrieval**

**GMF**

**Rain/QC flag**

**Ambiguity removal**

**Apply sigma0 across track correction**

**Use OSCAT Specific GMF**

**Apply final wind speed correction**

**Output Winds**
50 km grid
25 km grid
OSCAT GMF
V-pol

H-pol

Mean Sigma0, V-pol

Mean Sigma0, H-pol

Wind Speed (m/s)

Sigma0 (dB)
Across Track Sigma0 Bias

![Graph showing Across Track Sigma0 Bias](image)

- **L1B Sigma0**
- **NWP**
- **Output Winds**
Sigma0 Bias Map

H-AFT

V-AFT

Sigma0 Bias (dB)

H-FORE

V-FORE
OSCAT GMF

Wind Speed, m/s

AO, V-pol

AO, H-pol

AO, V-pol lat > 35°

AO, V-pol lat < 35°

0.56 dB

0.74 dB
OSCAT GMF bias

Diagram showing the process for OSCAT wind retrieval:

- **Wind retrieval**
  - GMF
  - Rain/QC flag
  - Ambiguity removal
- **Grouping Sigma0**
- **Apply sigma0 across track correction**
- **L1B Sigma0**
- **L2A**
- **Use OSCAT Specific GMF**

Graphs showing the relationship between wind speed and measured/model Sigma0 for V-pol and H-pol.
Wind Speed Correction
Rain Flagging
Preliminary NOAA OSCAT Rain Flag Algorithm

- MLE
- TbH
- TbV
- Wspd

OSCAT rain flag algorithm

Rain Probability

SSMI Rain Rate > 2 mm/hr

03/15/2012 RSS SSMI Daily Rain Map

OSCAT Rain-Flag

03/15/2012 Flagging ~ 1.5% (under flagging)
# OSCAT Data Quality Control Flag

<table>
<thead>
<tr>
<th>Wind speed</th>
<th>% of quality control flag data</th>
<th>NOAA (25km)</th>
<th>KNMI (50km)</th>
<th>ISRO (50km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 6 m/s</td>
<td></td>
<td>2.6%</td>
<td>4.9%</td>
<td>8.8%</td>
</tr>
<tr>
<td>6 - 10 m/s</td>
<td></td>
<td>1.8%</td>
<td>4.9%</td>
<td>18.7%</td>
</tr>
<tr>
<td>10 - 15 m/s</td>
<td></td>
<td>2.3%</td>
<td>5.2%</td>
<td>52.6%</td>
</tr>
<tr>
<td>&gt; 15 m/s</td>
<td></td>
<td>10.3%</td>
<td>7.1%</td>
<td>80.0%</td>
</tr>
</tbody>
</table>
NOAA OSCAT Wind Product Performance
Wind Speed Comparison

ISRO OSCAT Wind Speed, Clear
STD: 1.40

NOAA OSCAT Wind Speed, Clear
STD: 1.35

KNMI OSCAT Wind Speed, Clear
STD: 1.33

JPL OSCAT Wind Speed, Clear
OSCAT Products Currently Available at NOAA
OSCAT Wind Products Currently Available at NOAA

50km L2B ISRO and 25km L2B NOAA generated wind product is available in operational demonstration mode to OPC and NHC forecasters within their NAWIPS environment and is also being made available others participating in product testing/validation.

Data Products Available:

- Global surface wind vectors and ambiguities
- OSCAT daily ice products (BYU – David Long)
- Data files (L2B and OSCAT-lite)
- Graphical products
  http://manati.star.nesdis.noaa.gov/oscat
• STAR OWTeam developed MGDR-lite wind products suitable for ingestion to NAWIPS using ISRO L2B files

• Adapted NAWIPS software to be able to ingestion OSCAT data.
  • This change has been since implemented in latest NAWIPS version and is available to both OPC and NHC

• Developed a function in GEMPAK that allows for identification of areas of high wave generations and their propagation path.
  • This utility has been extended to OSCAT data and is now available for testing

• Integration into NWS systems is being prepared ahead of time for OSCAT
Questions?