WORLD METEOROLOGICAL ORGANIZATION

The World Meteorological Organization

Overview

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Had you ever heard of WMO before today?

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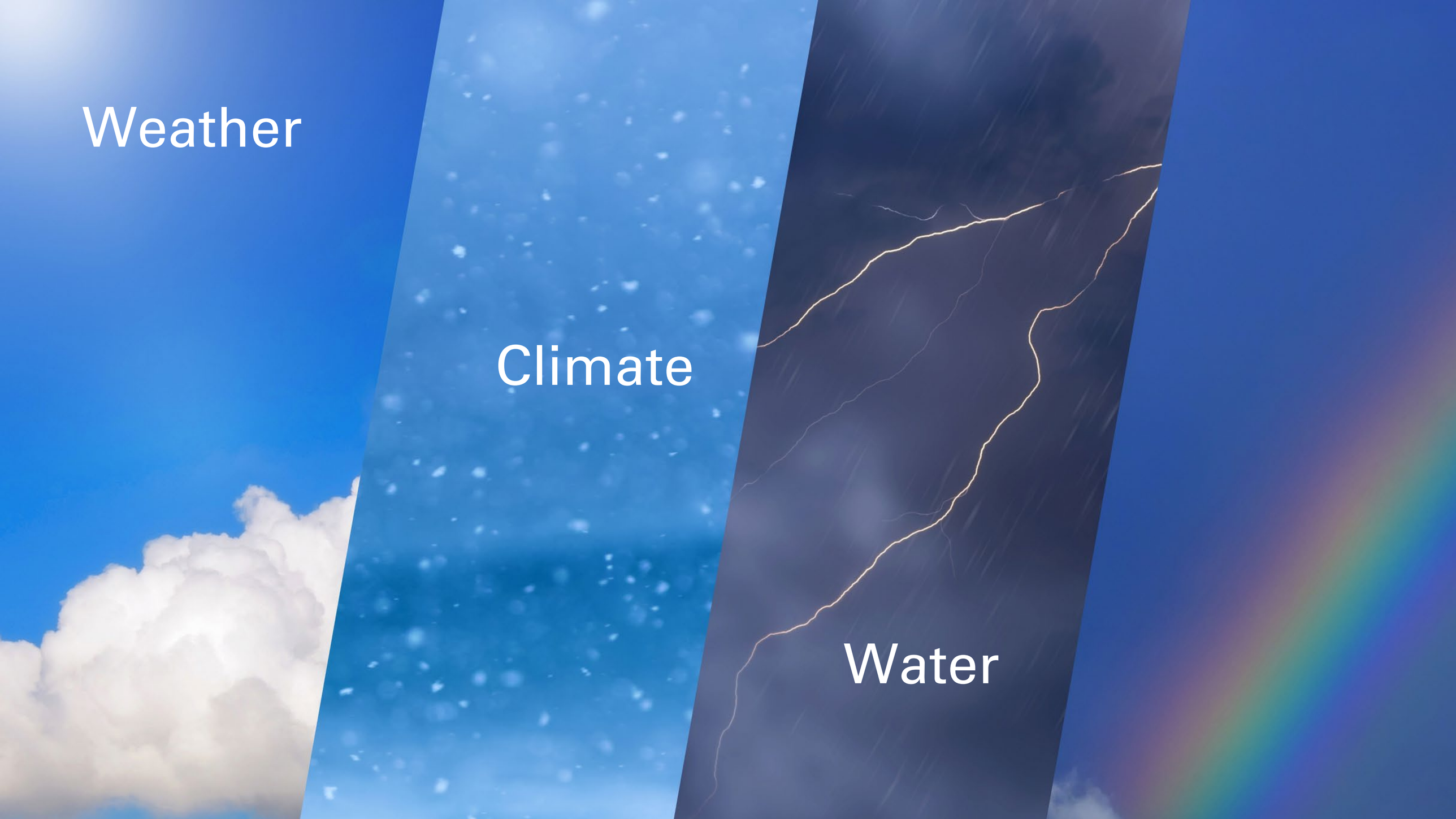
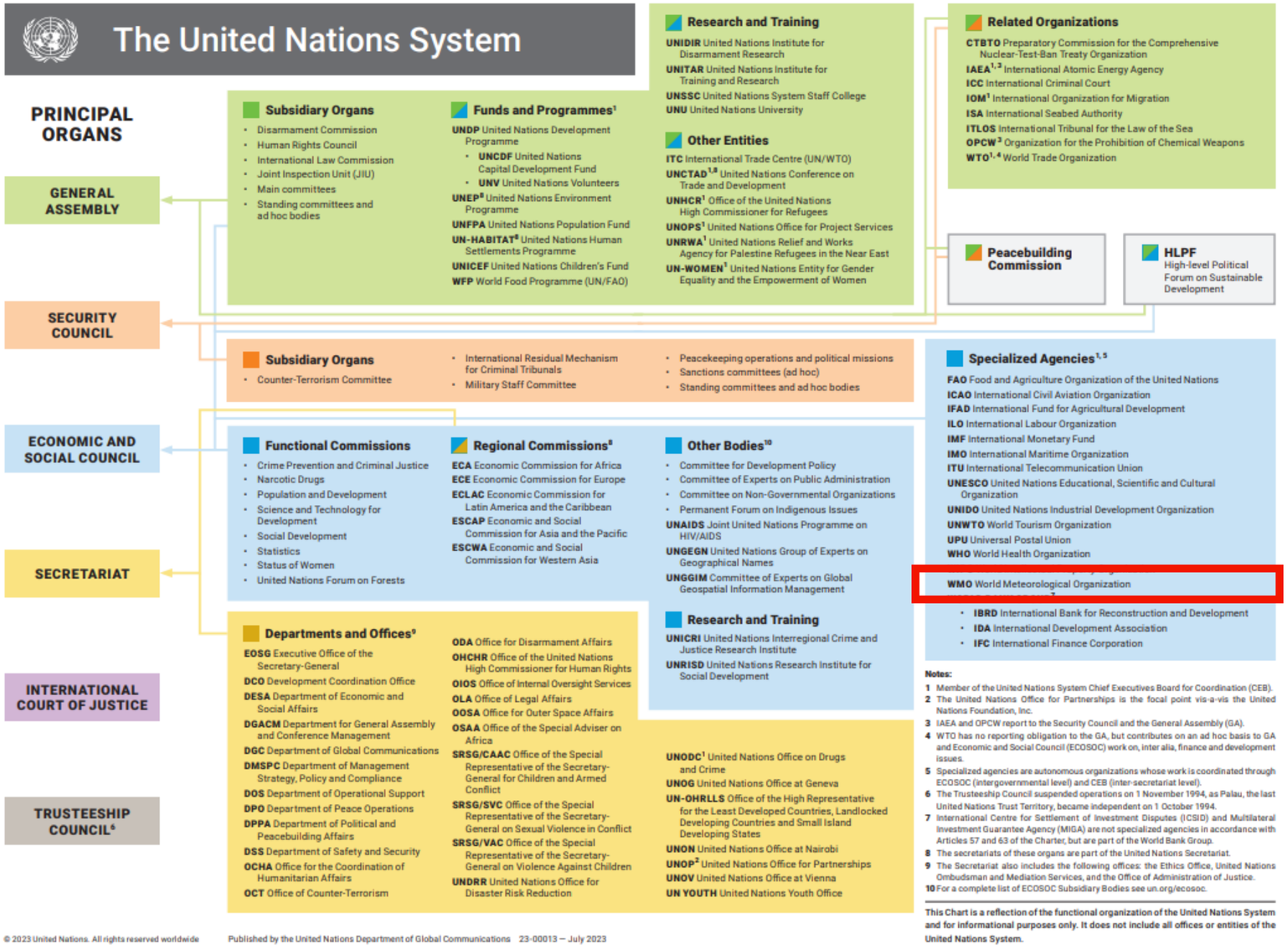

