Production and Validation of QuikSCAT Climate Data Product, and Extension of Climate Data Record with OceanSat-2 at Jet Propulsion Laboratory

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QuikSCAT / OSCAT Data Available at PODAAC

• QuikSCAT V3 L2B on 12.5 km grid (public release 4\textsuperscript{th} April 2013):
  – Over 10 years of data: 1999-300 to 2009-325
  – Final QuikSCAT L2B data product.

• SCAT on OceanSAT-2 L2B on 12.5 km grid (public release 28\textsuperscript{th} March 2013):
  – Over 3 years of data: 2010-016 to 2013-091
  – \textit{New data added monthly}.
  – Processing algorithms are still in development.

• Both products use nearly-identical NetCDF file formats and dataset names – if you can use one, you already know how to use the other!
QuikSCAT / OSCAT Processing Chain

• Improved processing algorithms and model functions:
  – Use of overlap gridding at the L1B to L2A level.
  – New model functions (Ku2011 for QuikSCAT, repointed QuikSCAT for OSCAT).
  – Neural Network based rain impact estimation and speed bias correction.

• All improved algorithms have been published in peer-reviewed journals:
Data Flagged as Rain-Free; ECMWF in 3 to 30 m/s

- Speed Bias [m/s]
- Speed RMS [m/s]
- Direction RMS [deg]
- % Within 45 deg

QuikSCAT V3
QuikSCAT V2
OSCAT

Data	Flagged	as	Rain-Free;	ECMWF	in	3
to	30
to	m/s
All Data; ECMWF in 3 to 30 m/s

- Speed Bias [m/s]
  - Speed RMS [m/s]
  - Direction RMS [deg]
  - % Within 45 deg

- QuikSCAT V3
- QuikSCAT V2
- OSCAT

All Data; ECMWF in 3 to 30 m/s
QuikSCAT L2B Buoy Matchups

- Use all NDBC/TAO/PIRATA/RAMA in 2000-2009
- 5.1 million in 10 years: Within 25 km, 30 minutes; flagged as rain-free and land-free.

Only Trusted Buoys

QuikSCAT/Buoy Matchups

- Spd Bias (3–30): −0.03
- Spd STD (3–30): 1.06
- Dir STD (3–30): 20.19

All Buoys

QuikSCAT/Buoy Matchups

- Spd Bias (3–30): −0.05
- Spd STD (3–30): 1.13
- Dir STD (3–30): 22.73
JPL/OSCAT Buoy Matchups

- Use all NDBC/TAO/PIRATA/RAMA in 2010-2012
- 600 thousand in 3 years: Within 25 km, 30 minutes; flagged as rain-free and land-free.
ISRO/OSCAT Buoy Matchups

- Use all NDBC/TAO/PIRATA/ARAMA in 2010-2012
- 780 thousand in 3 years: Within 50 km, 30 minutes; flagged as rain-free and land-free.
Phasor Spectra

Wavelength [km]

ECMWF
V3 L2B12
V2 L2B12
JPL/OSCAT
Example of Problem: 2012 OSCAT Zonal Bias w.r.t ECMWF; Ascending
Summary

• 10 years of QuikSCAT data are available:
  – Data are extensively calibrated and validated.

• More than 3 years of OSCAT data are available:
  – Data is of comparable quality to QuikSCAT.
  – Algorithms not finalized.

• Future Work
  – Continued improvement of OSCAT data.
  – Reduction of swath-based artifacts due to instrument calibration issues.
Total Usable Buoy observations (i.e. able to compute U10)

Counts

Year


NDBC

TAO

PIRATA

RAMA
Useable Buoys in 2000

- NDBC
- TAO
- PIRATA
Useable Buoys in 2002

- **NDBC**
- **TAO**
- **PIRATA**
- **RAMA**
Useable Buoys in 2003

Longitude [deg]

Latitude [deg]

- NDBC
- TAO
- PIRATA
Useable Buoys in 2004

- NDBC
- TAO
- PIRATA
- RAMA
Useable Buoys in 2006

- NDBC
- TAO
- PIRATA
- RAMA
Useable Buoys in 2007

- NDBC
- TAO
- PIRATA
- RAMA
Useable Buoys in 2008

NDBC
TAO
PIRATA
RAMA
Useable Buoys in 2009

Longitude [deg]
Latitude [deg]

NDBC
TAO
PIRATA
RAMA
Data Flagged as Rainy; ECMWF in 3 to 30 m/s

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<th>Speed Bias [m/s]</th>
<th>Speed RMS [m/s]</th>
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QuikSCAT V3
QuikSCAT V2
OSCAT

Data Flagged as Rainy; ECMWF in 3 to 30 m/s