

Information at a glance on:

- State of the Climate**
 - Greenhouse Gases
 - Global Temperature
 - Approaching 1.5°C
 - Sea ice extent
 - Glacial mass
 - Ocean heat content
 - Sea level
 - Precipitation
 - State of global water
 - Extreme events
- Climate Action**
 - State of Climate Services
 - Early Warning for All
 - Renewable Energy

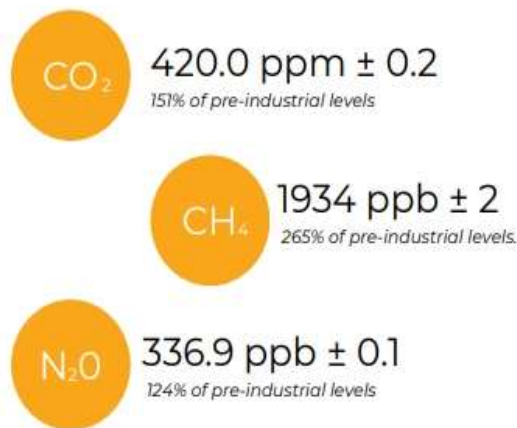
主要なグラフ等のインデックス
(THの個人的メモ)

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Greenhouse gases reached record observed levels in 2023.

Real time data indicate that they continued to rise in 2024.

Concentrations of the three key greenhouse gases in the atmosphere (WMO 2024a) – carbon dioxide, methane, and nitrous oxide – reached record high observed levels in 2023, the last year for which there are global consolidated figures. Measurements from individual locations, such as Mauna Loa and Kennaook/Cape Grim, suggest that concentrations of the three greenhouse gases will be higher again in 2024. The atmospheric concentration of carbon dioxide (CO₂) has increased from around 278 ppm in 1750 to the current level of 420 ppm, an increase of 51%. The average CO₂ growth rate during the past decade was 2.4 ppm per year. Emissions from fossil fuels have been the largest source of human emissions since the 1950s. Global averaged methane (CH₄) concentrations increased from 729 ppb during preindustrial time to 1934 ppb in 2023, which represents an increase of 165%. Nitrous oxide (N₂O) concentration increased from 270 ppb in 1750 to 336.9 ppb in 2023, which represents 24% increase.



大気中の温暖化ガスは、**2023**年には、記録的な高濃度となった。

2 酸化炭素 : 420.0 ppm

(産業革命以前の **157 %**)

メタン : 1934 ppb

(同 **265 %**)

一酸化 2 窒素 : 336.9 ppb

(同 **124 %**)

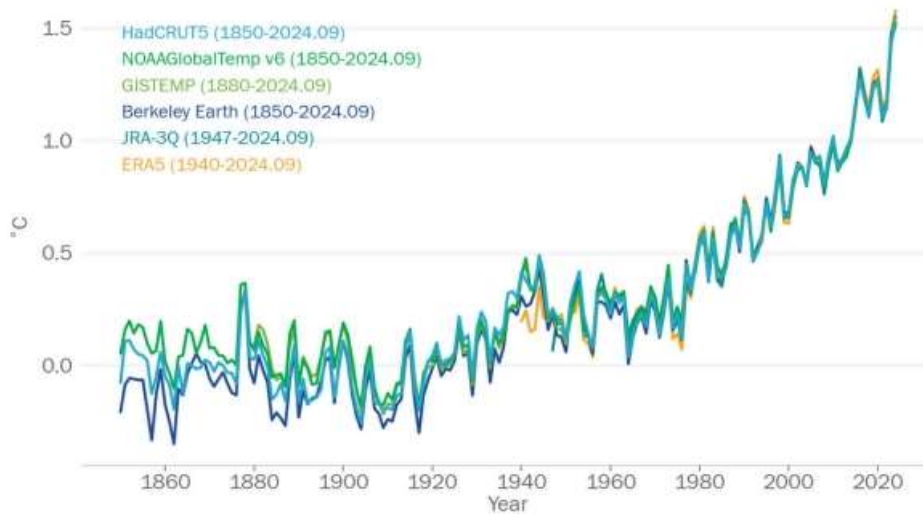


Figure 1: Annual global mean temperature anomalies (relative to 1850-1900) from 1850 to 2024 from six datasets. The 2024 average is based on data from January-September.