Weather
Climate
Water

WMO & the UN System



- The International Meteorological Organization (IMO) was founded in 1873.

- Welcomed into the UN Systems as a specialized agency of the Economic & Social Council in 1950.

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Who governs WMO? (Who are our "Members"?)

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What does WMO do?

WMO Strategic Plan at a Glance

VISION

A world where **all nations**, especially the **most vulnerable**, are **more resilient** to the **socioeconomic impact** of **extreme weather, climate, water** and other **environmental events**, and **empowered** to boost their **sustainable development** through the **best possible weather, climate and water services**

OVERARCHING PRIORITIES

Preparedness for, and reducing loss of life, infrastructure and livelihood from hydrometeorological extremes	**Climate-smart decision-making** to build resilience and adaptation to climate risk	**Socioeconomic value** of weather, climate, hydrological and related environmental services

CORE VALUES

Accountability for results and transparency	Collaboration and partnership	Inclusiveness and diversity

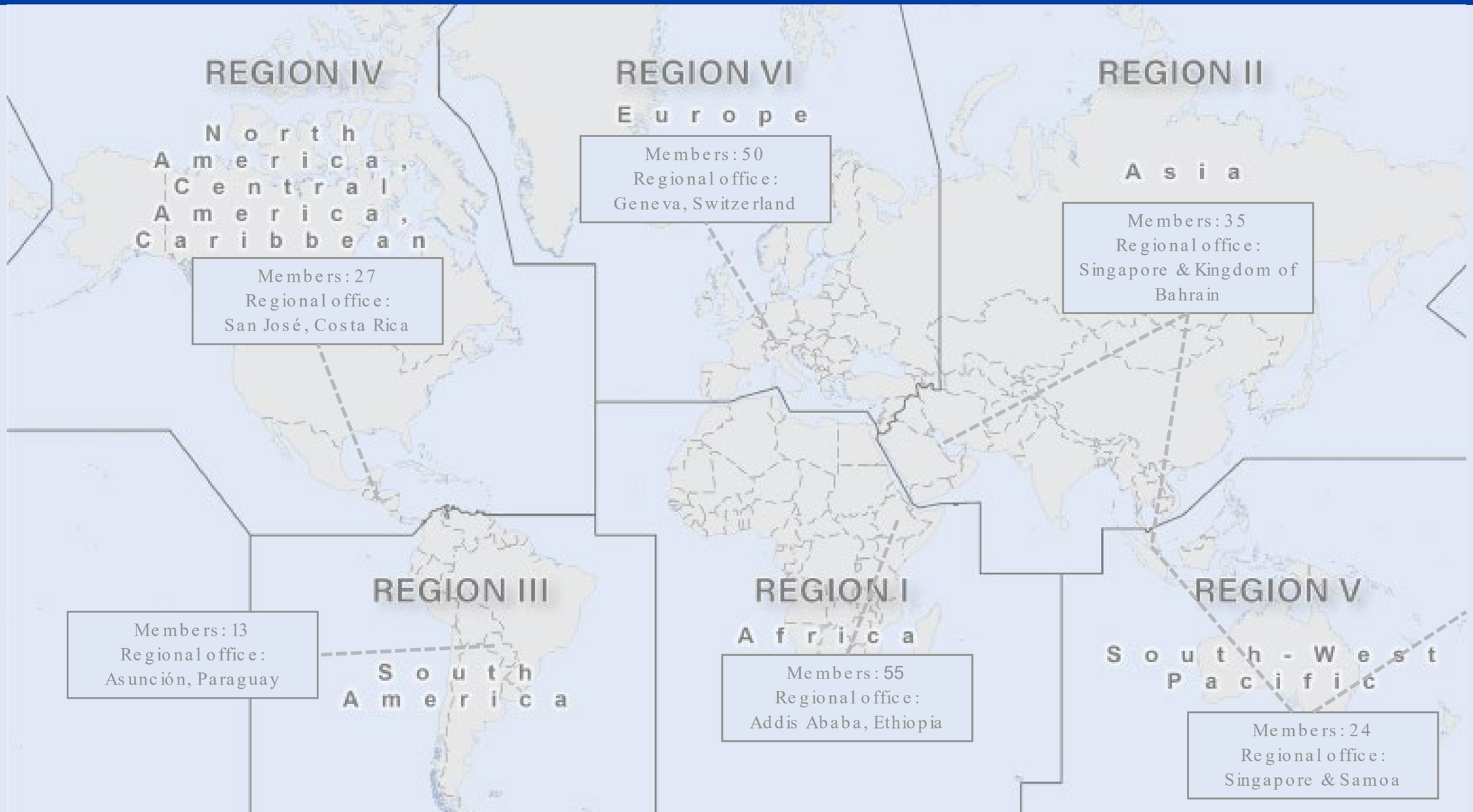
LONG-TERM GOALS

1 Services	2 Infrastructures	3 Science and Innovations	4 Member Services	5 Smart Organization
Better serve societal needs	**Enhance Earth system observations and predictions**	**Advance targeted research**	**Close the capacity gap**	**Strategic realignment of WMO structure & programmes**

