

Mercator Ocean contributes to the WMO climate report, shows rapid ocean warming

The much-awaited state of the global climate annual report has been published by the World Meteorological Organisation (WMO), presenting an overview of the climate and weather conditions throughout the year 2022. Along with various meteorological and hydrological organizations worldwide, Mercator Ocean International contributed to the report, **revealing recent and rapid ocean warming**. The report also evaluates essential climate metrics including greenhouse gas emissions, temperature fluctuations, sea level increase, and ocean acidification.

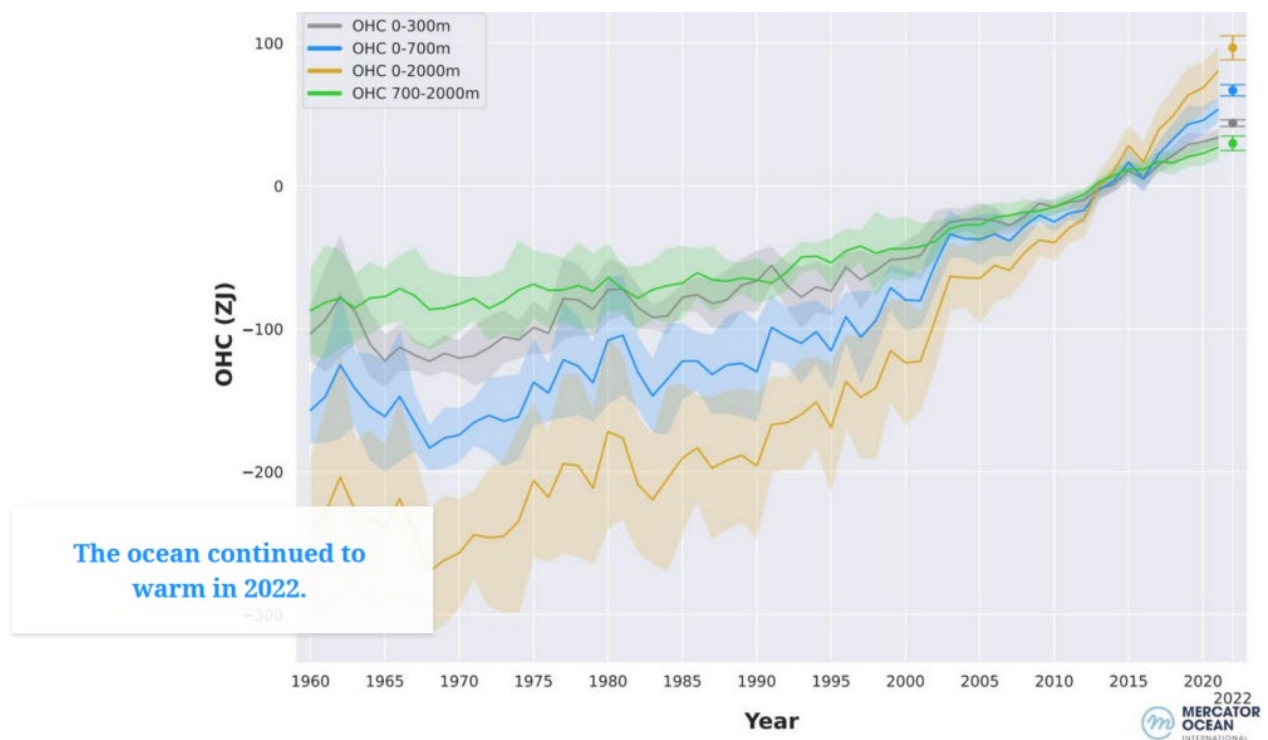


Figure 1: Ocean Heat Content in Zeta Joules: 1960-2021 ensemble mean time series and ensemble standard deviation (2-standard deviations, shaded) of global ocean heat content (OHC) anomalies relative to the 2005-2021 average for the 0-300m (grey), 0-700m (blue), 0-2000m (yellow) and 700-2000m depth layer (green). Note that values are given for the ocean surface area between 60°S-60°N and limited to areas deeper than 300m in each product. The ensemble-mean OHC anomalies for the year 2022 have been added as separate points, together with their ensemble spread, and is based on the 8 products. Source: WMO State of the Global Climate report 2022, contributed by Mercator Ocean International.