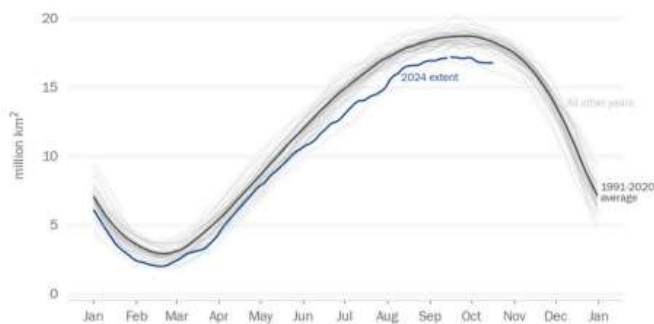
January-September 2024 was 1.54±0.13°C above the pre-industrial average.

Following a prolonged La Niña, which is typically associated with a temporary reduction in global temperatures, from late 2020 to the early months of 2023, a strong El Niño event boosted global temperature to record observed levels later in 2023 and through 2024. For 16 consecutive months (June 2023 to September 2024), the global mean exceeded anything recorded before 2023 and often by a wide margin. 2023 and 2024 will be the two warmest years on record, with the latter being on track to be the warmest, making the past 10 years, 2015 to 2024, the warmest ten years in the 175-year observational record.

2024年1-9月の平均気温は、産業革命以前と比して、1.54±0.13度高くなっていた。

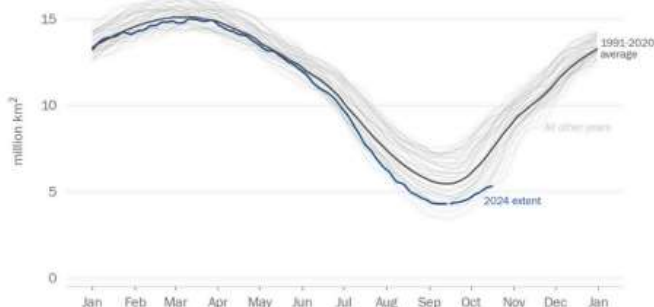
(メモ) パリ協定の努力目標は、西暦2100年時点で、1.5度となっており、すでにこれを超えていることが分かる。

Antarctic and Arctic sea ice extent in 2024 have both been well below average.



Antarctic sea-ice extent reached its annual minimum of 2.0 million km² on 20 February, the second lowest extent in the satellite record (1979-2024), the lowest being in 2023. The annual maximum Antarctic sea-ice extent was reached around 19 September, with an extent of 17.2 million km². The 2024 maximum is the second lowest extent in the satellite record, the lowest being in 2023.

Figure 3: Daily Antarctic (top) and Arctic (bottom) sea ice extents in 2024 compared to the average and historical records since 1978. Source: National Snow and Ice Data Center



Arctic sea-ice extent reached its annual maximum of 15.01 million km² on 14 March, slightly below the long-term average (1991-2020) of 15.2 million km². On 11 September, Arctic sea-ice likely reached its annual minimum extent of 4.3 million km². The 2024 minimum is the seventh lowest in the satellite record.

