Status of AMSR2 Research Product (Ver.3 Update)

- All-weather Sea surface Wind speed (ASW) -

Japan Aerospace Exploration Agency
Earth Observation Research Center

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AMSR2 Research Products

	Product	Area	Grid	Goal Accuracy	Range	Note
Geophysical parameters	All-weather Sea Surface Wind Speed	Global Ocean	60 km	±7 m/s (for strong wind >17m/s)	0 – 70 m/s	Except sea ice area
	10-GHz (high-resolution) Sea Surface Temperature	Global Ocean	30 km	±0.8 ℃	9 – 35 ℃	Except sea ice and precipitating area
	Soil Moisture (SMC) and Vegetation Water Content (VWC) based on the data assimilation methodology	Africa, Australia (at first stage)	25 km	SMC: ±8 % VWC: ±1 kg/m^2	SMC: 0 – 100 % VWC: 0 - 2 kg/m^2	Profiles are retrieved for SMC.
	Land Surface Temperature	Global Land	15 km	Forest: ±3 ℃ Nondense Vegetation : ±4 ℃	0 - 50℃	Temperature at a canopy top is defined as land surface temperature.
	Vegetation Water Content	Global Land	10 km	± 1 kg/m^2	0 - 4 kg/m^2	
	High-resolution Sea Ice Concentration	Ocean in High-latitude	5 km	±15 %	0 - 100%	Accuracy is expressed in absolute values of sea ice concentration [%].
	Thin Ice Detection	Okhotsk sea (at first stage)	15 km	80 %	N/A	Sea ice area (=<30cm) is defined as thin ice area. A flag representing whether thin ice is dominant in a pixel is stored in a product. Accuracy is expressed in right answer rate [%]
	Sea Ice Moving Vector	Ocean in High-latitude	50 km	2 components: ±3 cm/s	0 – 40 cm/s	2 components consist of latitude and longitude directions.

Background

- The AMSR2 research products were defined by the GCOM Advisory Committee in March 2015.
- The 10-GHz (high-resolution) Sea Surface Temperature (SST) (version 2.1) met the goal accuracy and released to the public as the part of the standard SST product in March 2015, and updated to Ver.3 in March 2017. (http://suzaku.eorc.jaxa.jp/GCOM_W/materials/product/170222_Ver3.0_release_e.pdf)
- The All-weather Sea surface Wind speed (ASW) (version 1.2) also met the goal accuracy and has been released since October 2015.
- This document describes update of ASW to Ver. 3 from Ver.1.2 (NOTE: ASW Ver.2 is not released to public).

Overview of ASW Ver.3

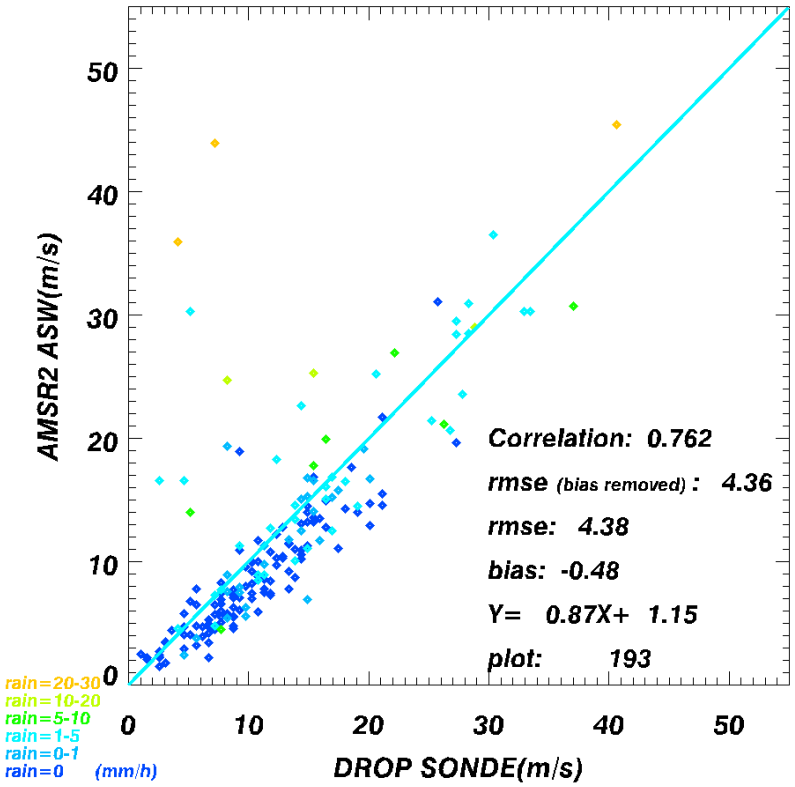
- Update ASW algorithm from Ver.1.2 to Ver.3 to increase consistency between ASW and standard Sea Surface Wind speed (SSW). This update eliminate negative biases in low wind speed regions that was known in Ver.1.2 needed to be improvement in future.
- As a result;
  - RMSE of ASW Ver.3 is improved to **4.07 m/s** while current Ver.1.2 is 4.38 m/s;
  - Bias of ASW Ver.3 becomes **0.33 m/s** while current Ver.1.2 is -0.48 m/s.