The ocean and sea ice are continued victims of global warming

The report finds that about 90% of the energy trapped in the climate system by greenhouse gases goes into the ocean and that ocean heat content, which measures this gain in energy, reached a new observed record high in 2022.

Global mean sea level continued to rise, reaching a new record high (since the beginning of satellite records in the early 1990s). The rate of global mean sea level rise has doubled between the period 1993-2002, which increased at a rate of 2.27 millimetres (mm) per year and the period 2013-2022, which saw a rate of 4.62 mm per year.

The top 2000 meters of the ocean experienced a sustained increase in temperature in 2022, which is predicted to persist in the coming years and result in irreversible changes over the next hundreds and even thousands of years. **The ocean heat content was the highest on record in 2022, surpassing the previous year's value by 17 ± 9 ZJ** (Zeta Joules) (see figure 1).

Verified across multiple datasets, the report found that ocean warming rates were **particularly high in the past twenty years**. Ocean warming for 0-2000 metres has been increasing at a rate of 0.7 ± 0.1 Watts per square metre from 1971-2022; however, this increased in 2006 to 2022 at a rate of 1.2 ± 0.2 Watts per square metre. Below 2000 metres, which is considered the deep ocean, is estimated to be warming at a rate of 0.0725 ± 0.1 Watts per square metre from 1992-2022, globally.

Dr. Karina von Schuckmann, oceanographer at Mercator Ocean International, is a contributing author to the report. She is specialized in ocean climate monitoring, specifically looking at the ocean's absorption of heat, a key element in quantifying and understanding global warming. Dr. von Schuckmann's research, Mercator Ocean expertise, along with Copernicus Marine Service data contributed to the WMO report key findings surrounding ocean warming.

Some of these findings were first released in a [recent paper](#) for which Dr. von Schuckmann was a lead author. This research was linked with the WMO co-sponsored Global Climate Observing System (GCOS) [\[1\]](#) and an international team of 70 researchers from 15 countries and was published earlier this month in the journal Earth System Science Data [\[2\]](#).

“We found that about 89% of the excess anthropogenic heat built up in the Earth system over the past six decades has been absorbed by the Ocean. Additionally, over the last 15 years, the accumulated heat in the ocean has risen by nearly 50% in comparison to the amount accumulated over the last 50 years. This has led to sea level rise, alterations in ocean circulation patterns, weather phenomena, as well as numerous negative impacts on marine ecosystems. This has widespread implications for us as humans as it touches many aspects of our lives from food security to world economies,” explains Dr. Karina von Schuckmann, oceanographer at Mercator Ocean International, summing up some of the key findings of the paper.

[Read more on Mercator Ocean's contribution](#)

Important Links

- [WMO State of the Global Climate 2022: Mercator Ocean expertise contributes](#)

- [Official press release: WMO annual report highlights continuous advance of climate change](#)
- Mercator Ocean Analysis: [Global sea surface temperatures reach record high](#)
- [Global Warming and the Ocean: a new study led by Mercator Ocean International expert sheds light on the Earth's Energy Imbalance](#)
- [Climate change: recent, rapid ocean warming alarms scientists](#), BCC article highlighting the research of MOi oceanographer, Karina von Schuckmann

About Mercator Ocean International

Mercator Ocean International (MOi) is a non-profit organisation in the process of becoming an intergovernmental organisation and is committed to building a science-based [Digital Ocean](#) for supporting the conservation and the sustainable use of our oceans and seas.

MOi delivers an operational digital description of marine environments worldwide and helps organisations implement community and institutional programmes, projects and initiatives. Mercator Ocean continuously fosters interactions between scientists, policymakers, public and institutional decisionmakers as well as civil society.

At the One Ocean Summit organised by France in Brest in February 2022, six European states (France, Italy, Norway, Portugal, Spain, and the UK) showed commitment to developing European oceanographic excellence by transforming MOi into an intergovernmental body by 2025 through the "[Brest Declaration](#)".

Led by Director-General Pierre Bahurel, MOi is based in Toulouse, France and has over 100 employees.

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