南極(上方のグラフ)、北極(下方のグラフ)で示されているように、海氷面積は、近年、両者とも小さい値となっていることが多い。

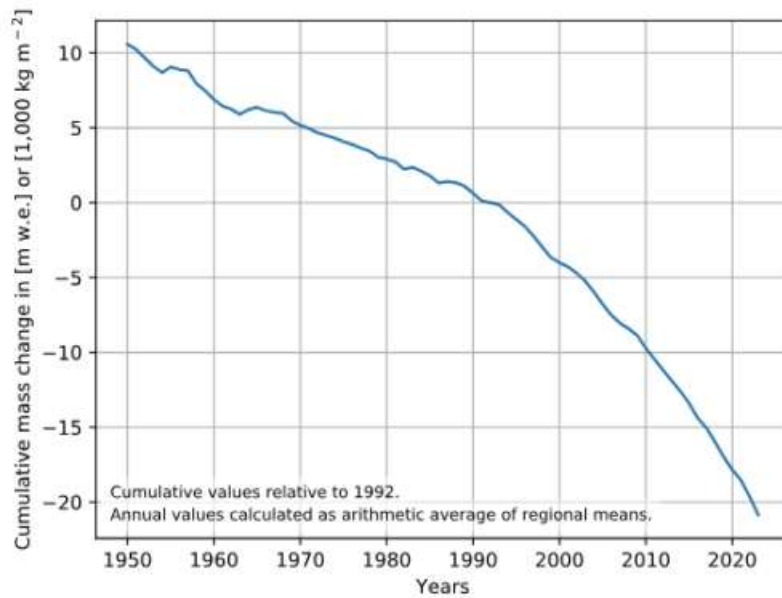
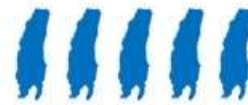


Figure 4: Global cumulative mass change of reference glaciers since 1950. 0 = 1992. Shown in meter water equivalent. Source: World Glacier Monitoring Service.

Glacier loss is accelerating. In 2023, glaciers lost an observed record 1.2 meter water equivalent of ice.



That's approximately 5 times as much water as there is in the Dead Sea.

(陸上)氷河の喪失が加速している。**2023**年には、**1.2 m**の水量に相当する喪失が発生した。

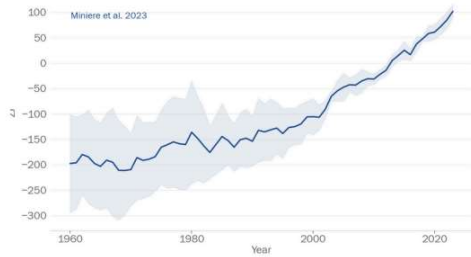


Figure 5. Ocean heat content from 1960-2023, shown as a difference from the 2005-2020 average. Source: Miniere et al. 2023

Ocean heat content in 2023 was the highest on record. Preliminary data show 2024 has continued at comparable levels.

18X

The ocean absorbed around 3.1 million TWh of heat in 2023, 18x the world's total energy consumption.

海洋に含まれている熱量が、**2023年**には歴史上最大となった。これまで得られている予備的データによれば、**2024年**もこの傾向が続いている。

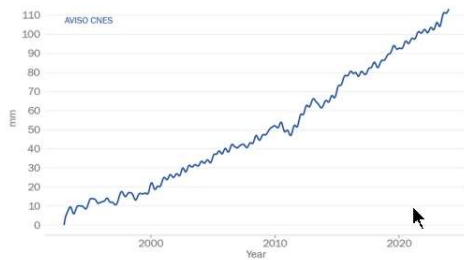


Figure 6. Global mean sea level from 1993-2023. Source: AVISO CNES

Sea level rise is accelerating. From 2014-2023, global mean sea level rose at a rate of 4.77 mm per year.

2X

That's more than double the rate from 1993-2002 (2.13 mm/yr).

2014-2023年の間、海水面の上昇が観測されており、上昇速度の**全球平均**は、**年4.77 mm**であった。

Below average precipitation

amounts were observed in northern and central South America, Northwest Africa as well as central southern Africa, Northwest and Northeast North America, Southeast Europe, northern Asia and on Pacific Islands.

Unusually high precipitation

was recorded in the Sahel region, around the Greater Horn of Africa and parts of eastern Africa. Furthermore, some spots at the eastern coast of South America, some of the Caribbean Islands, and some spots in North America received exceptional more rain than on the long-term mean. An unusual high precipitation excess was also recorded on the Arabian Peninsula, the Indian Monsoon region as well as western and central Asia. The Maritime Continent as well as northern and Central Australia received more than usual rainfall totals. Abnormal high precipitation totals were also recorded in Central and southwestern Europe.

