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## Arctic sea-ice volume budget from satellite observations and CMIP6 models

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Sea-ice floating upon the Arctic ocean is a constantly moving, growing and melting surface. The seasonal cycle of sea ice volume has an average change of  $10\,000\text{ km}^3$  or 9 billion tonnes of sea ice. The role of dynamic redistribution of sea ice, the process by which it flows and deforms when blown by winds and floating upon ocean currents, has been observable during winter growth by the incorporation of satellite remote sensing of ice thickness and drift. CMIP6 models contain dynamic sea-ice components that simulate the drift and mass balance of Arctic sea ice.

We combine satellite-derived observations of sea ice concentration, drift, and thickness to provide maps of ice growth, melt and dynamic redistribution. Winter growth and summer melt seasons are analyzed over the CryoSat-2 period between October 2010 and April 2020. We reveal key circulation patterns that contribute to summer melt and minimum sea ice volume and extent. Specifically, we show the importance of ice drift to the interannual variability in Arctic sea-ice volume, and the regional distribution of sea ice growth and melt rates. When comparing these observations to CMIP6 models long term trends are revealed. We show how the divergence and mechanical redistribution of sea ice is a key component in the resilience of central Arctic ice volume to anthropogenic climate change.