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Editorial

Major Disruption of the Region's Marine Ecosystem

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DESCRIPTION

Two properties of ocean water contribute enable circulation at great depths: temperature and salinity. When water cools, it becomes denser and sinks, displacing the water below. The more saline the water, the denser it is. Together, these properties create a process called thermohaline circulation, first discovered in 1960. Thermohaline circulation is constant in Polar Regions, where water at the surface cools, sinks, and is replaced with more water. The current is created and travels at depth until it finally upwells again during a return current to Polar Regions. Thermohaline circulation is responsible for slowly moving a huge volume of water all over the world. Carrying nutrients obtained from the ocean bottom, the upwelling process brings these nutrients to the surface, replenishing the requirements of ocean plant and animal life. Oceanic water also interacts with the atmosphere, exchanging enormous quantities of oxygen and CO_2. The ocean absorbs much of the sun's radiation as heat is delivered downward into the ocean's depths. Warm-water currents carry heat. When this heat is transferred to the atmosphere, air rises, creating regions of low. In contrast, cold-water currents cause high pressure systems. Both warm and cold currents affect the climate, but the reverse is additionally true. Some scientists believe that heating could clean up or weaken parts of the thermohaline current system. Some scientists speculate that an influx of freshwater from ice sheets and glaciers running into the North Atlantic could "freshen," and thus disrupt the sections of the thermohaline circulation. Since freshwater is less dense than salt water, significant amounts of freshwater entering the North Atlantic may lower the density of surface waters and stop the sinking motion that drives thermohaline circulation.

Several well-documented current systems greatly impact climates. The Gulf Stream is a warm current flowing north-eastward in the North Atlantic off the North American coast. It is a part of a clockwise-rotating gyre that begins with the westward-moving North equatorial current. Some consider the Florida current sweeping warm water up the Florida and Carolina coasts a part of this technique also. The Gulf Stream tends to change over time, at times even seeming to disappear and then reappear. Its winds carry warm, moist air to north Western Europe. In winter, the air over the North Atlantic west of Norway is quite 22°C (40°F) warmer than the typical for that latitude. The Gulf Stream is one among several western boundary currents. The Kuroshio in the north western Pacific is an example of another. Although these currents bring moderate and warm weather to the coasts, occasionally irregular events cause shifts in the currents and dramatic changes in weather. El Nino is the name for unusually warm weather conditions that occur periodically along the Pacific coast of South America, near the Equator. El Nino occurs when trade winds (persistent winds blowing from the west) weaken, which reduces the upwelling of cool, nutrient-rich water, kills plankton, a major food source for fish, and results in a temporary but major disruption of the region's marine eco-system. El Nino also causes an atypical increase in precipitation in many areas, some thousands of miles away from the Equator. It is unclear why the trade winds weaken, so El Nino is tough to predict.

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