



National Aeronautics and Space
Administration
Jet Propulsion Laboratory
California Institute of Technology



Science Data Product Improvements

R. Scott Dunbar, JPL

OVWST Meeting

Salt Lake City

July 6, 2006

Science Data Product Improvements

BACKGROUND

- Work on SeaWinds/AMSR blending and overall scatterometer processing enhancements has been on-going since 2004.
- “Beta” releases of SeaWinds (full-mission) and QuikSCAT (CY2003 only) were produced early this year for evaluation.
- The data sets were independently validated by a subset of the OVWST; the validation results will be summarized by Ernesto.
- The improvements made in the beta releases, plus some recommended changes made as a result of the evaluation, will be included in the public release of the SeaWinds data and the full-mission reprocessing of QuikSCAT (July-Dec 2006).

Science Data Product Improvements

QuikSCAT Data Issues

- Major issues raised by the OVWST have included:
 - Rain flags: Overflagging of high wind speeds by MUDH
 - High resolution: Do wind retrievals at 12.5km!
 - Model function: Retrievals of speeds > 20 m/s biased low
 - Coastal retrievals: Get closer to the coast!! Can we?
 - Wind vector error estimates: Need reliable errors for modeling.
- Improving the autonomous rain flags for QuikSCAT and SeaWinds is the most important; Bryan will describe this process in more detail.
- All of these are addressed (and more!) in the new SeaWinds and QuikSCAT processing.

Science Data Product Improvements

Summary of Algorithm/Data Changes

Data Level	Algorithm/Data Change	SWS	QSCAT
L1B	Echo tracking for attitude estimation	*	X
	ET attitude fitting/smoothing to 2 nd order Fourier series	--	X
	Best-eight slices/slice balance	*	X
	Yaw bias removal (EM boresight azimuth offset)	*	X
L2A	<u><i>Sigma0 corrections (in addition to climatology)</i></u>		
	AMSR attenuation and atm. backscatter corrections	X	--
	Empirical attenuation and backscatter corrections	X	--
	<u><i>Other improvements/additions</i></u>		
	High-resolution land-sea map, 2-mask land flag	X	X
	Coastal margin for 25km L2A land flag	30km	30km
	Coastal margin for 12.5km L2A land flag	20km	20km
	Ice flag using scatterometer-based daily ice mask	X	X
	Sigma0 Frame/pulse reference back to L1B data	--	X
	12.5km slice-composite version of product	X	X
L2B	<u><i>Wind Retrieval Enhancements</i></u>		
	QSCAT-1/F13, GMF recalibrated for U > 16 m/s	X	X
	Winds retrieved with AMSR-corrected sigma0	A	--
	Winds retrieved with SSM/I climatological atten. corr.	S	X
	Enhanced wind retrieval to remove speed quantization	X	X
	MLE objective function with log(Variance) term	X	X
	Attenuation correction of sigma0 variance	A,S	X
	Error estimates in speed/direction from integration of MLE	X	X
	Multi-pass ambiguity removal includes coastal WVC filtering	A,S	X
	<u><i>Rain detection/flagging/correction</i></u>		
	Impact MUDH rain flagging	S	X
	Rain impact estimates on wind speed/direction	A	--
	SRad rain rate from scatterometer Tb	A,S	X
	12.5km slice-composite version of product	S	X

* Used in 2003 SWS processing; L1B data not reprocessed in 2006

-- Not included

X New in 2006 SWS and/or QSCAT data

A AMSR-corrected SWS L2B only

S Scatterometer-only SWS L2B only

Science Data Product Improvements

Product Changes in New QuikSCAT Release

- L1B: Echo-tracking, best-8 slices
- L2A: 25km (egg) and 12.5km (slice-composite)
WVC resolution
 - High-resolution land flag
 - Frame/pulse index (pointer back to L1B sigma0 data)
- L2B: Winds retrieved at 25km and 12.5km
 - IMUDH rain flags (flags for 12.5km copied from 25km products)
 - New QSCAT1/F13 model function
 - All updates of wind retrieval/ambiguity removal
 - Wind vector error estimates
 - SRad rain rate added to product

Science Data Product Improvements

Product Changes in New SeaWinds Release

- L2A: Includes all 3 atmospheric correction types and high-resolution land flags (25km, 12.5km)
- L2B/AMSR: Winds retrieved using AMSR-corrected sigma0 (25km only)
 - Includes AMSR-derived “rain impact” on speed and direction
 - Used to train IMUDH algorithm
- L2B/SCAT: Winds retrieved using climatology-corrected sigma0 (25km, 12.5km)
 - IMUDH rain flags (flags for 12.5km copied from 25km products)
 - New QSCAT1/F13 model function
 - All updates of wind retrieval/ambiguity removal
 - Wind vector error estimates

Science Data Product Improvements

What's Next?

- Bryan will describe the derivation of the autonomous IMUDH rain-impact flag starting from SeaWinds & AMSR.
- Ernesto will summarize the results of the validation of the SeaWinds and QuikSCAT Beta releases.
- Scott will describe the plan for QuikSCAT full-mission reprocessing and the SeaWinds/AMSR data release.

Backup

Echo-tracking with Fourier Smoothing QuikSCAT L1B

