Recent behavior of the Nares Strait ice arches: anomalous collapses and enhanced export of multi-year ice from the Arctic Ocean

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The ice arches that usually develop at the northern and southern ends of Nares Strait play an important role in modulating the export of multi-year sea ice out of the Arctic Ocean. As a result of global warming, the Arctic Ocean is evolving towards an ice pack that is younger, thinner and more mobile and the fate of its multi-year ice is becoming of increasing interest to both the scientific and policy communities. Here, we use sea ice motion retrievals derived from Sentinel-1 imagery to report on recent behaviour of these ice arches and the associated ice flux. In addition to the previously identified early collapse of the northern ice arch in May 2017, we report that this arch failed to develop during the winters of 2018 and 2019. In contrast, we report that the southern ice arch was only present for a short period of time during the winter of 2018. We also show that the duration of arch formation has decreased over the past 20 years as ice in the region has thinned, while the ice area and volume fluxes have both increased. These results suggest that a transition is underway towards a state where the formation of these arches will become atypical with a concomitant increase in the export of multi-year ice accelerating the transition towards a younger and thinner Arctic ice pack.