

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.

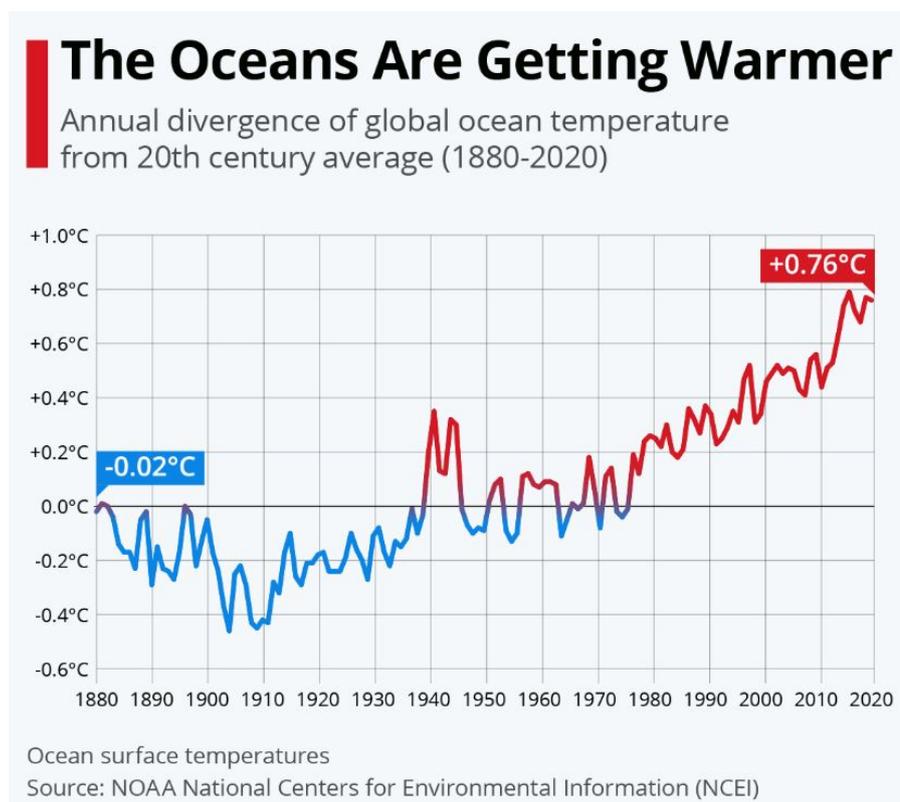
How does it contribute to a climate crisis?

- 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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