Melting Sea Ice – An Anthropogenic Time Bomb

What is Sea Ice?

Sea ice is frozen water that forms, grows, and melts in polar oceans. It is found in the Arctic and Antarctic but influences global climate. For instance, sea ice surface has high albedo, reflecting solar energy and keeping earth cool. Sea ice is also partly responsible for oceanic water movements. [1]

13.1 %

Per Decade Arctic Ice Decline based on 1981-2010 average [2]

11°C

High arctic temperature increase by the end of the 21st century [2]

Why is Sea Ice Important?

Climate Control

Sea ice regulates local and global climates. As sea ice melts, the arctic's ability to reflect solar radiation back into space is reduced, accelerating overall global warming rates. [3]

Transportation

Northern Canadian communities depend on sea ice as transportation routes for people and supplies. Earlier melts and later freezes complimenting an overall drop in abundance devastates logistics.

Communities

In addition to transportation, northern communities also rely on sea ice for hunting and tourism. Declines may instigate risks in food and financial security for thousands. [4]

Erosion Prevention

Sea ice breaks wave formation, reducing thermal abrasion and subsequent land erosion and loss. Communities like the Kashechewan First Nation have relocated to higher ground to avoid land loss.

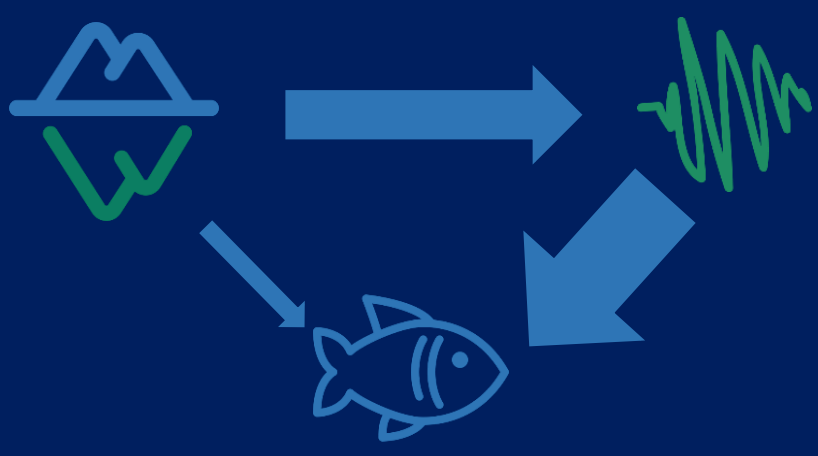
Oceanic Circulation

Freezing sea ice expels salty, dense water, driving global thermohaline circulation and transporting nutrients, heat, and sediments worldwide.

Sea Ice Impacts All Life – And It Is Changing

Image Source [5]

Arctic sea ice extent is declining. 2012's record minimum extent was just 3.41 million km². The orange line depicts the 1981-2010 median extents.



Ecosystems are changing from ice algae-based ecosystems to open water phytoplankton-based ones, altering biodiversity and species interactions.

Ice Thinning

Ice thinned by about 40cm/decade over the Canadian Basin and about 10cm/decade over the Continental Shelf [6], raising sea levels, disrupting thermohaline circulation, hastening erosion, devastating coastal communities, and introducing new transportation risks.

Hunting Grounds

Ice floe edges (where fast ice meets ocean) are moving closer to shore, reducing hunting grounds and access to marine food resources such as fish and seals.

Shipping

As melting sea ice opens the Arctic to navigation, vessels can take shortcuts through the region. [7] However, this is not without risk as pollution can devastate the fragile ecosystem.

Northern Communities

Communities like Tuktoyaktuk suffer coastal erosion, sea level rise, flooding, land loss, and hunting ground reduction. Tuktoyaktuk reported that over $50 million is needed to protect against further erosion alone. [8]

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References