

Source or sink: CO₂ in Arctic waters

Limited data shows that Canadian Arctic waters are a sink for CO₂ – but not all the time. We need more information to understand the full picture.

The ocean and the atmosphere are constantly exchanging CO₂

When the ocean absorbs CO₂ from the atmosphere, we call it a CO₂ sink; when it releases CO₂ into the atmosphere, it is a CO₂ source.



Melting ice

Meltwater floats on top of saltier water and absorbs more CO₂.

Trapped CO₂ release

CO₂ trapped under the ice can be quickly released when ice starts to melt or break up, creating a short-term CO₂ source.

Phytoplankton

Phytoplankton need CO₂ to grow. When they bloom during the open-water period, they create a CO₂ sink.

Seasonal switches

Hudson Bay switches from a sink to a CO₂ source in late summer and then back to a sink in the fall.

River water

Rivers carry decomposing material, which gives off CO₂ as it breaks down. This can make river water at the surface of the ocean a source of CO₂.

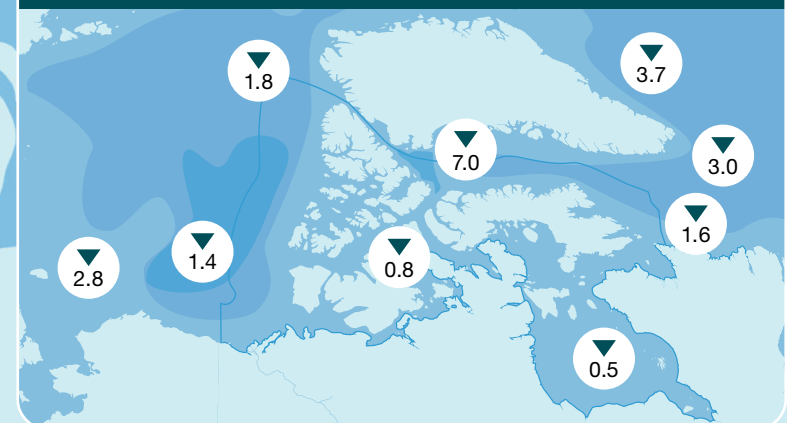
CO₂ changes with depth

CO₂ at the surface of the ocean can be very different from waters just a few metres below. We need measurements from multiple depths to fully understand CO₂ exchange in the ocean.

Water movement

Mixing can alter the direction and strength of CO₂ exchange.

The strength of the CO₂ sink varies by location



Values are approximate and can vary over time. Units are mol C m⁻² year⁻¹.