

The Water Planet

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The world's oceans cover over 70% of the earth's surface. The oceans are a global biosphere, they receive energy from the sun, winds and tides and then distribute this energy around the globe. The oceans also transform chemical matter

from the ocean basins and continents and cycle this matter through living organisms and sediments.

The majority of people live comparatively close to the sea, the oceans provide recreation and food, receives waste and serve as a global highway for all of us. For those who live inland the oceans still influence their lives greatly as they supply the water necessary for life. They also store and release



much of the solar energy that powers the earth's atmospheric circulation, causing weather systems. By observing the vast temperature changes that take place in a desert and contrasting these with the more modest

changes in the coastal zone the ocean's importance as a climate buffer can also be seen.

By obtaining a better understanding of the oceans we can hope to predict changes in ocean circulation and climate and also learn enough to permit us to use this resource for transport and waste disposal without destroying it as a food source and recreation area.

Plants and Animals of the Sea



Phytoplankton can be called the grasses of the sea. Through photosynthesis these microscopic, single-celled plants nourish the entire food web of the oceans. The lives of all

animals that live in the sea with the exception of hydrothermal vent organisms depend on phytoplankton for energy and minerals. The global carbon cycle which regulates the temperature of the planet and oxygen production (which is essential to the metabolism of all aerobic organisms) are controlled by the actions of phytoplankton. These organisms play a major role in the maintenance of life on earth.



Ocean Currents

The wind blows across the surface of a body of water, the water then begins to move. Capillary waves are formed. If the wind continues larger waves appear,



momentum is transferred to the water and the water begins to move. Moving water is subject to the Coriolis force just like the wind, thus it begins to bend. In the Northern Hemisphere water is

deflected to the right of the direction of the wind and in the Southern Hemisphere, water is deflected to the left. The overall effect of this is that surface currents move at a 45 degree angle to the wind.

The differential heating of the earth gives rise to global wind patterns. These winds create permanent movements of water, currents, as they are persistent. The wind, the Coriolis effect and the positions of landmasses are responsible for the surface currents in the world's oceans.

Surface currents can be compared to the density driven deep water circulation.

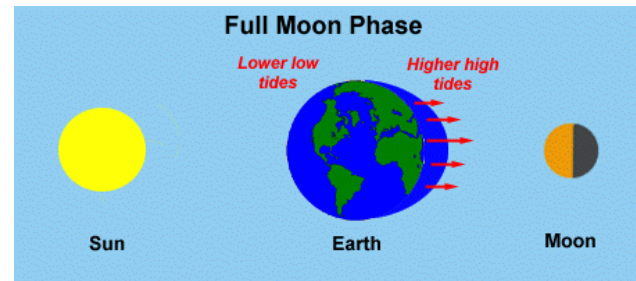


Surface currents are faster, wind driven and strongly effected by the Coriolis force,

whereas density currents are slow and result from the changes in seawater density which occurs as a result of changes in temperature and salinity.

Tides

Tides are the variations in sea level that are observed day to day. These changes in sea level are caused by the gravitational attraction of the sun and moon on the earth. Many factors influence the nature and intensity of the tides, these include the shape of the ocean basin and the Coriolis force. Together these factors create high and low tides. Depending on the position



of the earth with respect to the moon and the sun, differences in the height of the sea level during the high and low tides occur. This periodic change in height is known as the Spring Neap cycle.



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