Defence & Security · GS - I

Account for variations in oceanic salinity and discuss its multi-dimensional effects.

EXAM YEAR	PAPER	SUBJECT
2017	GS - I	Defence & Security

MARKS	WORD LIMIT
15	~250 words

Answer Hint

Evaporation; precipitation; freshwater inflow; freezing and melting; ocean circulation; marine ecosystems

Model Answer

Introduction

Oceanic salinity refers to the concentration of dissolved salts in seawater. Its global average is approximately 35 parts per thousand, but it varies with latitude, depth, freshwater inflow and ocean circulation.

Causes of Variations

- **Evaporation:** High evaporation in subtropical regions increases salinity.
- **Precipitation:** Heavy rainfall dilutes seawater, lowering salinity in equatorial and monsoon regions.
- **River discharge:** Large rivers reduce salinity near their mouths.
- **Freezing and melting:** Sea-ice formation releases salt into surrounding water, whereas melting ice dilutes it.
- **Ocean currents:** Currents transport water masses with different salinity levels.
- **Winds and enclosed seas:** Wind patterns and restricted exchange can intensify evaporation or freshwater accumulation.
- **Depth:** Salinity varies vertically according to temperature, density and mixing.

Multi-dimensional Effects

1. Ocean Circulation: Salinity affects seawater density and contributes to thermohaline circulation, influencing global heat distribution.

2. Climate: Ocean circulation transfers heat between regions and influences regional weather and climate patterns.

3. Marine Life: Organisms have different salinity tolerances. Rapid changes can affect biodiversity, reproduction and species distribution.

4. Water Cycle: Salinity patterns reflect the balance between evaporation and precipitation and help scientists understand the global hydrological cycle.

5. Coastal Economies: Changes in estuarine salinity affect fisheries, mangroves, aquaculture and freshwater availability.

Conclusion

Ocean salinity is a key control on ocean dynamics, climate and marine ecosystems. Monitoring its variations is increasingly important amid climate change, melting ice and changing rainfall patterns.

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