# Increase in Ocean Water Temperature

## Why in news?

The world's oceans recorded extreme heating in 2022 (for the fourth year in a row) on account of anthropological activities like greenhouse gas emissions.

## What is Ocean Heat Content (OHC)?

- **Ocean Heat Content (OHC) -** It is the amount of energy absorbed by and stored in the oceans. It is measured in joules.
- **Heat capacity** - When sunlight reaches the earth, oceans absorb this energy and store it as heat.
- While the heat is first absorbed at the surface of the water body, some of it is eventually disbursed throughout.
- Water has a higher heat capacity than air, which means that it can store much larger amounts of heat.
- **GHG emissions** - These gases trap heat in a blanket around the earth, not allowing it to escape, thus raising the temperature of the earth's surface and leading to global warming.

*More than 90% of the excess heat accumulated in the earth's climate is deposited in the oceans.*

## How does it contribute to a climate crisis?

- As ocean temperatures rise, the glaciers that make up the polar ice caps are melting faster.
- Because of this rapid melting, sea levels causing problems such as
  - Erosion
  - Flooding
  - Habitat loss
  - Saltwater contamination of freshwater sources
  - Ocean acidification
- **Ocean Heat Content (OHC)** - OHC is an important indicator of climate change.
- Rising ocean temperatures strengthen the exchange of energy from oceans to the atmosphere by increasing the evaporation of water and thus the quantity of atmospheric moisture.
- This leads to changes in global precipitation patterns as well as temperatures.
- **Salinity -** In 2022, the salinity-contrast index (the difference between the salinity averaged over climatologically high-salinity and low-salinity regions) also reached its highest level on record in 2022.

- Salinity determines water density, which drives the circulation of water in oceans.
- The changes in salinity of oceans act as an indicator of a change in the water cycle.
- **Vertical stratification –** The temperature and salinity changes in oceans change the density of water and lead to vertical stratification.
- This stratification affects water mixing and the exchange of heat, carbon, oxygen and so on between layers.

*Since 1992, global sea levels have risen by about 11 millimetres.*

## What do studies indicate?

- **Warming** - Spatial maps of ocean heating in 2022, relative to the mean 1981-2010 conditions, show significant warming in most ocean areas.
- Atlantic and southern oceans are heating at a faster rate than other ocean basins.
- The data shows that heat has increased in equatorial regions over the past year.
- **Salinity** - Salinity trends for 2022 show that most of the Pacific and East Indian Oceans are currently undergoing a freshening
- However, mid-latitude Atlantic, the Mediterranean Sea and West Indian oceans are becoming more saline.

### References


1. The Hindu | World's oceans warmest on record in 2022
2. Let's Talk Science | Ocean Warming



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