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Utilising Cryosat-2 observations of the Arctic sea ice cover to produce a new Arctic sea ice reanalysis

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In this work we present results from a new sea ice reanalysis over the satellite era. We use a newly created sea ice data assimilation system CICE-PDAF, combining the Los Alamos Sea Ice Model (CICE) and the Parallelized Data Assimilation Framework (PDAF), to take advantage of the new observations of the sea ice cover produced in the last decade by Cryosat-2. Sea ice thickness and sea ice thickness distribution observations from Cryosat-2, alongside sea ice concentration observations, are assimilated to explore their effects on our current estimates of the Arctic sea ice cover. In particular we look at its effects on the sea ice thickness distribution. The true state of the Arctic sub-grid scale thickness distribution system is not well known, and yet it plays a key role in the dynamic and thermodynamic processes present in the model to produce a good estimate of the Arctic sea ice state. Thus by combining knowledge from state-of-the-art sea ice models with knowledge from newly developed observations we hope to produce a clearer picture of the Arctic sea ice and its thickness distribution.