State of the Climate

Update for COP31



WORLD METEOROLOGICAL ORGANIZATION

Introduction

This update on the current state of the global climate has been prepared to inform discussions at the thirty-first Conference of the Parties to the United Nations Framework Convention on Climate Change (COP31) with authoritative, up-to-date information. The update combines consolidated data for the year 2025 with data for 2026 to date where available. While some indicators, such as global temperature and sea level, can be monitored in near-real time, others, such as greenhouse gas concentrations and glacier mass balance, are only available through the end of 2025 due to the time required for collection, quality control and verification. Reference periods vary between indicators and are specified alongside the relevant data and figures. Together, these complementary datasets provide a robust picture of ongoing climate change.

The indicators presented in this report, as well as the climate services and early warnings that support adaptation across sectors and regions, are underpinned by sustained, systematic observations of the climate system. The foundational role of systematic observations is recognized in the Global Goal on Adaptation, which includes targets relating to climate information and multi-hazard early warning systems. To support these targets and the assessment of progress toward the Global Goal on Adaptation, WMO provides standards, methodologies and guidance to strengthen the scientific foundations needed to assess climate risks and inform adaptation planning and implementation.

The information presented here draws on WMO reports and contributions from partner institutions. To ensure transparency and traceability, all data are from authoritative sources cited on the final page.

This update is intended to be used as:

- A scientific reference to anchor COP negotiations in authoritative evidence.
- A communication tool to highlight key climate indicators and their relevance to inform policymaking.
- A bridge to more detailed reports, where the underlying datasets and analyses can be explored further

"Extreme weather has made headlines throughout 2026. Behind the headlines and the statistics in this report are people who suffered the loss of loved ones, threats to their health and safety, flooded homes, failed harvests, empty shelves, lack of water and choking air. The past four years have been the warmest in the 177-year observational record, and the heat in the oceans is breaking records for the tenth year in a row. The ongoing El Niño is forecast to be one of the strongest on record, and the heat it releases from the ocean will continue to fuel high temperatures and extreme weather into 2027. Forecasts underpinned by sustained observations are more important than ever to monitor our rapidly changing climate and help navigate the increasing risks to societies and economies."



Celeste Saulo,
WMO Secretary General

Key messages

Greenhouse gases:
Concentrations of carbon dioxide, methane and nitrous oxide reached record observed levels in 2025, with real-time measurements indicating continued increases in 2026.

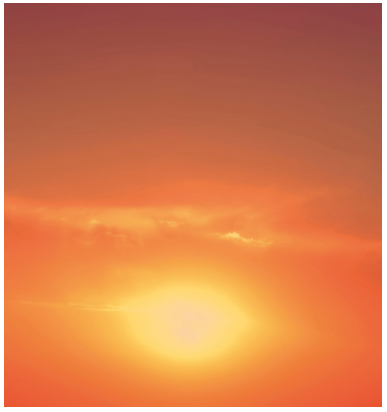
Earth's energy imbalance:
The Earth system is accumulating heat at an increasing rate, with a record high observed in 2025 and preliminary 2026 data suggesting another record.

Ocean heat:
Ocean heat content reached a record high in 2025, with preliminary data showing continued warming in 2026.



Sea level:
Global mean sea level reached record levels in 2026, highlighting the combination of long-term rise and El Niño-related shifts in rainfall.

Global temperature:
January–September 2026 was 1.47 °C ± 0.13 °C above the pre-industrial average, putting 2026 on track to be among the four warmest years on record. Sea-surface temperature anomalies were also exceptionally high, having reached record levels in August.



El Niño:
A strong El Niño developed rapidly in 2026 and is nearly certain to persist into early 2027, influencing climate impacts across many regions.

Regional climate:
WMO regional reports show how climate change and variability interact with different drivers, exposures and vulnerabilities to produce distinct conditions and impacts around the world.

Sea ice:
Sea-ice extent remained mostly below average in both polar regions, with particularly low annual maxima in the Arctic and Antarctic.

Underpinning the report: Sustained, systematic observations are fundamental for climate monitoring, forecasts and early warnings.



Precipitation:

January–August 2026 brought unusually wet and dry conditions across different parts of the world, with some El Niño-related patterns beginning to emerge.

Extreme events:

Weather- and climate-related extremes from January to August 2026 caused major impacts on lives, livelihoods and agriculture, and resulted in displacement across multiple regions.

Glaciers:

Earth's glaciers lost more than 400 gigatons of ice in 2025, equivalent to approximately 1 mm of sea-level rise.

Water stored on land:

Terrestrial water storage has declined globally since 2014.

Renewable energy:

Climate variability continued to affect renewable energy supply and demand, with substantial regional and monthly differences.



Health:

Weather and climate extremes are affecting people, communities and health systems, while climate information can provide critical lead time for action.

Agriculture:

Weather and climate extremes are placing agriculture and food security under pressure, with El Niño adding to risks in vulnerable regions.

Early warnings:

Early warning systems are expanding, supported by improved observations, data exchange and forecasting, but important coverage gaps remain.

Greenhouse gas concentrations reached record observed levels in 2025

Real-time data indicate that they continue to rise in 2026.

