Geography · GS - I

How does the cryosphere affect global climate?

EXAM YEAR	PAPER	SUBJECT
2017	GS - I	Geography

MARKS	WORD LIMIT
10	~150 words

Answer Hint

Albedo effect; global heat balance; sea-level regulation; ocean circulation; permafrost carbon; climate feedback loops

Model Answer

Introduction

The cryosphere comprises Earth's frozen water, including glaciers, ice sheets, sea ice, snow cover, permafrost and frozen ground. It plays a vital role in regulating global climate.

Influence on Global Climate

- **Albedo effect:** Snow and ice reflect a large proportion of incoming solar radiation, limiting surface warming.
- **Global heat balance:** Seasonal snow cover and sea ice influence the distribution of heat between the atmosphere and Earth's surface.
- **Sea-level regulation:** Glaciers and ice sheets store freshwater. Their melting contributes to rising sea levels.
- **Ocean circulation:** Melting ice changes ocean salinity and density, potentially influencing ocean circulation and heat transport.
- **Permafrost:** Thawing frozen soils can release carbon dioxide and methane, intensifying global warming.
- **Climate feedback:** Ice loss exposes darker land and ocean surfaces, increasing solar absorption and accelerating warming.

Conclusion

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The cryosphere is both a regulator and an indicator of climate change. Its rapid degradation can intensify warming, threaten coastal regions and disrupt ecosystems, making cryosphere monitoring essential for climate policy.

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