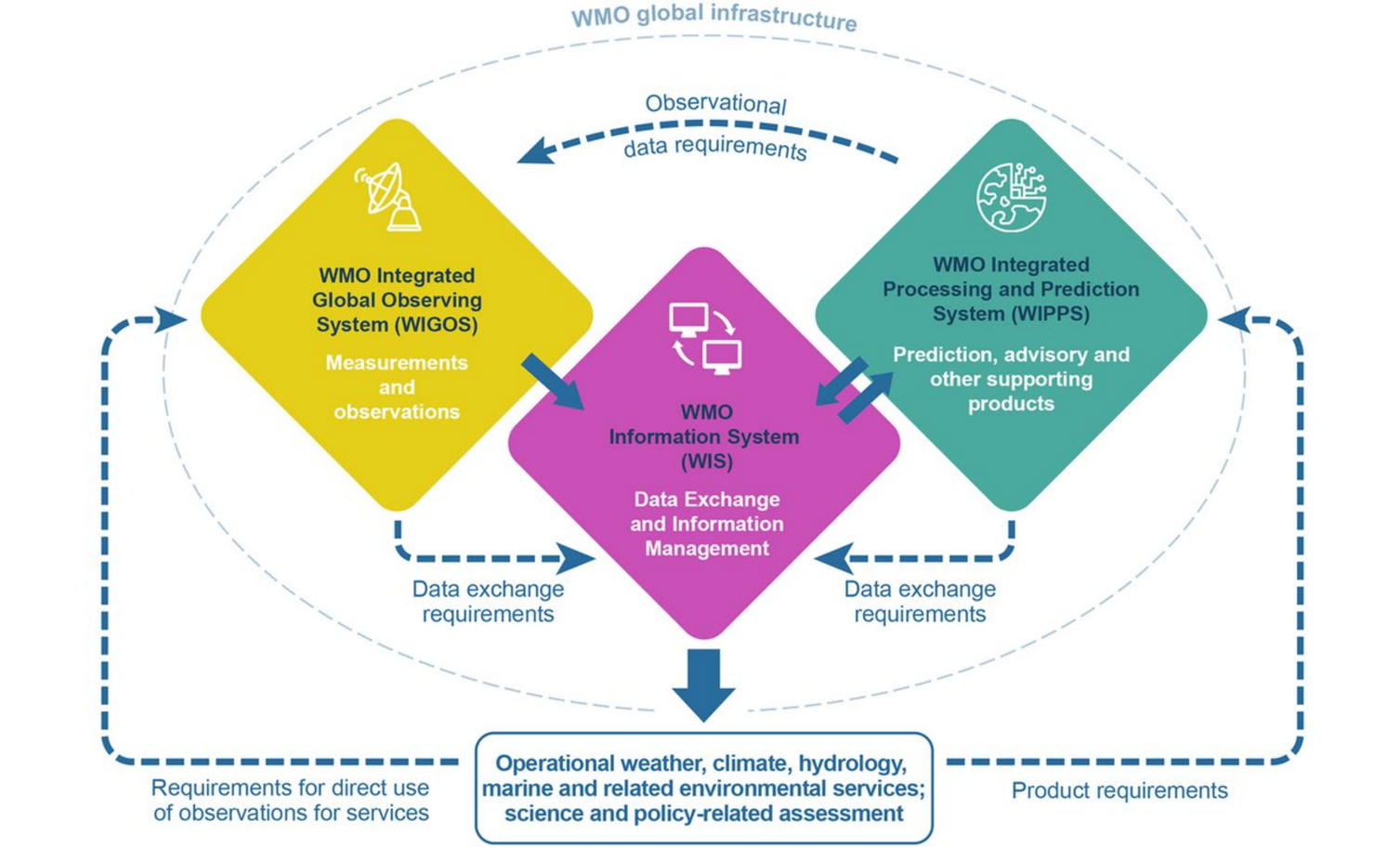
STRATEGIC OBJECTIVES

1. National multi-hazard **early warning/alert systems** 2. Policy- and decision-supporting **climate** information & services 3. **Hydrological** services 4. Decision-supporting **weather** information & services 5. Changes in the **cryosphere** and downstream impacts	1. **Acquisition** of Earth system observation data (WIGOS) 2. **Access to, exchange and management** of Earth system observation data and products (WIS) 3. Access to and use of **numerical analysis** and Earth system **prediction products**	1. Advance **scientific knowledge of the Earth system** 2. Enhance **science-for-service value chain** to improve predictive capabilities and analysis 3. Advance **policy-relevant science**	1. Enable developing countries to **provide and utilize essential services** 2. Develop and sustain **core competencies and expertise** 3. Scale up **partnerships for investment** in sustainable cost-efficient infrastructure and service delivery	1. Optimize WMO **constituent body structure** 2. Strategic **partnerships** 3. Advance **equal, effective** and **inclusive participation** 4. **Environmental sustainability**

