**Ocean Currents**

An ***ocean current*** is the permanent or continuous, directed movement of ocean water that flows in one of the Earth's oceans. Oceanic currents are driven by several factors such as tides, winds, and the differences in water density. The ocean holds 97 percent of the water on earth and covers 71 percent of it. The ocean is a key factor in the storage and transfer of heat energy across the globe. Ocean currents occur at the ocean’s surface and more than 400 feet below its surface.

There are two type of Ocean Currents:

**1. *Surface Currents***

* These waters make up about 10% of all the water in the ocean.
* These waters are the upper 400 meters of the ocean.

**2. *Deep Water Currents***

* These waters make up the other 90% of the ocean
* Deep ocean currents are driven by density and the rise and fall of temperature.
* These waters move around the ocean basins by density driven forces and gravity.
* The density difference is a function of different temperatures and salinity
* These deep waters sink into the deep ocean basins at high latitudes where the temperatures are cold enough to cause the density to increase.

Surface and deep water currents move water horizontally and vertically across the earth. The ocean has an interconnected system powered by wind, tides, the Earth’s rotation (Coriolis effect), the sun (solar energy), and water density differences. These all play major roles in how these currents affect the climate of the continents they flow by. The ***Coriolis effect*** is the result of Earth's rotation on weather patterns and ocean currents. It makes storms swirl clockwise in the Southern hemisphere and counterclockwise in the Northern Hemisphere. The ***global conveyor belt***’s circulation is the result of two simultaneous processes: warm surface currents carrying less dense water away from the Equator toward the poles, and cold deep ocean currents carrying denser water away from the poles toward the Equator.

**Warm Water and Cold Water Currents**

**Warm water currents** move away from the equator carrying warm water towards the poles. These currents have warm air above the water and causes the temperature of the continents they flow by to increase. The continents they flow by usually have warmer climates.

Cold water currents come from high latitude areas near the poles and move cold water towards the equator. Cold water has a greater density causing it to flow beneath the surface. The cold water replaces the warm water as it moves away from the poles and causes “upwelling”. ***Upwelling*** is a process by which currents bring cold water to the ocean surface.

Occasional cycle interruptions called *El Niño* and *La Niña* cause worldwide weather disasters. *El Niño* is a warm current off the normally cold waters west of South America. It is created by shifts in wind direction. During a winter season, *El Niño* produces the extremes of flooding and drought in various places around the globe. Its reverse, *La Niña,* often follows in the next season. It is a dramatic cooling of currents in the same region. This causes floods and drought in places where *El Niño* has created just the opposite conditions.