Ocean heating

The ocean plays a central role in regulating the Earth's temperature by storing nearly all the excess heat trapped by greenhouse gases.

Heat moves around the ocean via a 'global conveyor belt' known as thermohaline circulation.

Thermohaline circulation consists of warm surface water flowing northward and cold deep water flowing southward, resulting in a net poleward transport of heat in the ocean.

It is estimated that 1 metre cubed of seawater takes 1,000 years to complete the cycle.

Seawater has the greatest heat capacity of Earth's climate system – it stores huge quantities of solar energy in the ocean and prevents the Earth's surface from overheating.

Changes and impacts

- In the past 50 years, the ocean has absorbed 93% of excess heat generated by greenhouse gas emissions.
- By 2100 it is predicted that average global ocean temperatures will have increased by between 1°C and 4°C.
- The heating of the ocean will disrupt the sinking of water in the polar regions – this could slow, or might even stop thermohaline circulation.
- Warming seawater increases in volume - sea level has risen more in the past 100 years than over the last 2,000 years.
- Over 50% of living coral has been lost in recent decades due to warming sea temperatures and ocean acidification.
- The warming of the ocean is leading to low oxygen conditions, known as hypoxia, which are harmful to most marine organisms.
- Warming waters are driving species to move in search of cooler waters, affecting natural ecosystems and fisheries.