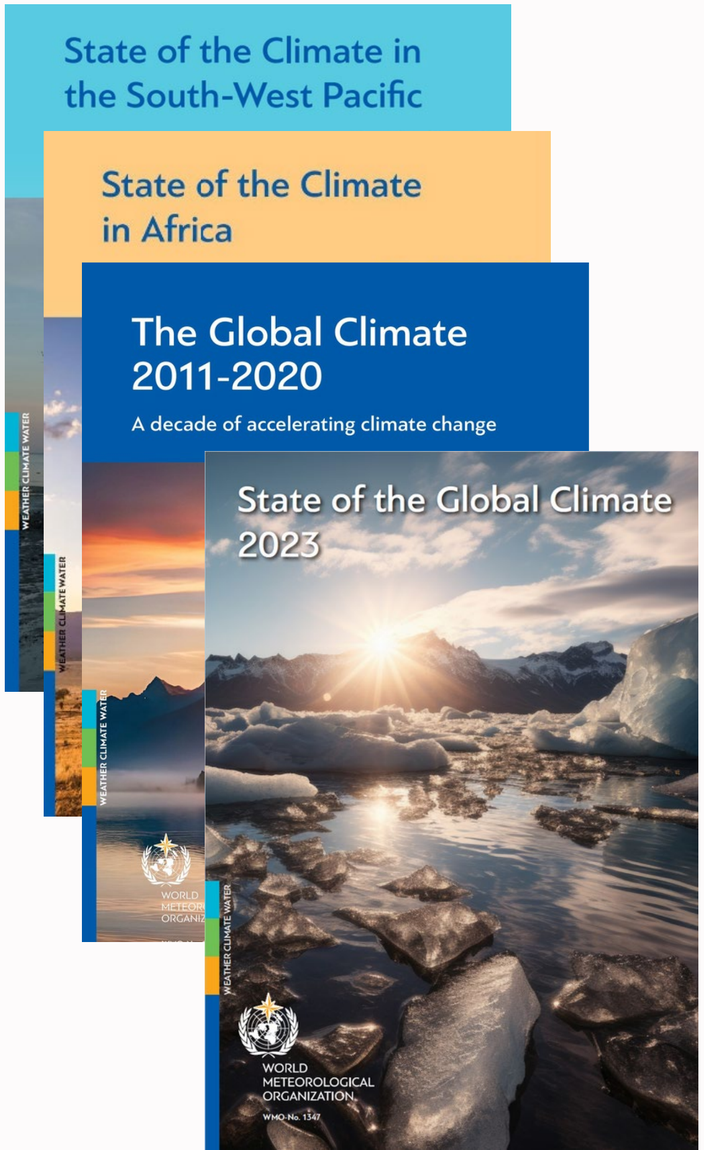
Member Services

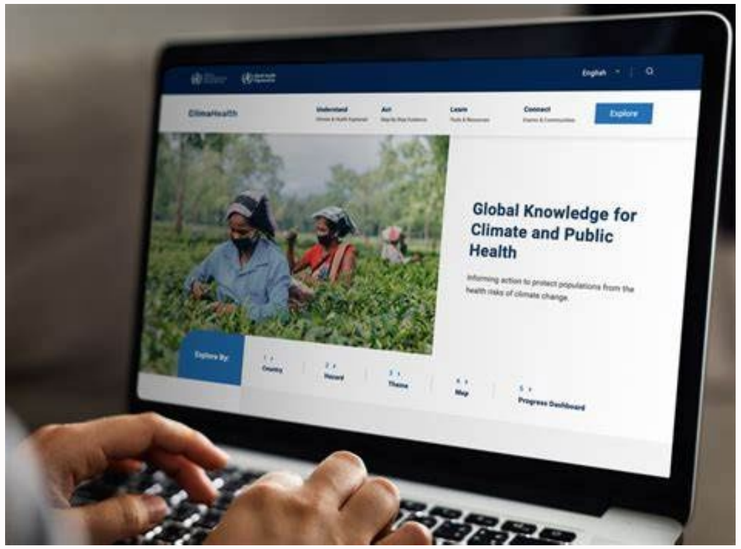


Infrastructure



Climate Services



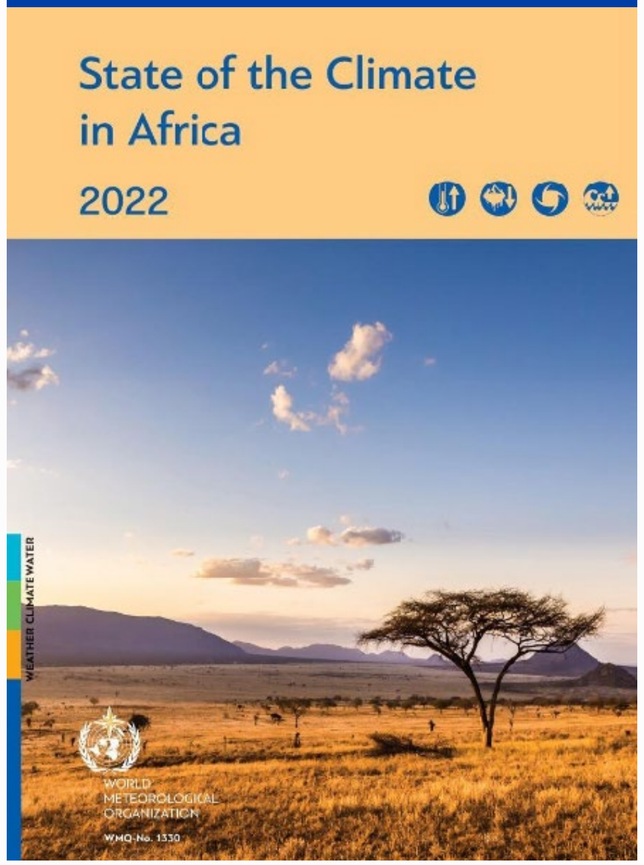


Early Warnings for All

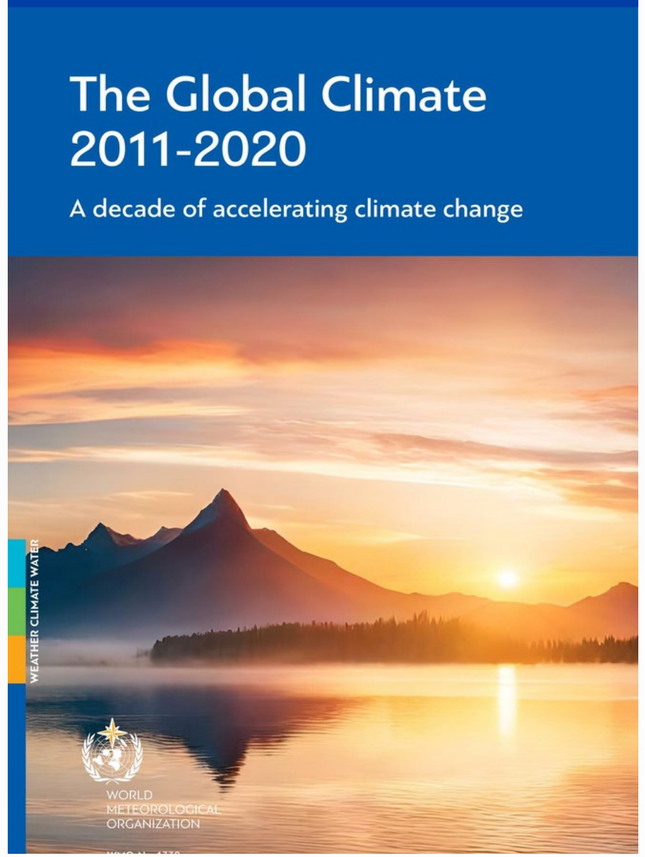
State of the Climate

Global

Regional



Multiyear



Report Structure

Temperature and Energy	Atmospheric Composition	Ocean and Water	Cryosphere
Surface Temperature	Atmospheric CO_2	Ocean Acidification	Glaciers
Ocean Heat		Sea Level	Arctic and Antarctic Sea Ice Extent

Key climate indicators

Extreme Events

Impacts & Policy

Report Structure

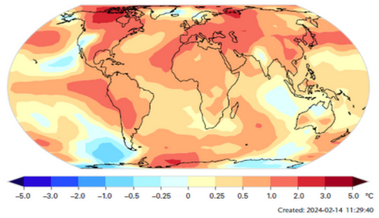


Figure 3. Mean near-surface temperature anomalies (difference from the 1991–2020 average) for 2023.
Source: Data are the median of the six datasets indicated in the legend. See Data set and methods for more details

likely explains some of the rise in temperature from 2022 to 2023. However, some areas of unusual warming, such as the North-East Atlantic (see Figure 3) do not correspond to typical patterns of warming or cooling associated with El Niño. Other factors, which are still being investigated, may also have contributed to the exceptional warming from 2022 to 2023, which is unlikely to be due to internal variability alone.[9]

The average global temperature over the past 10 years, from 2014 to 2023, was 1.20 ± 0.12 °C above the 1850–1900 average, making the past 10 years the warmest among all 10-year periods on record in all six datasets.

Between late spring in the northern hemisphere and the end of 2023, global average sea-surface temperatures (SSTs) were also at a record observed high. The records for July, August and September were each broken by a large margin (between 0.21 °C and 0.27 °C). Exceptional warmth relative to the 1991–2020 baseline was recorded in the eastern North Atlantic, the Gulf of Mexico and the Caribbean, the North Pacific extending eastward from the Sea of Japan, the Arabian Sea and large areas of the Southern Ocean (see Figure 3; see also Marine heatwaves and cold spells).

Observed global land temperature anomalies reached record levels in July and August, somewhat later than for SSTs, but the September average was also a record by a large margin of 0.53 °C–0.71 °C. The second-widest margin by which a record has been broken in the past 60 years was 0.22 °C–0.27 °C in September 2002. In 2023, most land areas were warmer than the 1991–2020 average (see Figure 3). Unusual warmth was reported across large areas of northern Canada, the southern United States of America, Mexico and Central America, as well as large areas of South America. Large areas from Central Asia to western Europe, including parts of North Africa and the Arabian Peninsula, were also unusually warm, as were South-East Asia and Japan.

