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Using science to delineate the limits of Canada's continental shelf

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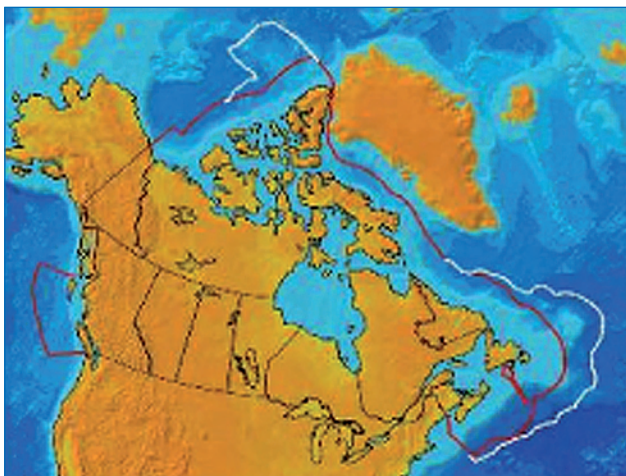
Canada



Using Science to Delineate the Limits of Canada's Continental Shelf

Canada is a coastal state, bordering three oceans: the Atlantic, the Pacific and the Arctic. About 40% of Canada's territory lies beyond the coast line beneath the sea and extends to 200 nautical miles (nm) offshore. Under the United Nations Convention on the Law of the Sea (UNCLOS) coastal states that have a wide continental margin, like Canada, can obtain sovereign rights over an area beyond the 200 nm - the extended continental shelf. This would give Canada the exclusive rights to the resources on and below the seabed in this area (e.g., oil and gas).

Canada ratified the UNCLOS in 2003 and has until 2013 to prepare a submission to the United Nations to define the limits of its extended continental shelf. The determination of this limit is based upon scientific data – the shape of the seafloor and the thickness of the sedimentary layer. Natural Resources Canada's (NRCan) is mapping the underwater geological formations in both the Atlantic and Arctic Oceans. Preliminary studies have estimated that the size of Canada's extended continental shelf could be as large as 1.75 million square kilometers – an area equivalent to the size of Canada's three Prairie provinces.



Map of Canada outlining the 200 mile exclusive economic zone (red line) and the possible limit of the extended continental shelf (white line).

Background

The continental shelf is the natural extension of the continent as it descends to the deep oceanic floor (see diagram). In order to determine the underwater limit of the continental shelf, NRCan researchers look at the seabed's topography (shape) and the thickness of deposits (sediment thickness). The mapping of these features uses sound waves, which travel through the water column. These waves are either reflected by the seafloor (giving it shape) or penetrate the upper layers where they are then reflected (giving the sediment thickness).

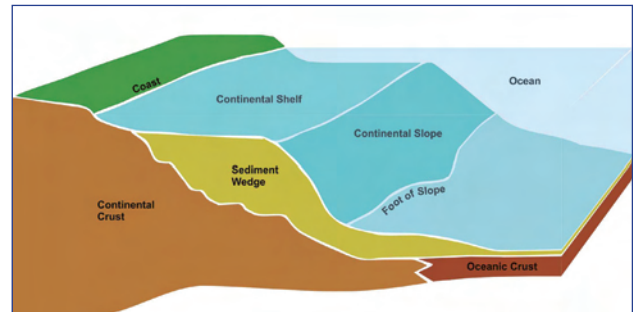


Diagram of an Atlantic-style continental margin including the continental shelf, slope and rise.

Operations in the Arctic take place under challenging conditions. Weather and ice play important roles in determining the success of these surveys. The field seasons are short, about six weeks in the spring for the on-ice surveys. These surveys use helicopters and the temperature needs to be cold enough so that no ice-fog forms, which prevents the helicopters from flying and could dangerously strand researchers on ice floes. Seismic operations in the Arctic use icebreakers and take place in the fall, when the ice is thinner.

Despite these challenges, the program is on track and NRCan is confident that the surveying and analysis will be completed by 2013.

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Partners

The UNCLOS project is led by the Department of Foreign Affairs and International Trade, with the mapping component jointly managed by Natural Resources Canada and Fisheries and Oceans Canada.

Wherever possible, Canada is collaborating internationally when conducting surveys in the Arctic. In 2006, a joint Canada-Denmark seismic project was carried out from the Canadian Forces Station in Alert, located on Ellesmere Island in the Canadian Arctic. The goal was to determine if the Lomonosov Ridge, a submarine mountain chain to the northeast, meets UNCLOS requirements for an extension of the North American continental shelf. Despite bad weather conditions, losing about 70% of the survey time, the joint operation was a success.

Canada is also exploring collaborations with the other arctic countries, Russia and the USA.



The research team from the 2007 joint Canada-Denmark seismic project in Alert.

Key Findings

1. The results of the 2006 Lomonosov Ridge study indicate that the area remains of interest for both Canada and Denmark.
2. The results of the first year of seismic surveying in the Beaufort Sea in 2007 indicate that there are more sediments than anticipated.
3. The preliminary analysis of the 2007 seismic survey off Nova Scotia indicates that the sediments extend further offshore than anticipated.

Making a Difference

Over the next three years, Canada will continue its research of two particular areas in the Arctic: the Beaufort Sea in the Western Arctic, and the Lomonosov and Alpha ridges which are submarine mountain ranges in the Eastern Arctic. A series of voyages in 2008, 2009 are scheduled for seismic surveying in the Beaufort Sea. All the data must be collected then analyzed before the limits of the continental shelf are can be determined. The goal is to complete the surveying, analyse the data and prepare a submission by the end of 2013.

For additional information visit:

Defining Canada's Extended Continental Shelf

http://geo.international.gc.ca/cip-pic/geo/defining_cs-en.aspx

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