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HIGH ACCURACY SEA ICE VELOCITY DATA SETS FROM AMSR SERIES AND THEIR APPLICATIONS TO UNDERSTANDING/FORECASTING OF SEA ICE VARIATIONS

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The huge sea ice retreat in the summer of 2007 was occurred by the enlargement of open water by the movement of sea ice rather than by sea ice melt. In recent years, sea ice retreat was large in the Pacific sector of the Arctic Ocean, however, heavy sea ice bands being formed by rafting of sea ice usually remained along the Alaskan coast and northern Chukchi slope. These heavy ice bands strongly affect the availability of Arctic sea route. These evidences suggest that the high accuracy sea ice motion data sets, which enable us to evaluate Lagrange drifting track and convergence of sea ice velocity causing rafting of sea ice, are required to forecast sea ice distributions especially for the ship operation on the Arctic sea routes. Here we introduce several key techniques to improve the accuracies (table 1), and also show several examples that enable us to interpret the sea ice distributions and variations (Figure 1).

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Table 1. Standard deviation of satellite derived sea ice velocities against to measured velocities by ADCP on the Northwind Ridge in 2002-2003.

	Winter	Summer
AMSR-E	2.5	3.4
SSM/I	4.8	6.2
NSIDC	4.8	6.6

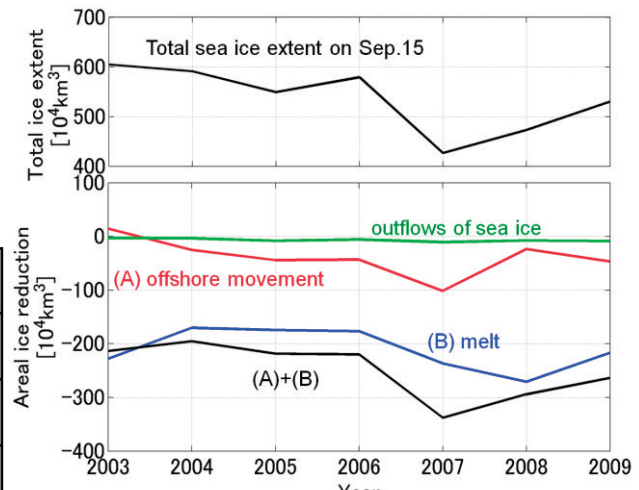


Figure 1. (Top) Time series of sea ice extent in September from 2003 to 2009. 2009. (Bottom) Contributions of sea ice reduction by sea ice movement, melt, and outflows through the Fram Strait.