OCEAN

Increasing human emissions of carbon dioxide (CO_2) and other greenhouse gases cause a positive radiative imbalance at the top of the atmosphere. This imbalance leads to the accumulation of energy in the Earth system in the form of heat, which is driving global warming.[10,11] The ocean, which covers about 70% of the Earth's surface, absorbs heat and CO_2, which can act to slow the rate of warming in the atmosphere. However, the heat absorbed by the ocean leads to ocean warming, which, together with the melting of ice on land, raises sea levels, while the absorption of CO_2 leads to ocean acidification. Warming waters, sea-level rise and ocean acidification all have significant effects on the ocean, as well as on the plants and animals that live in it and the people who rely upon it for their livelihoods.

OCEAN HEAT CONTENT

In 2023, ocean heat content reached its highest level in the 65-year observational record.

About 90% of the energy that has accumulated in the Earth system since 1971 is stored in the ocean. As energy has accumulated in the ocean, it has warmed, and global ocean heat content has increased (see Figure 4).

According to a consolidated analysis based on several individual datasets, the upper 2 000 m of the ocean continued to warm in 2023.[12] It is expected that warming will continue – a change that is irreversible on centennial to millennial timescales.[13,14] Ocean heat content in 2023 was the highest on record, exceeding the 2022 value by 13 ± 9 ZJ (see Figure 4)[15] consistent with estimates published in early 2024.[16]

All datasets agree that ocean warming rates show a particularly strong increase in the past two decades. The rate of ocean warming for the 0–2 000 m layer was 0.7 ± 0.1 W m^{-2} from 1971 to 2023 on average, but 1.0 ± 0.1 W m^{-2} from 2005 to 2023 (the period covered by the Argo programme). The steady increase in ocean warming rates[17,18] is seen consistently in direct estimates from in situ observations, indirect estimates from remote sensing and direct estimates of the net flux at the top of the atmosphere as measured by satellites.[19] Different drivers of this change are discussed in literature, including a change in anthropogenic climate forcing[20] and natural variability.[21] Deep-ocean global warming below 2 000 m depth is estimated to be 0.07 ± 0.03 W m^{-2} from 1992 to 2022.[22]

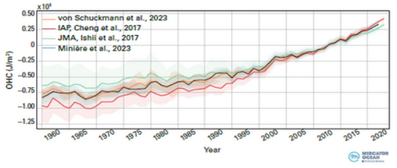
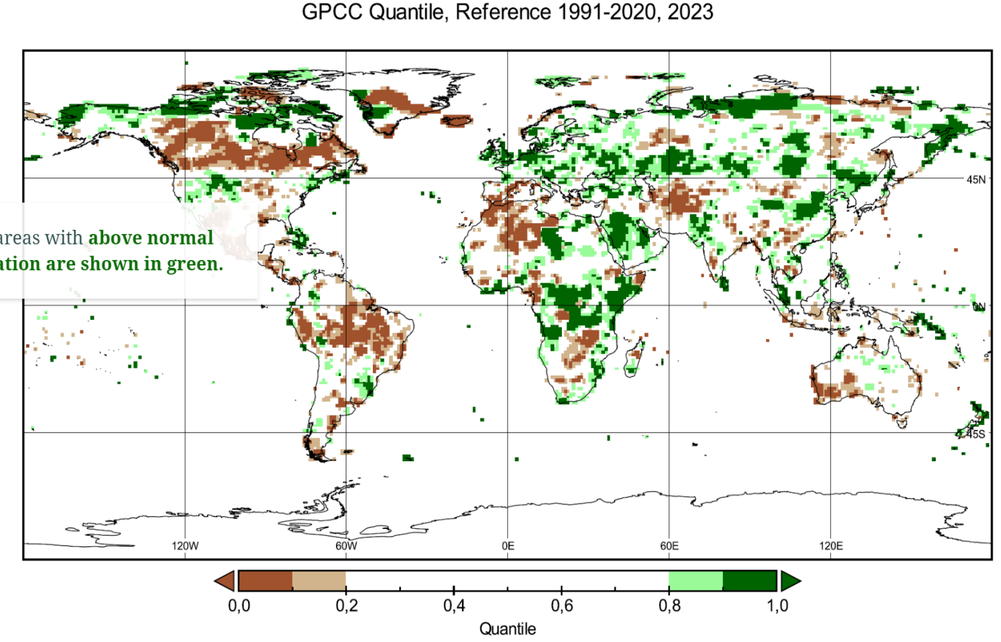


Figure 4. Global ocean heat content anomalies relative to the 2005–2021 average for the 0–2 000 m depth layer 1960–2023 (orange). Ensemble mean time series and ensemble standard deviation (2-standard deviations, shaded) updated from Schuckmann et al., 2023 (red); Cheng et al., 2017 (green); Minière et al., 2023 (light blue); and Ishii et al., 2017 (dark blue).
Source: Mercator Ocean international.

