

Ocean Currents

[UPSC Notes]

What is an Ocean Current?

Ocean currents are the directional movement of saltwater that is continuous and predictable. It is a large flow of ocean water created and affected by a number of factors. They resemble oceanic river flows. There are various forces and factors responsible for directing an ocean current, such as-

- Wind
- Insolation or Sun Light
- Water Salinity
- The Coriolis Effect
- Gravitational Force

Characteristics of Ocean Currents

The ocean current is the horizontal movement of the stream of an ocean on a very large scale.

- The ocean currents are a continuous flow of water covering a large distance.
- The wind, Coriolis effect, gravity, temperature, etc. play a deciding role in the direction of the flow of ocean currents.
- These ocean currents are responsible for multiple climatic conditions across the world.
- The ocean currents mainly carry hot water or cold water. The current flowing from the equator carries warm water while the current flowing from the poles carries cold water.
- The ocean currents play a very significant role in heat distribution from the poles to the equator.

Types of Ocean Currents

Ocean currents can be differentiated on the basis of their depth. Therefore there are two types of ocean currents-

- **Surface Currents:** Surface currents are created by the global wind that gets energy from the Sun. As they trap the heat of the Sun, they transfer this heat to the polar region.
- **Deep-Water Currents:** Deepwater ocean currents are caused by changes in the water density which is further due to the variations in temperature and salinity of the water. This phenomenon is also called thermohaline circulation

Warm and Cold Ocean Currents

Ocean Currents can also be categorized based on temperature - Warm and Cold. Warm and Cold Ocean Currents UPSC Topic is often asked in the examination.

- Warm Ocean Current: The warm currents usually carry water from the equatorial region to the polar region as the cold water present at the poles sinks.
- Cold Ocean Current: Cold currents mostly flow from the polar regions to the equatorial regions and give a chilling effect to the surrounding land where they pass by.

List of Warm and Cold Ocean Currents

Below mentioned is the list of Cold Ocean currents

	Region
Cold Currents List	
Kurile or Oya shio Current	North Pacific Ocean
Humboldt or Peruvian Current	South Pacific Ocean
Falkland Current	South Atlantic Ocean
Canary Current	North Atlantic Ocean
Western Australian Current	Southern Ocean & South Indian Ocean
South Indian Ocean Current	South Indian Ocean
Eastern Greenland Current	Arctic Ocean & North Atlantic Ocean
Labrador Current	North Atlantic Ocean
Northeast Monsoon Current	North Indian Ocean
Benguela Current	South Atlantic Ocean
California Current	Pacific Ocean
Somali Current	West Indian Ocean
Antarctic Circumpolar Current	Southern Ocean

Check the list of warm ocean currents

Warm Currents List	Region
Florida Current	South Atlantic Ocean & Caribbean Sea

Agulhas Current	South-West Indian Ocean
Gulf Stream	North Atlantic Ocean
South Equatorial Current	Atlantic Ocean, Pacific Ocean, and the Indian Ocean
Southwest Monsoon Current	Indian Ocean
El Nino Current	Central & East-Central Equatorial Pacific
Mozambique Current	Indian Ocean
Brazilian Current	South Atlantic Ocean
Norwegian Current	North Sea (Atlantic Ocean) & Barents Sea (Arctic Ocean)
East Australian Current	South-Western Pacific Ocean
North Pacific Current	Pacific Ocean
Equatorial Counter Current	Atlantic Ocean, Pacific Ocean, and the Indian Ocean
North Equatorial Current	Pacific Ocean & Atlantic Ocean
Tsushima Current	Sea of Japan
Kuroshio Current	Pacific Ocean
Irminger Current	North Atlantic Ocean
Antilles Current	North Atlantic Ocean
Alaskan Current	North Pacific Ocean

Factors Responsible for Ocean Currents

There are certain factors that are responsible for the occurrence and movement of ocean currents, let us explore them all-

Wind Cause the Ocean Currents:

The wind is the most dominant force for ocean currents. It has been observed that most of the oceanic currents follow the direction of the planetary winds such as trade winds, westerlies, and polar easterlies.

Sunlight Causes the Ocean Currents:

Sunlight is the other factor that affects ocean currents in an extensive manner. Sunlight mostly creates two differences: the first one is temperature difference sunlight being direct on the equatorial region heats up the water over there while the other one is

salinity difference, where the water in regions away from equators has a low temperature as the sunlight is not direct and intense there.

Salinity and Ocean Currents:

The presence of salt in ocean water determines the density of water as more salt content in water will make the water denser while less amount of salt results in less water density.

Coriolis Effects of Ocean Currents

Another very significant force responsible for the movement of ocean currents is the Coriolis force or Coriolis effect.

- Due to the movement of the earth that is from west to east direction the flow of water from the equator to the poles is never in a straight line. The deflective forces deflect the path of ocean currents, this deflective force is known as the Coriolis effect caused by the rotation of the earth.
- Because of the Coriolis effect, all the dynamic bodies are deflected in the clockwise direction in the northern hemisphere whereas they will be deflected in the anti-clockwise direction in the southern hemisphere.
- Similarly, the flow of ocean currents is also deflected in the northern hemisphere in the clockwise direction while in the anti-clockwise direction in the southern hemisphere