SESSION: OCEAN 1-SEA ICE

MARS Themes:

Earth System Observation

Title:

Sub-daily Antarctic sea-ice variability estimates using swath-based retrieval methods

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Abstract:

Satellite-derived sea-ice concentration measurements have traditionally been used to evaluate the impact of climate change on polar regions. However, concentration-based measurements of sea-ice variability do not allow the discrimination of the relative contributions made by thermodynamic and dynamic processes. This prompts the need to use sea-ice drift and type products and develop new methods to quantify changes in sea-ice properties that would indicate trends in the ice characteristics. A component of the sea-ice variability is driven by local weather events, and in some cases is the dominant driver of variability over larger-scale atmospheric features. Previous work by de Jager & Vichi (2022) has suggested that sea-ice vorticity (derived from low resolution sea-ice displacement vectors) may be a useful metric for quantifying dynamical features in Antarctic sea ice; specifically shorter term changes in the ice-interior driven by atmospheric storms. However, this study hypothesised that much of the rotational drift in the underlying sea-ice field was blurred as a result of the relatively large 48-hr temporal resolution of the drift product, therefore highlighting the necessity of measuring sea-ice properties at higher temporal frequencies. This study will therefore assess the usefulness of an overlapping swath-based method of sea-ice displacement retrieval recently made available by the EUMETSAT OSI-SAF. This swath-based method of retrieval allows for analysis of sea-ice variability at sub-daily timescales, which may be more suitable for measuring the effect of weather events on the sea-ice landscape than using daily averages of merged swaths. In situ data of sea-ice conditions were collected on board the SA Agulhas II research vessel in the Atlantic Sector in July, 2022, which will be compared to swath-based satellite estimates. Furthermore, the newly released 24-hr OSI-SAF drift product will also be compared. To complement these drift estimates, a modified swath-based ice-type retrieval method will be presented to add further context to any potential thermodynamic changes affecting the optical properties of the sea-ice surface.

Format:

Poster

Keywords: (add ; between keywords)

Sea ice, remote sensing, Earth observation