



水循環変動観測衛星「しずく」

Global Change Observation Mission-Water "SHIZUKU"

Validation Results for the AMSR2 Research Product Sea Ice Motion Vector

Developer ID: Y
Version: 2.210.210

Japan Aerospace Exploration Agency
Earth Observation Research Center
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1. プロダクト概要



- Product ID: SIM (Y)
- Developer: Eri Yoshizawa (JAXA), Koji Shimada (Tokyo University of Marine Science and Technology)
- Developer ID: Y
- Area: High latitude oceans
- Spatial resolution: 50 km
- Temporal resolution: 1 day
- Release accuracy: ± 6 cm/s

Note: Accuracy is evaluated separately for the latitudinal and longitudinal components.

2. Validation Method



Validation Data

- A Lagrangian validation was conducted using drift trajectory data from buoys deployed on sea ice. Drift velocities derived from GPS position measurements were compared with satellite retrieval estimates to assess the accuracy of the motion vector components in the latitudinal and longitudinal directions.
- Level 1 buoy data provided by the International Arctic Buoy Programme (IABP) were used for the validation (<http://iabp.apl.washington.edu/index.html>).
- To derive drift velocities from buoy position data, the following quality control procedures were applied to generate a dataset with outliers removed:
 - Removal of duplicate samples (position records and observation timestamps) from the Level 1 data
 - Conversion of latitude and longitude coordinates to Polar Stereographic projection coordinates
 - Estimation of velocity components in the Polar Stereographic coordinate system
 - Resampling to 3-hour intervals and removal of unrealistic velocity components (absolute velocity component > 2 m/s)
 - Calculation of daily mean values

Note: The validation was performed using latitudinal and longitudinal velocity components converted from the X- and Y-direction velocity components in the Polar Stereographic coordinate system.

Validation Period

- January 2013 – December 2025

Validation Criteria

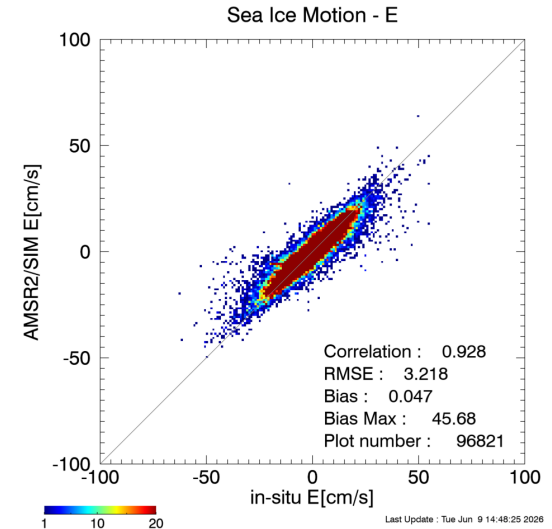
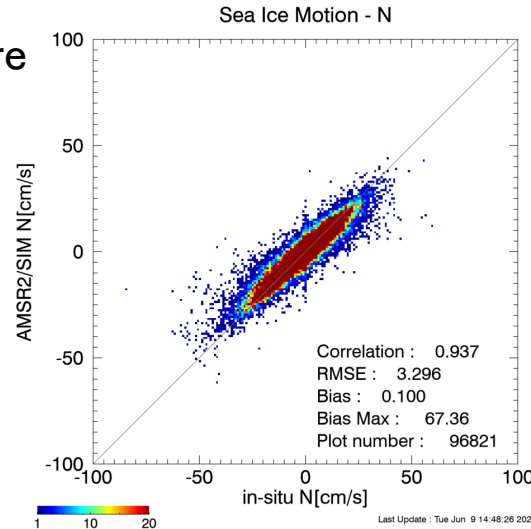
- Observation time difference: within ± 12 hours
- Spatial separation distance: within ± 25 km

3. Validation Results

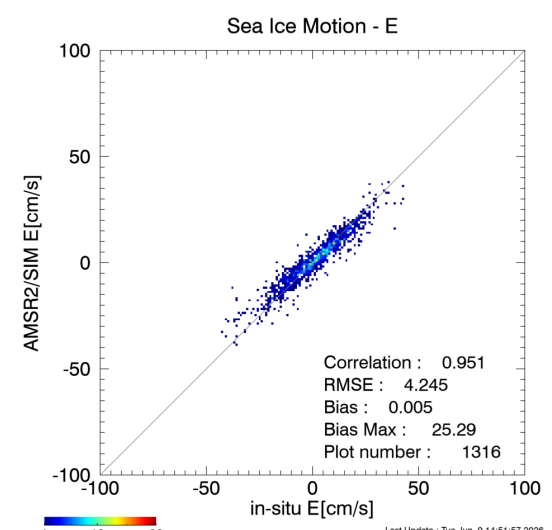
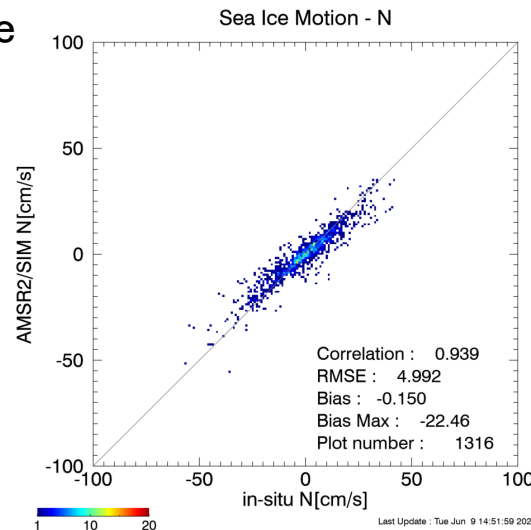
Latitudinal (northward)
component

Longitudinal (eastward)
component

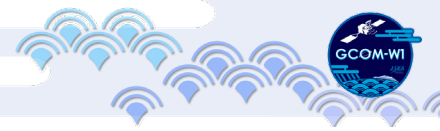
3.1 Northern Hemisphere Year-round



3.2 Southern Hemisphere Year-round



3. Summary of Validation Results



RMSE [cm/s]

Area	Year-round		Winter		Summer	
	Northward	Eastward	Northward	Eastward	Northward	Eastward
Northern Hemisphere	3.3	3.2	3.0	2.8	4.4	4.5
Southern Hemisphere	5.0	4.2	5.0	4.3	4.9	3.9

- *Northern Hemisphere, Winter: October – June**
Summer: July – September
- *Southern Hemisphere, Winter: April – December**
Summer: January – March