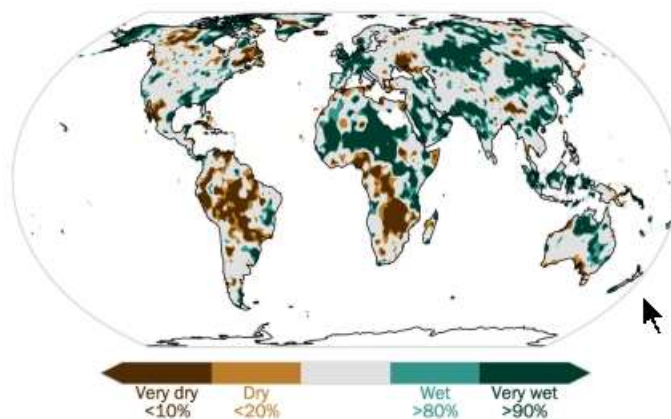


Figure 7: Precipitation worldwide from January to September 2024, relative to precipitation totals from 1981 to 2020. Source: GPCC

Extreme precipitation events

While the departure from the annual averages provides a global distribution pattern, extreme precipitation events are usually recorded at daily-to-monthly timescales. They are associated with heavy rain events that might lead to floods. Some of these extreme precipitation events are depicted on the map in the Extreme Events section below.

降水については、平均降水量の減少した地域（赤色）、降水量が例外的に多かった地域（黒色）が、混在していたる。

短い期間に発生する極端気象とその影響については、後の地図を参照。

Global rivers experience driest year in over three decades

The 2023 State of Global Water Resources report (WMO, 2024b) provides a quantitative overview of the status of various components of the global water cycle—such as river flow, groundwater, soil moisture, snow and ice, lakes and reservoirs. The report reveals that 2023 was the driest year for global rivers in over three decades, coinciding with record-high observed temperatures (WMO, 2024c). The last five years have seen some of the lowest percentages of areas under normal river flow conditions, with reservoir inflows following a similar pattern, further reducing water availability for communities and ecosystems. Despite the dominance of dryness globally, flooding in connection with extreme precipitation events continued to induce severe loss and damage in many places of the world. Despite improvements in the availability and accessibility of in-situ data shared by WMO Members, significant gaps remain, particularly in Africa, South America, and Asia. The report underscores the potential of satellite-based observations and modeling systems to assist countries, especially those with limited monitoring capabilities, and large data gaps, to address these challenges and improve hydrological data collection.

