IWRAP: Observations of Hurricane Ike Status of Data Products and Availability

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Outline

- **Summary of HS2008**
  - Ku-band: V-pol @ 30 and 50 deg incidence
  - C-band: H-pol @ 30 and 50 deg incidence
  - **+13dB sensitivity via pulse compression @ 50 deg**
  - **Real-time radar processor in-flight**

- **Overview of Ike**
  - Flights on 9/6-7, 9/9-12
  - Underflights of QuikSCAT and ASCAT
  - Attenuation effects/correction

- **Data Products Description**
  - Level-1 “Conical-Scan” products
  - Level-2 “Along-Track” products
Imaging Wind and Rain Airborne Profiler (IWRAP)

C and Ku-band
Simultaneous incidence angles off nadir @ 30 & 50 degrees

15–120 m range gates

Conical Scan Rate 30-120 RPM

50 deg 30 deg

SFMR C-band radiometer (WS and RR)
### Summary of flights (2007 - 2008)

<table>
<thead>
<tr>
<th>Year</th>
<th>Date</th>
<th>Name</th>
<th>Category</th>
<th>C-</th>
<th>Ku-</th>
<th>SFMR</th>
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<tr>
<td>2007</td>
<td>Jan 20,22,26</td>
<td>St. Johns</td>
<td>&lt; 40 m/s</td>
<td>V</td>
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<td>UM</td>
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<tr>
<td>2007</td>
<td>Feb 2,6,8,9</td>
<td>Quikscat/ASCAT</td>
<td>&lt; 40 m/s</td>
<td>V</td>
<td>V</td>
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<td>2007</td>
<td>Aug 31, Sept 1,2</td>
<td>Felix</td>
<td>5,5,5</td>
<td>V</td>
<td></td>
<td>HRD</td>
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<td>Sept 14,15,17</td>
<td>Ingrid</td>
<td>TS,TS,TS</td>
<td>H</td>
<td>V</td>
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<td>Aug 18</td>
<td>Fay</td>
<td>TS</td>
<td>H</td>
<td>V</td>
<td>HRD</td>
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<td>Aug 29-31</td>
<td>Gustav</td>
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<td>Sept 6-7, 9-12</td>
<td>Ike</td>
<td>4, 3, TS, 1, 2, 3</td>
<td>H</td>
<td>V</td>
<td>HRD</td>
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Data Collections 9/6-7
Outbound eyewall penetration Ku-band
Ku-band 50 deg incidence
C-band 50 deg incidence
+’s: mean NRCS for R < 5 mm/hr and level flight – based on preflight calibration

20080911: Ku-band, V-pol, 50 deg

IWRAP High-Wind GMF (Esteban, et al., 2006)
Rain Attenuation on 9/11

- Round-trip attenuated NRCS only
- Can omit volume backscatter contribution to apparent NRCS through range gating

Correct using a k-R relation (e.g. ITU)
Rain Attenuation

Attenuated Ku-band AO vs U10n by rain rate

Corrected Ku-band AO (ITU k-R relation)
Sampling of Winds & Rain Rate in Ike

- 0-4 mm/hr
- 5-9 mm/hr
- 10-14 mm/hr
- 15-24 mm/hr
- 25-34 mm/hr
- 35-44 mm/hr
- 45-54 mm/hr
- 55-64 mm/hr
- 65-74 mm/hr
- 75-84 mm/hr

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Data Repository

- [http://mirsl.ecs.umass.edu/](http://mirsl.ecs.umass.edu/)
  - --> Data
    - --> Ocean Vector Winds
    - Login page for IWRAP data repository
    - Web form for requesting username/password

- File formats
  - NetCDF include radar moments, pointing, Navigation, Flight-level & SFMR winds, rainrate, surface mask.
  - Level-1: Time-series (conical-scan) format
    - L1A: raw echo power, pulse-pair products
    - L1B: Ze, NRCS, velocity, incidence angle...
  - Level-2: Along-track binned format
Ocean vector winds research is carried out using the Imaging Wind and Rain Airborne Profiler (IWRAP) developed by MIRSL and routinely installed on the NOAA WP-3D research aircraft based in Tampa, Florida. Flight experiments are conducted as part of the NOAA NESDIS Ocean Winds program and the NASA Ocean Vector Winds Science Team.

IWRAP data are archived in NetCDF format. The data repository is currently password protected. To obtain access, please complete the form below. A username and password will be sent to you via return email.

We do ask that you indicate your planned use for the data (e.g., how you might use it in your analysis). This is just for our information so that we can learn how the data are being used and can provide guidance as to data suitability. Also, it is nice to know who to contact if a problem is identified...

- Go to the IWRAP data repository (password required)
- Direct link to archive

Form for requesting a username/password
Binning Procedure

Along-track bin

Flight direction

NRCS(bin, azim)

Azimuth angle

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