



Mains Practice Question

Q. Discuss the major factors that are responsible for the origin of ocean currents across the globe.

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Approach

- Start the answer by defining the ocean currents.
- Discuss the major factors that are responsible for the origin of ocean currents
- Conclude suitably.

Introduction

Ocean currents are continuous movements of water in the ocean that follow set paths, kind of rivers in the ocean. There are two distinct current systems in the ocean—surface circulation, which stirs a relatively thin upper layer of the sea, and deep circulation, which sweeps along the deep-sea floor.

Body

Ocean currents can be caused by wind, density differences in water masses caused by temperature and salinity variations, gravity, and events such as earthquakes or storms.

- **Gravity:** Surface currents in the ocean are driven by global wind systems that are fueled by energy from the sun. Also, Coriolis forces from the Earth's rotation interact with the currents.
- **Planetary Winds:** Patterns of surface currents are determined by wind direction.
 - Surface wind-driven currents generate upwelling currents in conjunction with landforms, creating deepwater currents.
- **Variation in Density:** Currents may also be caused by density differences in water masses due to temperature (thermo) and salinity (haline) variations via a process known as thermohaline circulation.
 - These currents move water masses through the deep ocean—taking nutrients, oxygen, and heat with them.
- **Occasional Events:** Geophysical events such as huge storms and underwater earthquakes can also trigger serious ocean currents, moving masses of water inland when they reach shallow water and coastlines.
 - Earthquakes may also trigger the rapid downslope movement of water-saturated sediments, creating strong turbidity currents.
- **Topography:** When a current that is moving over a broad area is forced into a confined space, it may become very strong.
 - On the ocean floor, water masses forced through narrow openings in a ridge system or flowing around a seamount may create currents that are far greater than in the surrounding water.
 - This affects the distribution and abundance of organisms as well as the scientists and their

equipment seeking to study these organisms.

Conclusion

The ocean currents act as the global conveyor belt and thus play a dominant role in determining the climate of many of Earth's regions.

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