

Beaufort Gyre Exploration Project: Dispatch 6: What a Blast!

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The [United Nations Convention of the Law of the Sea \(UNCLOS\)](#) has provided the opportunity for countries to extend their marine territorial limit from 200 to 350 nm (nautical miles = 1/60th degree of latitude). Canada signed on in 2003 and must provide bathymetry charts and data that estimate the thickness of marine sediments to the 350 nm boundary line by 2013.

Researchers Borden Chapman, Joe Manning and Ryan Pike from [Natural Resources Canada \(NRCan\)](#) and Thomas Funck from [The Geological Survey of Denmark and Greenland \(GEUS\)](#) have brought equipment that is designed specifically to chart the ocean floor and determine the depth of the sediment.

There are unique challenges when mapping the Canadian Arctic Basin due to the thick ice. Thus a series of tests are being conducted to ensure this equipment (which is nicknamed the "tow sled") is able to withstand the harsh conditions, in preparation for an extensive survey effort beginning with the [International Polar Year](#).

Seismic data is acquired by making a loud noise and listening for the echo. The tow sled consists of an array of 3 air guns and a listening device which the NRCan and GEUS team deployed off the stern of the *Louis*. To get the air guns positioned at the proper depth of 35ft below the surface, the NRCan team had to add 4,350 lbs (~ 2 tons) weight to the guns. With the heavy weight and complicated network of cables and lines it can be dangerous work, but the *Louis* crew, NRCan and GEUS team made it look easy due to their skill and extensive safety precautions.

The loud bang, repeated every 30 seconds, could be heard in the lower decks of the ship. It sounded like cannon shots! With each blast from the guns, made by the release of compressed air, a white cloud of bubbles rose to the surface behind the ship. During the first test the Captain assigned the Chief Engineer, Don Stortts, to scan the ship for any stress due to the pressure wave created by the air guns.

One of the tests being conducted is to determine the actual decibel level of the blast. The NRCan and GEUS team are very sensitive to the potential impact the noise may have on Arctic marine mammals. Joe Illasia and Ian Green, the wildlife researchers on board, are stationed on the observation deck throughout the seismic trials. If they spot whales or polar bears within 1 km (about 0.7 miles) from the ship, the operation will be suspended.

The first trial was a success. However, operation of the equipment through the thick multi-year ice is a challenge.

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Borden Chapman (white hard hat) watches the tow sled with air guns being lifted from its cradle for deployment, while Rico Amamio (grey hard hat) and Dan Maclean (yellow hard hat) guide the instrument with tag lines. *Photo by Rick Krishfield, WHOI.*



The tow sled is eased over the stern of the *Louis* by Rico. *Photo by Rick Krishfield, WHOI.*



Marine mammal observers (Joe Illasiak and Ian Green) on "monkey island" which is the outside deck over the ship's bridge. *Photo by Jennifer Hutchings, IARC.*



Joe Manning studies bathymetric data being recorded by the ship's new echo sounder system (background), but still finds time to read the latest cruise dispatch (on computer screen). *Photo by Rick Krisfield, WHOI.*

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