

Beaufort Gyre Exploration Project: Dispatch 4: The Many Faces of Sea Ice

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We hit sea ice last night. It jolted and jostled the ship and made a great grinding sound that woke me up. We've been in about 90% ice covered waters since then, and I've spent a good part of the day learning to read the ice.

Sea ice begins as small crystals suspended in the water. It's called frazil ice, and looks like an oily film on the water. If freezing conditions persist, the crystals bond together into a soupy mixture called grease ice. Ironically, this type of ice is not oily but matte, and thick like ketchup. As the ice thickens, it turns grey in color and will bend under gentle swells- nilas ice. Then it grows thicker yet and will ridge or break under pressure, earning the name *first year ice*, because it will survive the melt season and thicken up in the winter.

We haven't seen much ice in the early stages of growth. This is the melt season.

The ice pack that we entered last night is mostly multi-year ice that has survived at least one summer. The officers in the wheel house say the ice is all rotten, meaning heavily melted and easily navigable. The edges are full of holes, like swiss cheese. Large portions of the ice edges have melted back and are underwater.

Ice breaker ships are built with a rounded bottom so that they glide up on top of the ice and crush it under their weight. From the front side of the ship, you see a spectacular display of ice cracking and overturning at the edges of the boat. This is also the best place to observe the thickness of the floes as they turn sideways under the weight of the ship. I noticed a brownish-yellow discoloration on the bottom side of a piece of overturned ice yesterday - probably algae, but could it be polar bear pee?

The ice pack we're in now came from somewhere else, and will continue to thin until the autumn chill sweeps in and brings enough cold for the ice to grow again. But for the past three decades summer melt has outpaced winter growth, thinning the ice over time. Ship officers who have spent their careers working up here say the change in sea ice is astounding, with last summer reaching a record low. Quite possibly in our lifetime, the perennial Arctic Ice will exist only in memory.

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