



State of the Global Climate 2023: WMO

For Prelims: State of the Global Climate 2023: WMO, [World Meteorological Organization \(WMO\)](#), [Greenhouse gas \(GHG\)](#), Atlantic Meridional Overturning Circulation (AMOC).

For Mains: State of the Global Climate 2023: WMO, Environmental pollution and degradation.

[Source: DTE](#)

Why in News?

Recently, the [World Meteorological Organization \(WMO\)](#) has released its **State of the Global Climate 2023 report**, which highlights that the heat content of the world's oceans reached a record high in 2023.

- Additionally, **weather and climate hazards have compounded** concerns over [food security](#), **population displacements**, and impacts on vulnerable populations in 2023.

What are the Key Highlights of the Report?

- **Record-High Ocean Heat Content:**
 - The heat content of the **world's oceans reached a record high in 2023**, with the highest level of ocean heat content ever recorded.
 - This increase in ocean heat content is **attributed to anthropogenic climate drivers** such as [greenhouse gas \(GHG\)](#) emissions and changes in land use.
- **Contrasting Heating and Cooling Patterns in the North Atlantic:**
 - While the majority of the world's oceans are experiencing warming, relatively small regions, **such as the subpolar North Atlantic Ocean**, are experiencing cooling.
 - This cooling is linked to the slowdown of the **Atlantic Meridional Overturning Circulation (AMOC)**, a system of ocean currents.
 - AMOC is a system of **ocean currents that circulates water within the Atlantic Ocean**, bringing warm water north and cold water south.

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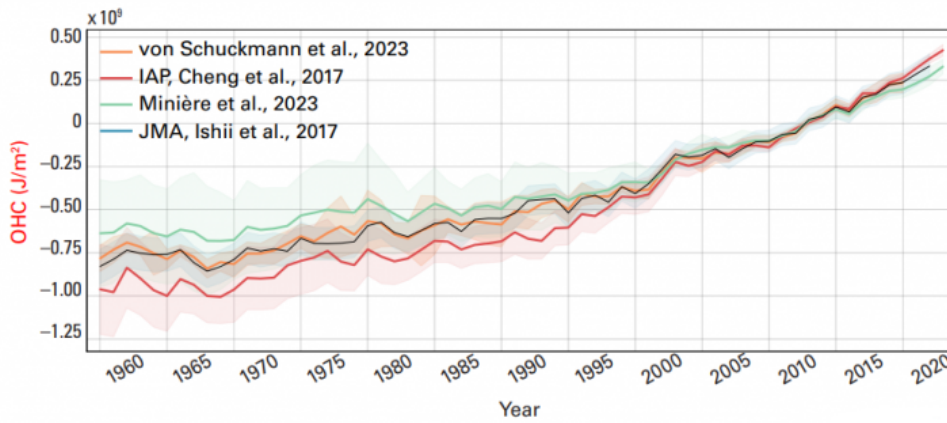


Figure 4. Global ocean heat content (OHC) anomalies relative to the 2005–2021 average for the 0–2000 m depth layer 1960–2023. Ensemble mean time series and ensemble standard deviation (2-standard deviations, shaded) updated from von Schuckmann et al. (2023) (orange). Updated from Cheng et al. (red) 2017. From Minière et al. 2023 (blue). Updated from Ishii et al. 2017 (green).

▪ **Global Average Sea-Surface Temperatures:**

- Global average [sea-surface temperatures \(SST\)](#) were at a record high in 2023, with several months breaking previous records by significant margins.
- Exceptional heating was observed in various regions including the eastern North Atlantic, the **Gulf of Mexico, the Caribbean, the North Pacific, and large areas of the Southern Ocean.**

▪ **Marine Heatwaves and Ocean Acidification:**

- The global ocean experienced an average daily [Marine Heatwave](#) coverage of 32%, well above the previous record of 23% in 2016.
- At the end of 2023, most of the global ocean **between 20° S and 20° N had been in heatwave conditions** since early November.
 - The end of 2023 saw a broad band of severe and extreme marine heatwave across the North Atlantic, with temperatures 3°C above average.
- These heat waves have negative repercussions for marine ecosystems and coral reefs. Additionally, [ocean acidification](#) has increased due to the absorption of carbon dioxide by the oceans.

▪ **Global Mean Near-Surface Temperature:**

- The global mean near-surface temperature in 2023 was 1.45 ± 0.12 °C above the **pre-industrial 1850–1900 average**, making it the **warmest year on record.**
- Every month from **June to December was record warm for the respective month**, and the long-term increase in global temperature is attributed to **increased concentrations of greenhouse gases** in the atmosphere.

▪ **Accelerating Glacial Retreat and Antarctic Sea Ice Loss:**

- Glaciers worldwide experienced the largest loss of ice on record, driven by extreme melt in both western North America and Europe.
- Antarctic sea ice extent reached an absolute record low for the satellite era, and Arctic sea ice extent remained well below normal.

