



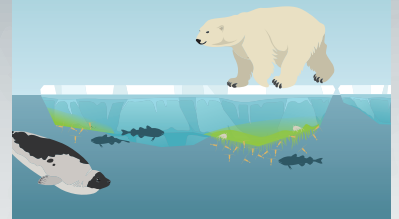
Sea ice in the Barents Sea

Sea ice covers the northern Barents Sea most of the year, the extent is seasonally increasing and decreasing, like a contracting heart, keeping the Arctic ecosystem alive. Over recent decades, sea ice extent in the Arctic, and the Barents Sea in particular, has decreased with drastic consequences for all organisms: from bacteria up the food chain to fish, polar bears and humans, all relying on sea ice as a nursery, habitat, or hunting ground.

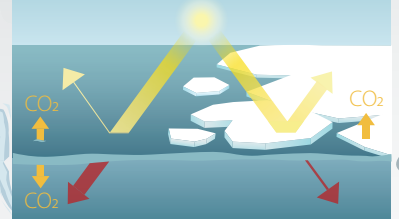


Why should we study sea ice?

Nursery & habitat space



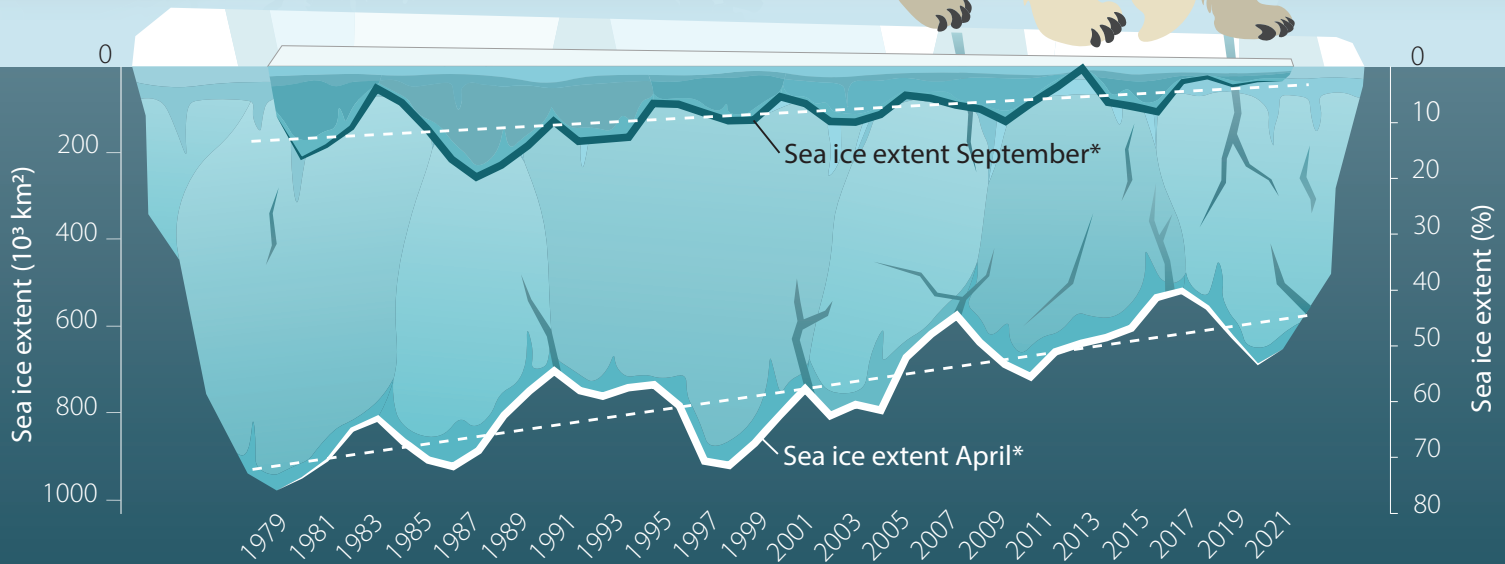
Ocean-atmosphere interactions



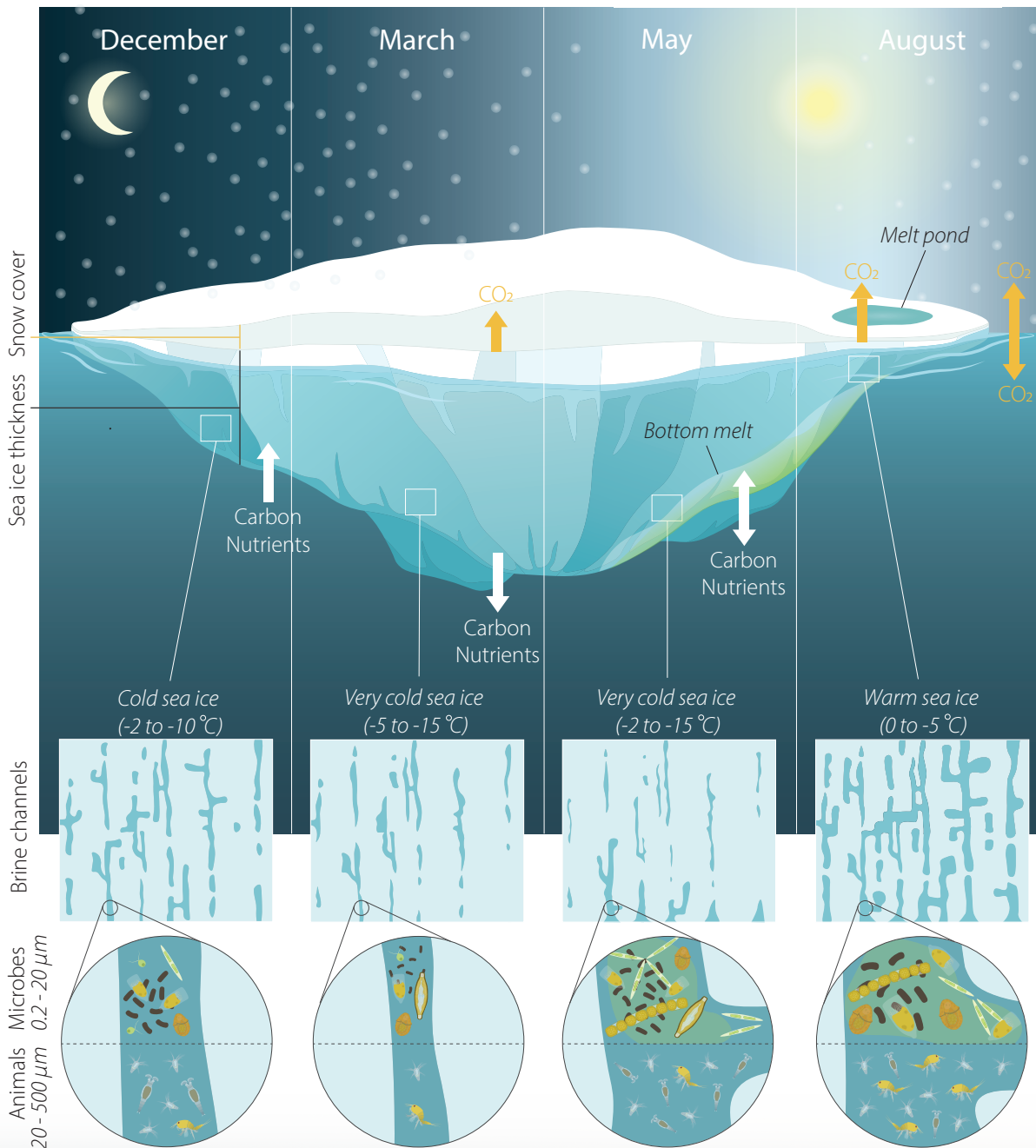
Human impacts and activities



Sea ice extent in the Barents Sea is decreasing on a decadal time scale. In recent years, most of the sea ice has been seasonal ice, either from local ice growth or advection into the Barents Sea, while most of the multiyear ice has disappeared.



*Three-year running mean, data sources: NSIDC (<https://nsidc.org/>), MOSJ (<https://mosj.no/>)



Sea ice provides a unique habitat and affects ocean-sea ice-atmosphere exchanges of nutrients and carbon, vertical exchange of heat, and gases (CO₂). Sea ice grows in winter and melts in the summer, both from the top (e.g. melt ponds) and bottom (bottom melt). Sea ice forms a unique habitat for a large diversity of different organisms, not only above and below, but also in the interior of the sea ice in so called brine channels. There, tiny organisms such as bacteria, ice algae and meiofauna can build a unique food web that is the source of nourishment for larger under-ice animals like crustaceans and polar cod.

