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Beaufort Gyre Exploration Project: Dispatch 4: It's All About the Ice

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Now that we are in the icepack, the *Louis* begins to do what it does best - break ice. Gone are the days of imperceptible motion described in Dispatch 2. From now on, we know when we are moving due to the constant crunching sounds of the 1-3 m (3-10 ft.) ice being crushed under the ship. Added to the noise is the herky-jerky motion imparted on the ship by the larger and thicker pieces of ice, which typically form as ice ridges. Walking down a passageway can sometimes take the form of a "drunkard's walk" due to the sudden side-to-side jolts. The only times when the motion is steady in the pack ice is when we are stopped to work, or traversing thin ice patches or open water "leads". When encountering an extremely hard ice patch, the massive icebreaker may sometimes even be stopped by the ice, necessitating backing up and re-ramming the offending floe. But if the ice becomes too uncooperative, then the Captain has the ability to bring another of the *Louis'* five engines online (see icebreaker page for more information on the ship's capabilities).

In fact, most icebreakers do not break ice by ramming (with the exception of the Russian nuclear icebreakers), but typically break ice by riding up over the ice, and using the weight of the ship to crack the floes. As a result the design of the hull is more rounded than most vessels, which means that the ship will also roll more in ice-free high seas. Anyone who has felt the rolling motion of an icebreaker in heavy seas would prefer the herky-jerky motion of the icebreaker in the ice.

On this day, we encounter highly concentrated relatively thick (3 m) multi-year ice (ice that has survived over at least one complete summer season) over the location of the CABOS mooring that we planned to recover. This is rather surprising, since very little ice has been encountered at this location during the past three summer cruises; although not too surprising, as we were warned of this possibility by the onboard Ice Observer Scott Payment, who analyzes daily satellite images of the icepack for navigational purposes (to see an example of satellite ice images, visit the Alaska Ocean Observing System website). Using an acoustic transponding device, Mike Dempsey and myself were able to verify the location and integrity of the instrumented mooring system, but the ice conditions prohibited recovery on this pass. We will try again near the end of the cruise, on our way back to Kugluktuk.

Meanwhile, the CTD and chemistry group meet in the ship's boardroom so that Chief Scientist Sarah Zimmermann (from IOS, Canada) can pass along information on the timing and work to be performed at the next CTD station. This is the third year that Sarah has skillfully lead the international team of scientists on the annual JWACS cruise. Besides coordinating the various scientific activities which all clamor for shiptime, and coordinating on behalf of the scientists with the Captain and ship's officers, Sarah also leads the CTD operations. I don't know how she manages to stay so pleasant with all these responsibilities heaped upon her.

Chunks of 1 m (3 ft) thick ice are pushed effortlessly aside by the *Louis*.

No, she hasn't been drinking. Walking down the causeway, Jane Eert stumbles into the bulkhead due to the motion of the ship breaking ice.

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Science meeting in the Louis boardroom. Chief Scientist Sarah Zimmermann (right) discusses upcoming operations with the CTD and chemistry group who listen attentively to her every word.

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