All-weather Sea surface Wind speed (ASW)

- **Principal Investigator**
  - Dr. Akira Shibata (RESTEC)
- **Major Changes from Ver.1.2**
  - Adjust biases between ASW and GPS-dropsonde observations
  - Change method of land/ocean determination by each pixel
- **Major Improvements from Ver.1.2**
  - Improvement of accuracy by adjustment of biases between GPS-dropsondes
- **Validation Method**
  - Evaluate Root Mean Square Error (RMSE) of AMSR2 ASW versus wind speed by GPS-dropsondes. GPS-dropsonde data are provided courtesy of the NOAA/AOML/Hurricane Research Division in Miami, FL (USA).
- **Validation Data and Match-up Conditions**
  - The wind speeds more than 17 m/s retrieved by this algorithm were compared with the maximum wind speeds within 200 km from the center position of the best track or the wind speeds observed by GPS-dropsondes.
- **Validation Period**
  - From July 2, 2012 to December 31, 2016

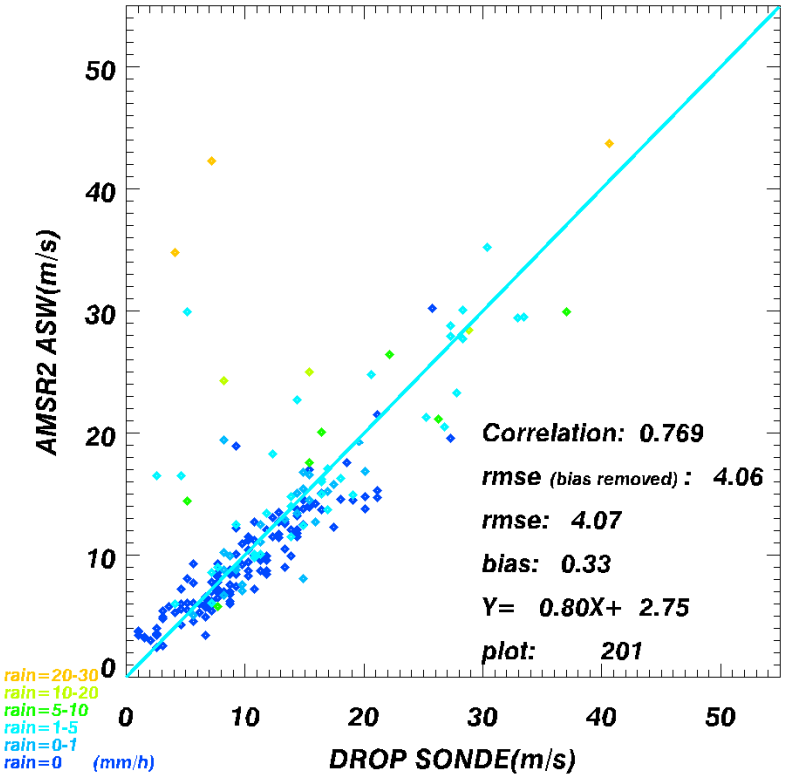
Validation Results

Ver.1.2 (old version)



Accuracy (Ver.1.2)	
RMSE	4.38 m/s
Bias	-0.48 m/s

Ver.3 (new version)



Accuracy (Ver.3)	
RMSE	**4.07 m/s**
Bias	0.33 m/s

Summary

- AMSR2 ASW (Ver.3) met the goal accuracy defined for public release not only in the strong wind speed range (> 17 m/s) but also in the total wind speed range. It was released to the public in January 2018.