

OCEAN EXPLORER

The ocean plays a fundamental role in shaping the climate zones we see on land. Even areas hundreds of miles away from any coastline are still largely influenced by the global ocean system.

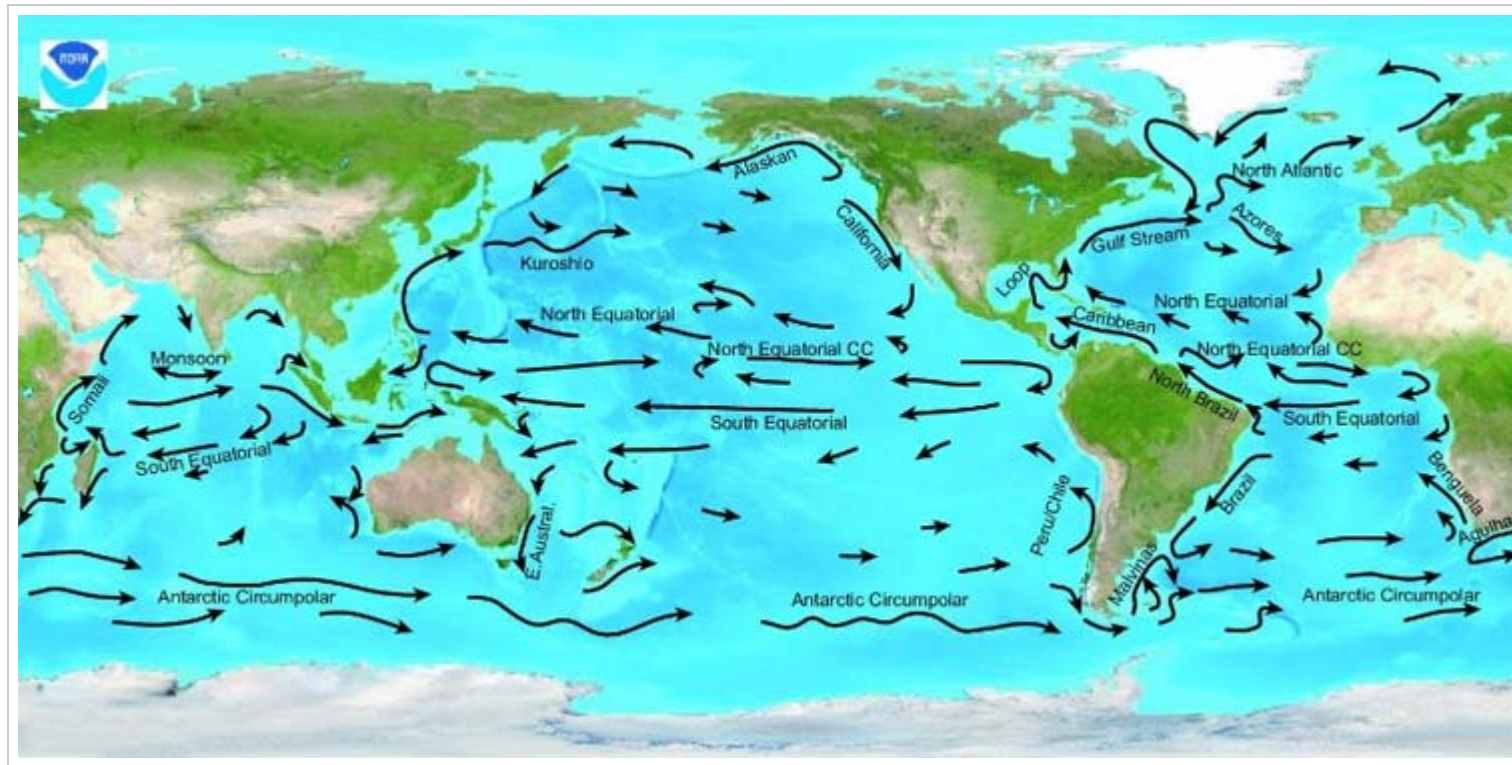


Illustration of major ocean currents throughout the globe. Ocean currents act as conveyor belts of warm and cold water, sending heat toward the polar regions and helping tropical areas cool off.

The world's ocean is crucial to heating the planet. While land areas and the atmosphere absorb some sunlight, the majority of the sun's radiation is absorbed by the ocean. Particularly in the tropical waters around the equator, the ocean acts as a massive, heat-retaining solar panel. Earth's atmosphere also plays a part in this process, helping to retain heat that would otherwise quickly radiate into space after sunset.

The ocean doesn't just store solar radiation; it also helps to distribute heat around the globe. When water molecules are heated, they exchange freely with the air in a process called evaporation. Ocean water is constantly evaporating, increasing the temperature and humidity of the surrounding air to form rain and storms that are then carried by trade winds, often vast distances. In fact, almost all rain that falls on land starts off in the ocean. The tropics are particularly rainy because heat absorption, and thus ocean evaporation, is highest in this area.

Outside of Earth's equatorial areas, weather patterns are driven largely by ocean currents. Currents are movements of ocean water in a continuous flow, created largely by surface winds but also partly by temperature and salinity gradients, Earth's rotation, and tides (the gravitational effects of the sun and moon). Major current systems typically flow clockwise in the northern hemisphere and counterclockwise in the southern hemisphere, in circular patterns that often trace the coastlines.

Ocean currents act much like a conveyer belt, transporting warm water and precipitation from the equator toward the poles and cold water from the poles back to the tropics. Thus, currents regulate global climate, helping to counteract the uneven distribution of solar radiation reaching Earth's surface. Without currents, regional temperatures would be more extreme—super hot at the equator and frigid toward the poles—and much less of Earth's land would be habitable.

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