

# GLOBAL SEA ICE COVER: GEOGRAPHY

**NEWS:** *Why global sea ice cover has dipped to record low — what this means*

## WHAT'S IN THE NEWS?

The US National Snow and Ice Data Center (NSIDC) reported a record low global sea ice extent of **15.76 million sq km** in February 2025, driven by rising temperatures, oceanic changes, and altered wind patterns. This decline accelerates **climate change, disrupts marine ecosystems, and threatens global sea levels**, necessitating urgent climate action.

## What is Sea Ice?

- **Definition:** Sea ice refers to **free-floating ice in polar regions** that forms and melts seasonally but some of it remains year-round.
- **Difference from Other Ice Forms:**
  - Sea ice forms in ocean water, whereas **icebergs, glaciers, ice sheets, and ice shelves** originate on land.
- **Role in Climate Regulation:**
  - **Enhances Albedo:** Reflects solar radiation, reducing heat absorption.
  - **Absorbs Ocean Heat:** Traps subsurface ocean heat, preventing excessive ocean warming.
  - **Prevents Ocean Acidification:** Helps in reducing **carbonification of ocean water**, which is crucial for coral health.

## Extent of Global Sea Ice Loss

- **Arctic Sea Ice:** Covers **40% of global sea ice** and has been shrinking at **12.2% per decade (1981–2010)** in September, when it reaches its minimum.
- **Antarctic Sea Ice:** Accounts for **60% of total global sea ice** and fluctuates seasonally.
  - Until **2015**, Antarctic sea ice was stable but lost **two million sq km (2014–2017)**, equivalent to four times the size of Spain.
- **Long-Term Ice Loss Trend:**
  - Since the **late 1970s**, an estimated **77,800 sq km of sea ice is lost per year**.

## Reasons Behind Global Sea Ice Decline

### 1. Rising Global Temperatures

- **Arctic and Antarctic regions warming rapidly**, with the Arctic warming **four times faster than the global average**.
- Warmer ocean temperatures **delay freezing and accelerate melting** of sea ice.
- **Ice-Albedo Feedback Effect:** As ice melts, darker ocean water absorbs more solar radiation, causing **further warming and ice loss**.

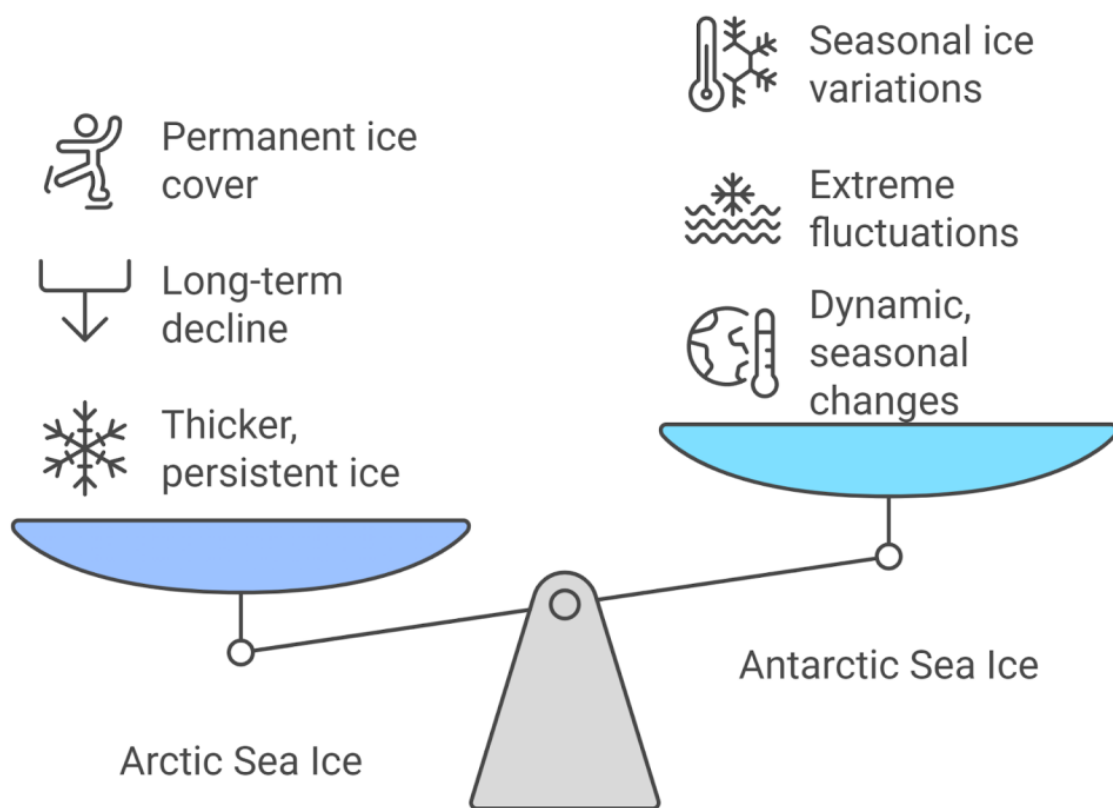
### 2. Oceanic and Atmospheric Changes

- **Subsurface warming of the Southern Ocean** has accelerated **Antarctic sea ice melt**.

