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Arctic sea ice volume budget decomposition satellite product for the CryoSat-2 (2010-2020) period

Harry Heorton¹, Michel Tsamados¹, Paul Holland², and Jack Landy³

¹University College London, Center for Polar Observation and Modelling, Earth Sciences, London, United Kingdom of Great Britain – England, Scotland, Wales (m.tsamados@ucl.ac.uk)

²British Antarctic Survey, Cambridge, United Kingdom of Great Britain – England, Scotland, Wales pahol@bas.ac.uk

³School of Geographical Sciences, University of Bristol, Bristol, BS8 1QU, UK

We combine satellite-derived observations of sea ice concentration, drift, and thickness to provide the first observational decomposition of the dynamic (advection/divergence) and thermodynamic (melt/growth) drivers of wintertime Arctic sea ice volume change. Ten winter growth seasons are analyzed over the CryoSat-2 period between October 2010 and April 2020. Sensitivity to several observational products is performed to provide an estimated uncertainty of the budget calculations. The total thermodynamic ice volume growth and dynamic ice losses are calculated with marked seasonal, inter-annual and regional variations. Ice growth is fastest during Autumn, in the Marginal Seas and over first year ice. Our budget decomposition methodology can help diagnose the processes confounding climate model predictions of sea ice. We make our product and code available to the community in monthly pan-Arctic netcdf files for the entire October 2010 to April 2020 period.