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Upper Ocean Evolution Across the Beaufort Sea Marginal Ice Zone

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The observed reduction of Arctic summertime sea ice extent and expansion of the marginal ice zone (MIZ) have profound impacts on the balance of processes controlling sea ice evolution, including the introduction of several positive feedback mechanisms that may act to accelerate melting. Examples of such feedbacks include increased upper ocean warming though absorption of solar radiation, elevated internal wave energy and mixing that may entrain heat stored in subsurface watermasses (e.g., the relatively warm Pacific Summer and Atlantic waters), and elevated surface wave energy that acts to deform and fracture sea ice. Spatial and temporal variability in ice properties and open water fraction impact these processes.

Four long-endurance autonomous Seagliders followed the retreating Beaufort Sea ice edge to repeatedly occupy sections that extended from open water, through the marginal ice zone, deep into the pack during summer 2014. Gliders penetrated up to 200 km into the ice pack, under complete ice cover for up to 10 consecutive days. This presentation will discuss the upper ocean variability, its relationship to sea ice extent, and evolution over the summer to the start of freeze up.