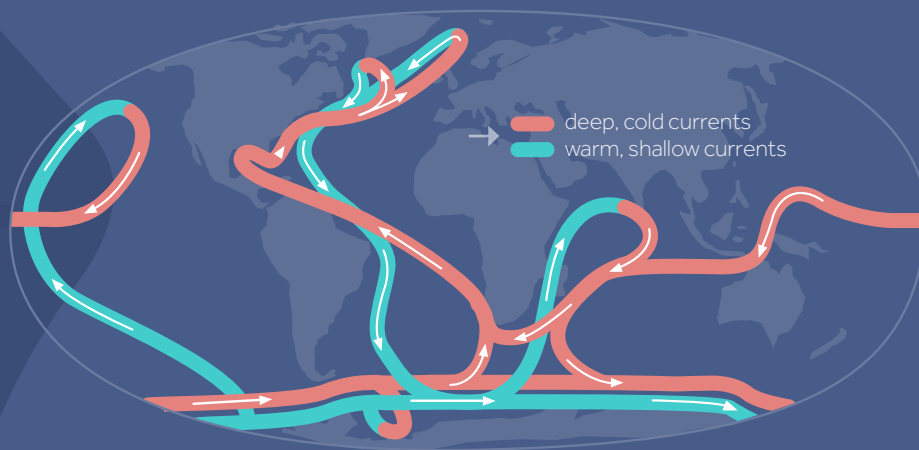


# Ocean heating

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**



Temperature (thermo) and salinity (haline) both **affect** the **density of seawater**

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**