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A CLIMATE DATA RECORD OF GLOBAL SEA-ICE DRIFT FROM THE EUMETSAT OSI SAF

Abstract

Sea-ice drift is a key variable for understanding sea ice in a changing climate, and an Essential Climate Variable (ECV) product for the Global Climate Observing System (GCOS). In the Arctic, sea ice has been reported to drift faster, associated with a reduction in area, general thinning, and loss of multiyear ice. In the Antarctic, trends in sea-ice drift have been linked to trends in wind patterns.

In this contribution, we present a new global 30-year Climate Data Record (CDR) of sea-ice drift vectors from 1991 to 2020. It uses the continuous maximum cross-correlation technique (CMCC) for measuring sea-ice drift, by matching features in pairs of passive microwave satellite imagery. During summer, this technique becomes far less accurate due to surface melting and higher atmospheric humidity. We therefore employ a computational free-drift model of the ice to fill the data gaps in the summer. This model calculates the ice drift based on wind vectors from the ERA5 wind reanalysis, under the assumption that the internal stresses of the ice can be neglected.

We describe the algorithm baseline for the new CDR as well as results of validation against the sparse network of on-ice buoy trajectories. This CDR was created in the context of the EUMETSAT Ocean and Sea Ice Satellite Application Facility (OSI SAF) and released in 2022.