

A Few Minutes Series

Subject – Geography

Date – 25th January 2023

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Explained – World's Oceans warmest on record in 2022: study



Introduction

- More than 90% of the excess heat accumulated in the earth's climate is deposited in the oceans.
- For the fourth year in a row, the world's oceans recorded extreme heating in 2022 on account of anthropological activities like greenhouse gas emissions.
- The worrying trend continues even as the time to reverse climate crisis is running out.

Basics- Ocean Heat Content

- Ocean heat content (OHC) is the amount of energy absorbed by and stored in the oceans.
- 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.

- An increase in greenhouse gas emissions traps more energy from the sun in the atmosphere.
- OHC is an important indicator of climate change .

How does rising ocean heat content cause a climate crisis?

- 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.
- Indicator - When evaporation occurs, liquid water that is high in salinity is left behind. Similarly, during precipitation, freshwater is added to saline water. Over time, changes in salinity of oceans include large areas and act as an indicator of a change in the water cycle.
- Together, temperature and salinity changes in oceans change the density of water and lead to vertical stratification. This stratification hinders water mixing and consequently the exchange of heat, carbon, oxygen and so on between layers.

Findings of the study

- 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 increasing occurrences of heatwaves and droughts in the northern hemisphere are consistent with the intensive ocean warming in the mid-latitude Pacific and Atlantic oceans.



- The data shows that heat has increased in equatorial regions over the past year— both through advection in the ocean and anomalous surface exchanges (advection refers to the exchange of energy, moisture, microbes or solutes carried by the bulk motion of water.)
- Salinity trends for 2022 show that most of the Pacific and East Indian Oceans are currently undergoing a freshening, while mid-latitude Atlantic, the Mediterranean Sea and West Indian oceans are becoming more saline.

Conclusion

- The study also noted that the global long-term warming trend is so steady that annual records continue to be set with each new year, as noted in the last four years.

Application

- Prelims – Oceans and Heating
 - Mains
 - Essay
 - GS 1
 - GS 2
 - GS3
 - GS 4
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