Microbes

Unicellular eukaryotes/
prokaryotes

- Diatoms/ice algae
- Dinoflagellates
- Ciliates
- Small flagellates
- Bacteria

Meiofauna

- Multicellular eukaryotes
- Copepod nauplii/
small crustaceans
 - Rotifers
 - Harpacticoids/
small crustaceans

RECOMMENDATIONS

What we know

The open-water period is becoming longer, and the ice-covered period shorter. Thicker multiyear ice is being replaced by thinner seasonal ice, accompanied by a general overall decrease in the area covered by sea ice, which has the following implications:

- Stronger atmosphere-ocean exchange of greenhouse gases.
- Albedo effect, causing increased surface ocean heating.
- Loss of nursery and habitat ground for many ice-associated flora (ice algae) and fauna (from meiofauna to polar bears).
- Changed timing in globally ecologically important processes, such as primary production and carbon sequestration.
- Less sea ice makes the area more accessible for human activity, increasing potential for hazards and needs for up-to-date environmental management and regulations.

What we don't know

Sea ice loss is threatening a unique ecosystem as well as the species dependent on the sea ice. With the remoteness and former inaccessibility of the area, our knowledge is still very limited regarding the processes in the sea ice environment and how these are linked to ecosystem functioning, natural resources, weather patterns, and climate feedbacks. With the ongoing rapid changes, sea ice research should be prioritized to understand how an ice-free Barents Sea and other sea ice areas will affect the future of not only species that rely on sea ice, but also the rest of the planet.