▪ **Increased Frequency and Intensity of Extreme Weather Events:**

- Extreme weather events such as heatwaves, floods, droughts, wildfires, and tropical cyclones had major socio-economic impacts on all inhabited continents.
 - Flooding linked to extreme rainfall from **Mediterranean Cyclone Daniel affected Greece, Bulgaria, Türkiye, and Libya** with particularly heavy loss of life in Libya in September 2023.
 - Tropical **Cyclone Freddy in February and March 2023** was one of the world's longest-lived tropical cyclones with major impacts on Madagascar, Mozambique and Malawi.
 - Tropical [Cyclone Mocha](#) in 2023, was one of the most intense cyclones ever observed in the Bay of Bengal and triggered 1.7 million displacements across the sub-region from Sri Lanka to Myanmar and through India and Bangladesh, and worsened acute food insecurity.

▪ **Renewable Energy Surge:**

- Renewable energy generation surged in 2023, with renewable capacity additions increasing

by almost 50% from the previous year.

- This growth indicates the potential for achieving decarbonisation targets and transitioning to clean energy sources to mitigate climate change.

▪ **Climate Financing Challenges:**

- In 2021/2022, global [climate-related finance flows](#) reached almost USD 1.3 trillion, nearly doubling compared to **2019/2020 levels**. Even so, tracked climate finance flows represent only **approximately 1% of global GDP**.
- There is a large financing gap. In an average scenario, for a 1.5°C pathway, annual climate finance investments **need to grow by more than six times, reaching almost USD 9 trillion by 2030** and a further USD 10 trillion through 2050.
- Adaptation finance continues to be insufficient. Though adaptation finance reached an all-time high of USD 63 billion in 2021-22, the global adaptation financing gap is widening, falling well short of the **estimated USD 212 billion per year needed up to 2030 in developing countries alone**.

What were the Socioeconomic Impacts of Weather and Climate Hazards?

▪ **Food Insecurity:**

- Extreme weather events such as [floods](#), [droughts](#), and storms led to crop and **livestock production losses**, exacerbating **food insecurity globally**.
- The acute food insecurity more than doubled from 149 million people affected before the **Covid-19 pandemic to 333 million in 2023**.
 - This crisis is the largest in modern human history, indicating the profound impact of **climate-related events on food availability and access**.

▪ **Population Displacement:**

- Displacements occurred in regions like **Syria, Lebanon, Jordan, Iraq, Egypt, Somalia, and Pakistan** where communities were already vulnerable due to conflict or previous **climate-related events**.
- These displacements strain resources and **exacerbate social tensions, contributing to instability in affected regions**.
 - Displaced populations living in temporary shelters are particularly vulnerable to disease outbreaks, which can further strain healthcare systems already grappling with the impacts of climate-related disasters.

▪ **Economic Losses:**

- These losses include damage to infrastructure, agricultural productivity, and livelihoods.
- The destruction of agricultural areas due to flooding and storms, as well as the disruption of supply chains, hinders economic recovery and exacerbates poverty in affected regions.

▪ **Inequality:**

- Migration and displacement due to climate-related shocks and stresses affect people's livelihoods which affect various [Sustainable Development Goals \(SDG\)](#).
 - These include poverty (SDG 1) and hunger (SDG 2), direct threats to their lives and well-being (SDG 3), widening inequality gaps (SDG 10), limited access to quality education (SDG 4), water and sanitation (SDG 6) as well as clean energy (SDG 7).
 - Pre-existing gender and socio-economic **inequalities mean women and girls are among the worst affected, impacting SDG5**.

▪ **Global Economic Impact:**

- The **socioeconomic** impacts of climate-related disasters extend beyond individual countries and regions, affecting global economic stability.
- Rising food prices, disruptions to supply chains, and increased humanitarian aid expenditures strain **resources and contribute to economic uncertainty** on a global scale.

What is the World Meteorological Organization (WMO)?

- The **World Meteorological Organization (WMO)** is an intergovernmental organisation with a membership of 192 Member States and Territories.
 - India is a member of WMO.
- It originated from the **International Meteorological Organization (IMO)**, which was established after the **1873 Vienna International Meteorological Congress**.

- Established by the ratification of the WMO Convention on 23rd March 1950, WMO became the specialised agency of the UN for meteorology (weather and climate), operational hydrology and related geophysical sciences.
- WMO is **headquartered in Geneva**, Switzerland.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims:

Q. “Momentum for Change: Climate Neutral Now” is an initiative launched by (2018)

- (a) The Intergovernmental Panel on Climate Change
- (b) The UNEP Secretariat
- (c) The UNFCCC Secretariat
- (d) The World Meteorological Organisation

Ans: (c)

Mains:

Q. ‘Climate change’ is a global problem. How India will be affected by climate change? How Himalayan and coastal states of India will be affected by climate change? (2017)

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