ARCTIC SEA ICE LOSS SLOWDOWN - ENVIRONMENT

A new study has revealed that while Arctic sea ice melting has slowed down in the past 20 years, the slowdown is temporary and melting is expected to accelerate again.

Background

Indicator of Climate Change - The melting of Arctic sea ice is one of the most visible and sensitive indicators of global climate change.

Observed Slowdown - Over the last two decades, the rate of Arctic ice loss has slowed compared to earlier periods, but this does not imply recovery or reversal of climate change impacts in the Arctic.

Reasons for Slowdown

Anthropogenic Global Warming - Human activities such as burning fossil fuels and deforestation have increased greenhouse gas (GHG) emissions, driving Arctic ice melt.

Natural Climate Variability - Cyclical variations in Earth's climate system can influence short-term ice melt trends.

El Niño-Southern Oscillation (ENSO) - Periodic warming and cooling of the Pacific Ocean alters atmospheric circulation, affecting Arctic temperatures and ice formation.

Pacific Decadal Oscillation (PDO) - Long-term fluctuations in Pacific Ocean temperatures can bring cooler waters to Arctic regions, temporarily slowing ice loss.

Atlantic Multidecadal Variability (AMV) - North Atlantic sea surface temperature fluctuations influence Arctic ice conditions and melt rates.

Key Findings of the Study

Rate of Slowdown - Ice loss slowed to approximately 0.35 million sq. km per decade over the last 20 years. This contrasts with 1.3 million sq. km per decade between 1993–2012, showing a significant decline in the rate of loss.

Temporary Nature - The slowdown is likely temporary and may continue for another 5–10 years.

Future Projections - Once the slowdown phase ends, climate models predict accelerated ice loss of roughly 0.6 million sq. km per decade.

Implications of the Slowdown

No Reversal of Climate Change - Despite the temporary slowdown, global GHG levels and mean temperatures continue to rise, and Arctic warming persists.

Potential Accelerated Melting - Following the slowdown, the Arctic may experience sharper, faster ice loss, which could have cascading environmental effects.

Impact on Albedo Effect - Reduced sea ice exposes darker ocean water, increasing solar heat absorption and further enhancing warming.

Threat to Ecosystems - Polar bears, seals, and other Arctic species face habitat loss, while overall Arctic biodiversity is at risk.

Disruption of Weather Patterns - Changes in Arctic ice cover can alter global atmospheric circulation, impacting monsoon patterns, storms, and rainfall distribution in distant regions.

Indirect Contribution to Sea-Level Rise - While floating sea ice melting does not directly raise sea levels, it accelerates the melting of Greenland's ice sheet, which contributes to sea-level rise.

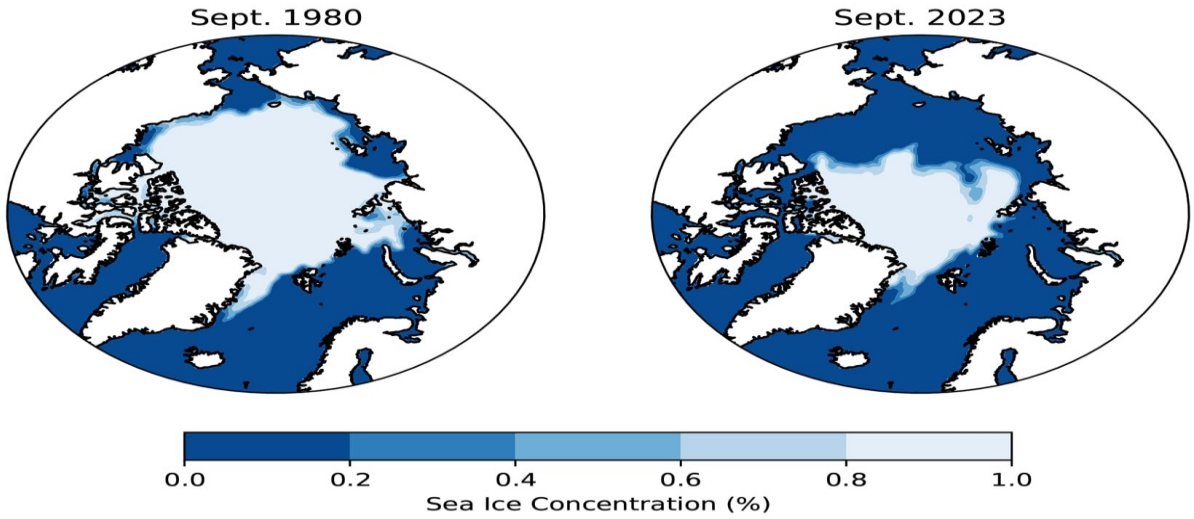
What is Sea Ice?

Definition - Sea ice is free-floating polar ice that forms from seawater, expands in winter, partially persists year-round, and melts in summer.

Location - Predominantly found in the Arctic Ocean and the Southern Ocean (Antarctica).

Formation - Unlike icebergs, glaciers, and ice sheets which originate on land, sea ice forms from frozen saltwater.

Salinity - Most salt is expelled during freezing, but some remains trapped in tiny pockets, giving the ice a porous structure.



Reasons for Decline in Arctic and Antarctic Sea Ice

Delayed Freezing - Warmer ocean temperatures slow cooling, delaying ice formation (e.g., Hudson Bay, northeastern Canada).

Marine Heatwaves (MHWs) - Arctic MHWs and heated Gulf Streams carry excess heat to polar regions, intensifying sea ice melt.

Ice-Breaking Winds - Storms in Barents and Bering Seas fragment ice, making it vulnerable. Antarctic ice, being more exposed to open ocean, is especially sensitive.

Thinning Ice - Arctic ice has become thinner and fragile, making it more susceptible to breaking due to storms and temperature variations.

Higher Air Temperatures - Regions like Svalbard, Norway, experience above-normal temperatures, accelerating melting at the edges of Antarctic ice shelves.

Consequences of Sea Ice Loss

Increased Global Warming - Less ice cover exposes more water to sunlight, increasing solar heat absorption and water temperature. Polar sea ice has lost ~14% of its natural cooling effect since the 1980s.

Disruption of Ocean Circulation - Melting sea ice reduces ocean salinity and surface water density, slowing global ocean currents and disrupting marine ecosystems.

Loss of Climate Regulation - Sea ice acts as a cooling cap, reducing evaporation and heat loss to the atmosphere. Less ice accelerates climate change.

Extreme Weather Events - Thinner ice and warmer waters may increase the frequency and intensity of storms and cyclones.

Source: https://indianexpress.com/article/explained/explained-climate/melting-arctic-sea-ice-slowed-down-10206635/