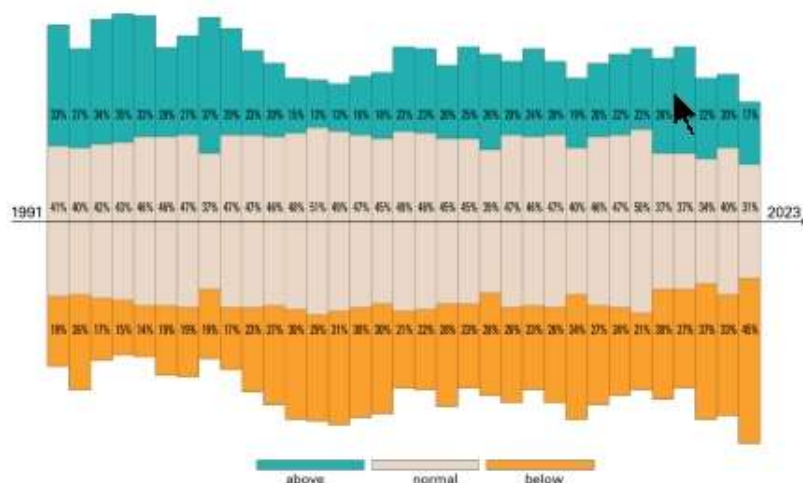
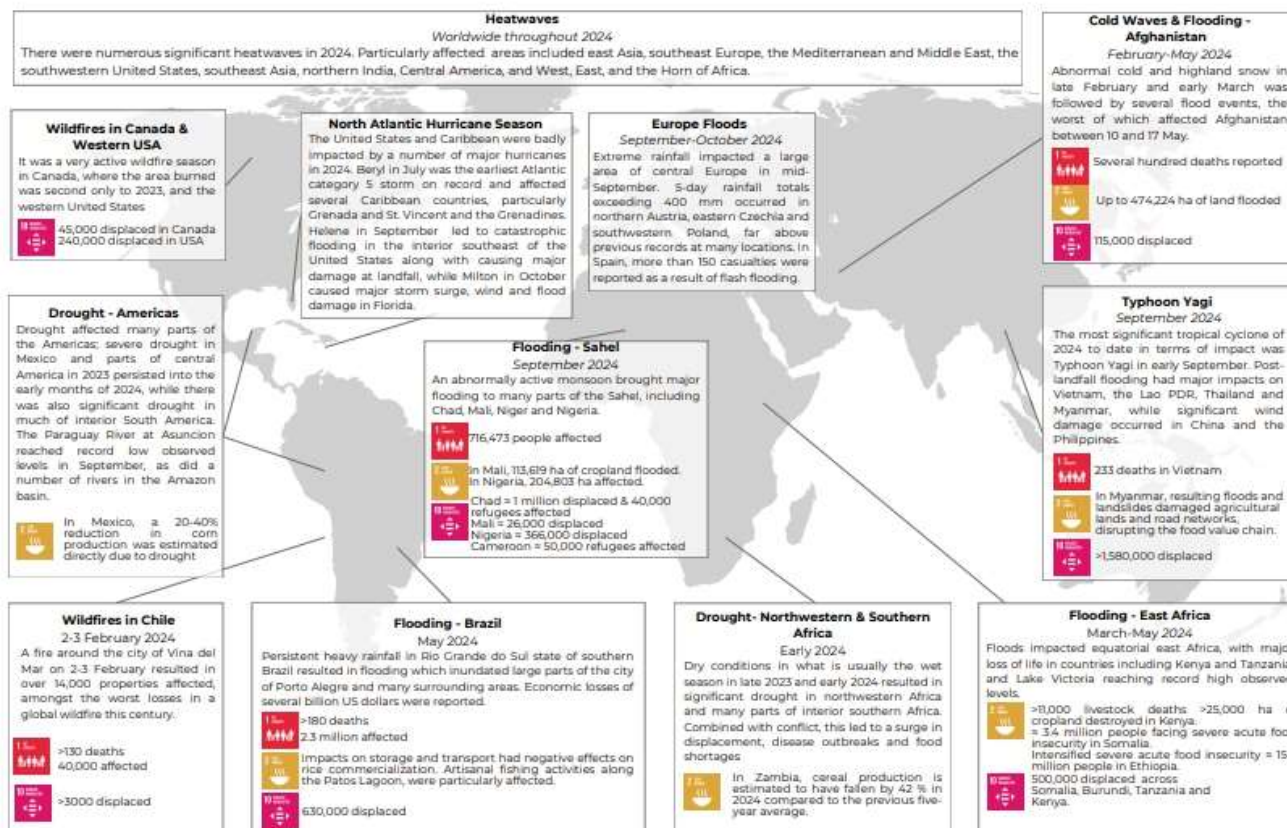


Figure 8: River discharge condition distribution from 1991-2023.
Note: 7% of the area has no data. Source: WMO, 2024 (in press)

2023年には、世界の河川が最も乾燥していた。

Extreme events led to extensive damage worldwide

Droughts, floods, tropical cyclones, heatwaves, and cold waves cause significant damage, loss of life, and hinder sustainable development. The map below highlights some of the most notable events from January to September 2024, with data on impacts collected from various UN agencies. Although many areas of development are affected by extremes, SDGs 1, 2 and 10 were chosen for this summary due to the timely availability of data from UN partners.



極端気象現象とそれによる被害の例

Acknowledgements

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報告書はここから入手可能。

<https://wmo.int/publication-series/state-of-climate-2024-update-cop29>