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LOCALISED SHELF-BREAK UPWELLING AND DOWNWELLING AND ALONGSHELF FLOW ON THE CANADIAN BEAUFORT SHELF – RESPONSE AT CAPE BATHURST AND HERSCHEL ISLAND TO ALONG-SHELF WIND AND FLOW.

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Strong convergences of isobaths at the eastern and western ends of the Canadian Beaufort Shelf amplify the current flow along isobaths. The acceleration of current in-turn locally amplifies upwelling and downwelling. This phenomenon is known to occur at the eastern end, where there is a ~10-fold increase in bottom slope on approach to Cape Bathurst from the west. At the western end of the shelf, upwelling occurring in Mackenzie Trough is additionally amplified over the steep sloping narrow shelf adjacent to Herschel Island before it spills onto the Yukon shelf further west.

For Cape Bathurst, we use 3 years of mooring data (2010-2014) from the cape, moored data from the shelf and wind data to examine the upwelling/downwelling response, generate a rough wind-based proxy for nutrient flux on and off the shelf, and estimate the influence of Cape Bathurst upwelling on the hydrography and circulation of the rest of the shelf. For Herschel Island, a small monitoring mooring has been placed north of the island, to expand our understanding of the conditions under which upwelling occurs there. Both upwelling 'hotspots' have strong influences on the local ecosystem and thus are potential candidates for observational focus if the Distributed Biological Observatory concept is expanded to include the Beaufort Sea.