- **Changes in wind patterns** influence sea ice extent by **pushing warmer waters into polar regions**.

### 3. Transformed Wind Patterns and Storms

- **In the Arctic:**
  - Storms have broken apart ice around the **Barents Sea (near Norway and Russia)** and the **Bering Sea (between Alaska and Russia)**.
  - **Hudson Bay saw delayed freezing** due to transformed wind patterns.
- **In Antarctica:**
  - Unlike the Arctic, the Antarctic is surrounded by ocean, making **sea ice more mobile and thinner**.



### Comparing Arctic and Antarctic Sea Ice

#### 4. Increased Ocean Heat Loss

- Less sea ice means **more exposed ocean**, leading to:
  - Increased heat absorption.
  - Accelerated ice melting.

#### 5. Higher Air Temperatures and Storm Impact

- Regions like the **Barents Sea and Svalbard (Norway)** witnessed:
  - **Stronger storms** that broke apart ice.

- **Higher-than-usual air temperatures** leading to further ice loss.

## Implications of Low Sea Ice Cover

### 1. Climate Change Acceleration

- Less sea ice means **more exposed ocean water**, leading to:
  - Increased **solar radiation absorption**.
  - Further rise in **global temperatures**.

### 2. Disruption of Ocean Currents

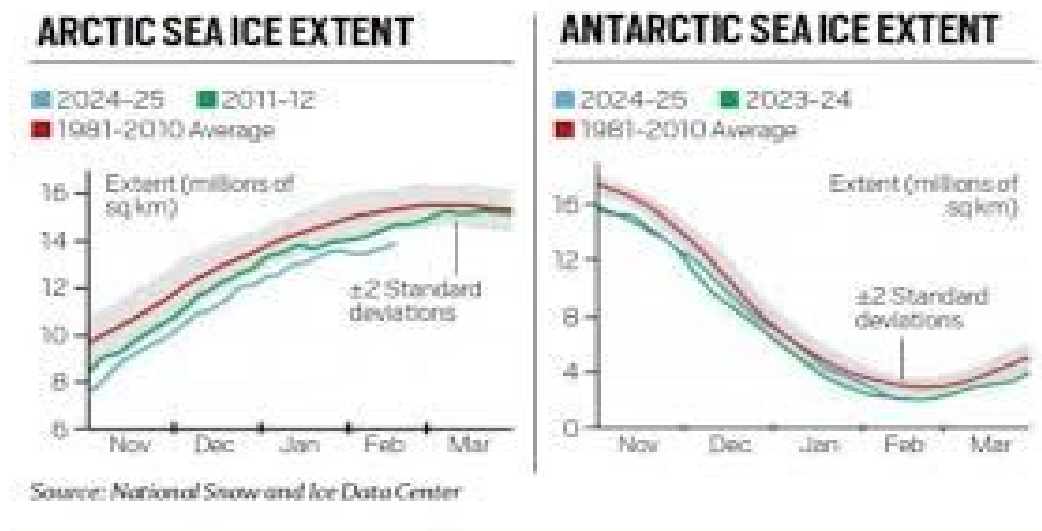
- **Freshwater influx from melting ice** slows down ocean currents, disrupting **global climate patterns**.

### 3. Rising Sea Levels

- **Melting sea ice does not directly raise sea levels**, but:
  - It exposes **glaciers and ice sheets** to warmer waters, **accelerating their melting**.
  - This indirectly contributes to **rising sea levels** and climate-induced migration.
  - Example: **Indonesia moved its capital from Jakarta due to rising sea levels**.

### 4. Disruption of Marine Ecosystems

- Polar species such as **krill, seals, and polar bears** depend on sea ice for survival.
- Loss of sea ice affects the **entire marine food chain**, threatening biodiversity.



## Way Forward – Mitigation Measures

### 1. Adhering to Climate Agreements

- Countries must **commit to the Paris Agreement targets** and work towards limiting **global warming to 1.5°C**.

### 2. Expanding Scientific Research & Observations

- **Increased satellite observations and expeditions** to better monitor and understand sea ice changes.

### 3. Strengthening International Agreements

- Governments must enhance **international cooperation on protecting polar biodiversity** and marine ecosystems.

#### **4. Implementing Strict Regulations**

- **Regulating industrial activities, fishing, and resource exploitation** in polar regions to reduce ecological damage.

#### **Conclusion**

- The **record-low global sea ice cover** is a stark reminder of the **accelerating impacts of climate change**.
- **Urgent global action** is needed to **mitigate cascading effects** on **climate, ocean currents, ecosystems, and human livelihoods**.
- Without **immediate intervention**, continued loss of sea ice could push Earth closer to **irreversible climate tipping points**.

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