Physical Report

In 2023, areas with **above normal precipitation are shown in green.**



Digital Resources

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Approximately how much warming does the ocean absorb?

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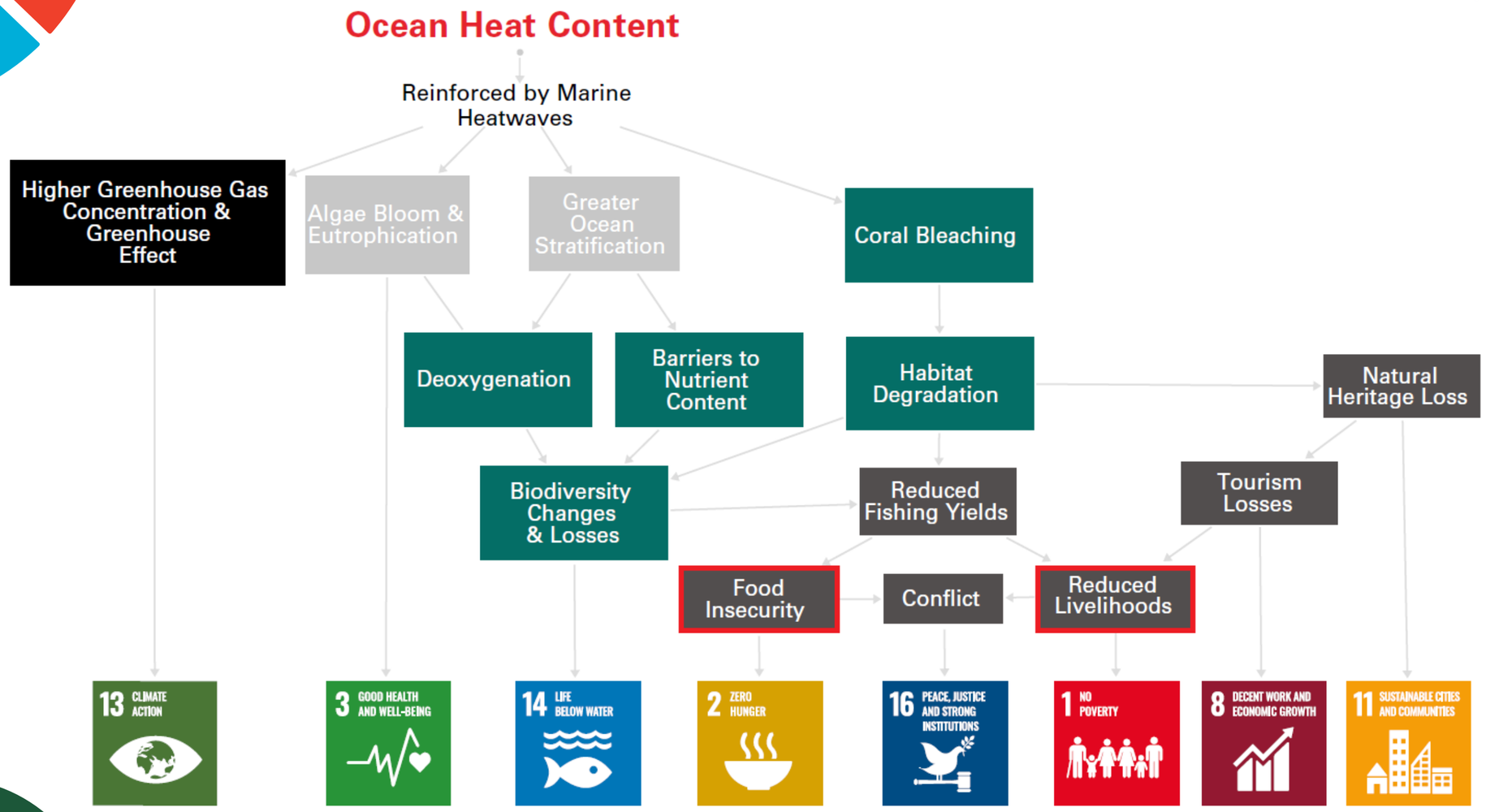

Figure 14. Associated risks of increased OHC and the SDGs

THANK YOU

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Datasets

State of the Global Climate

Regional & Decadal SoC