Increasing Mobility of High Arctic Sea Ice Increases Marine Hazards off the East Coast of Newfoundland

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As the Arctic ice cover has transitioned to a younger and thinner state it has become weaker and therefore increasingly mobile. One of the key indicators of this change is the increase in ice flux through Nares Strait, which connects the central Arctic to Baffin Bay and is an export pathway for some of the oldest and thickest sea ice remaining within the Arctic. Historically ice flux through the narrow Strait was seasonally limited by the formation of an ice arch, however as the ice cover has thinned the arch no longer forms every winter, and when it does form it tends to break up earlier. An increase in ice flux through Nares Strait not only affects the retention of old thick ice within the central Arctic, but also affects the icescape downstream of the Strait that extends from Baffin Bay, through the Labrador Sea and towards the southern ice edge around Newfoundland. While an ice cover does form annually around Newfoundland, it is typically a thin seasonal ice cover, which forms in January and is gone by May. However, during spring 2017 the ice conditions were considerably heavier, presenting hazardous conditions for the local maritime industry into June and requiring the Canadian Coast Guard research ice breaker Amundsen be pulled off of its scientific cruise and used to escort vessels and conduct search and rescue operations along Newfoundland’s northeast coast. The ice cover was considerably thicker and more extensive than previous years and sank two fishing vessels that became beset within the ice pack. Using a unique suite of in situ observations we confirmed that multiyear sea ice from the central Arctic was present within this anomalous ice cover. Using satellite imagery and regional ice charts we tracked the source of this multiyear ice back to Nares Strait and the central Arctic. While regional in focus, this work highlights how the decline of the Arctic ice pack has implications for downstream areas where risk may be increasing as the ice pack declines.