

**46°N to 75°N (Quebec City to the Beaufort Sea):**  
**2011 Ocean Mapping Group Operations in the Canadian Arctic, Part II**

**By Ian Church**

Ian Church, James Muggah, Carlos Rubrio Marques and Rodrigo Carvalho left Fredericton, NB, on August 23 to start their journey to join the CCGS Amundsen in Sachs Harbour, NWT. On August 25, they boarded a charter flight from Yellowknife, NWT, to Sachs Harbour, NWT, but were redirected to Inuvik, NWT, when the Dash 7 could not land in Sachs Harbour due to fog. By late in the day on August 26, another attempt was made to fly into Sachs Harbour. This time, the plane landed successfully in a rare clearing of the fog.

After arriving at the Amundsen a day late on August 26, to take over from Travis Hamilton and Brad Eisan, operations began almost immediately. Due to the immense operational cost of a 100-metre multidisciplinary ship like the Amundsen, no time is wasted onboard and work takes place 24 hours a day with the utmost efficiency.

The primary goal of this leg of the journey was to broaden Canada's understanding of the Beaufort continental slope with a massive bathymetric survey, a series of piston cores, and deployment and retrieval of seabed mooring instrumentation. The bathymetric survey was the final stage of a three-year project to investigate natural seabed geo-hazards in the area.

Several major oil and gas companies have expressed interest in drilling within the Canadian Beaufort Sea, but before drilling can commence a thorough investigation must be undertaken to ensure that drilling in such an environment could be done safely. One major component to this review is to assess whether any natural features on the seabed could damage a pipeline, seabed engineering structures, drill platform or interfere with any other related activity. Examples of potential geo-hazards in the area include ice keel scours, mud volcanos and submarine landslides.

The role of the Ocean Mapping Group was to acquire and process the acoustic multibeam and sub-bottom data. The multibeam echo sounder data provided a complete 3D model of the seabed morphology while the sub-bottom data gave insight into the sub-surface seabed structure. Initial plans had the Ocean Mapping Group collecting data for 12 hours per day during the night and processing data during the day while other operations took place. Due to unforeseen circumstances, the piston coring and mooring operations were cancelled early on in the cruise. This allowed the seabed mapping to operate 24 hours a day. The flexibility of the Ocean Mapping Group participants with processing and survey planning allowed the ship to continue to operate at maximum efficiency for the duration of the leg.

The bathymetric survey focused on an area of the Beaufort Sea in water depths between 1000 and 2000 metres. It built on existing seabed multibeam coverage collected by the Ocean Mapping Group in 2009 and 2010 during similar campaigns. The successful 2011 survey covered an area of over 4500 km<sup>2</sup> while the total area covered since 2009 has been more than 14,000 km<sup>2</sup>, a major portion of the Canadian Beaufort continental slope and shelf.

The extra-allotted survey time, due to the 24-hour-a-day survey operations, allowed for investigation of other areas within the Beaufort Sea. Additional survey lines collected outside the primary study area were of great interest to the Geological Survey of Canada (GSC) as it extended their broader regional overview of Canadian Arctic geology. Survey data from this year, along with previous years going back to 2003, has allowed the GSC to establish an improved understanding of the retreat of ice sheets during the last de-glaciation within the Beaufort Sea and the rest of the Arctic Archipelago.

On September 7, 2011, after a successful seabed survey campaign, Ian Church, Carlos Rubrio Marques and Rodrigo Carvalho left the Amundsen in Sachs Harbour. James Muggah stayed aboard to ensure a smooth handover for the next leg and to continue survey operations with OMG's Doug Cartwright, Christine Legere, and Pim Kuus.