Concentrations of the three key greenhouse gases in the atmosphere – carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) – reached record-high observed levels in 2025, the most recent year for which there are global consolidated figures (Figure 1). Measurements to date from individual locations, such as Mauna Loa and Kennaook/Cape Grim, suggest that concentrations of the three key greenhouse gases will continue to increase in 2026.

The atmospheric concentration of CO_2 has increased from around 278 parts per million (ppm) in 1750 to 426.8 ± 0.2 ppm in 2025, an increase of 53%. The average CO_2 growth rate during the past decade was 2.62 ppm per year. The increase in concentration from 2024 to 2025 was 2.8 ppm, less than the record increase of 3.5 ppm observed from 2023 to 2024. Global averaged CH_4 concentrations increased from 729 parts per billion (ppb) in 1750 to 1 948 ± 2 ppb in 2025, which represents an increase of 167%. N_2O concentrations increased from 270 ppb in 1750 to 339.1 ± 0.1 ppb in 2025, which represents a 26% increase.

Atmospheric concentrations of CO_2 reflect a balance between CO_2 sources and sinks. Emissions from fossil fuels have been the largest source of human emissions since the 1950s. Sinks of CO_2 include uptake by vegetation and the ocean. CO_2 absorbed by the ocean alters ocean chemistry, leading to a long-term decline in ocean surface pH, which continued to fall in 2026.

Did you know?

Land ecosystems exchange around 10 times more CO_2 with the atmosphere than humans emit, but climate stress and water shortages can reduce their ability to absorb CO_2 – turning some ecosystems from carbon sinks into carbon sources.



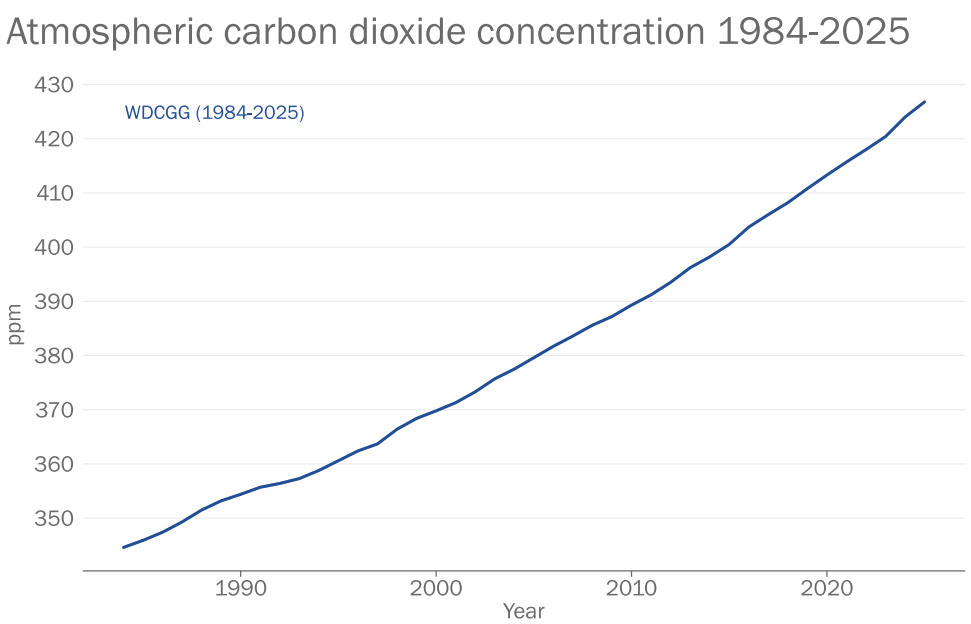


Figure 1: Annual mean globally averaged atmospheric mole fraction of carbon dioxide from 1984 to 2025 in parts per million (ppm).

Earth’s energy imbalance is increasing

Ocean heat measurements and satellite observations show an acceleration in the rate at which the Earth system is accumulating heat.

Since 1960, when observational records began, heat has accumulated in the Earth system, warming the ocean, atmosphere and land and melting ice. The increase in Earth's energy imbalance (EEI) is linked to rising concentrations of greenhouse gases and reductions in aerosol emissions (Hansen et al. 2023; Kramer et al., 2021; Raghuraman et al., 2021).

As a result of the growing energy imbalance, the total amount of heat accumulating in the Earth system is rising and at a growing rate. In 2025, the EEI reached its highest observed value (Figure 2). Preliminary EEI values for January–July 2026 suggest another record high (represented as points in Figure 2).

EEI is estimated using the complementary in situ and satellite observing systems. As the ocean absorbs most of the excess heat, long-term in situ measurements of ocean heat content provide the principal estimate of changes in EEI since 1960. Ocean heat content estimates indicate EEI increased at a rate of 0.13 ± 0.03 W m^{-2} per decade for the period 1960–2025 and at a higher rate of 0.30 ± 0.1 W m^{-2} per decade for the period 2001–2025 (Figure 2, orange, light blue and green lines).

Since the early 2000s, satellites have monitored the balance between incoming and outgoing energy at the top of the atmosphere. The rate of increase of EEI as measured by satellites over 2001–2025 was 0.44 ± 0.13 W m^{-2} per decade (Figure 2, dark blue line). Both estimates are consistent within the joint margin of error where they overlap and, together, show that the rate at which heat is accumulating in the Earth system has risen in recent decades.

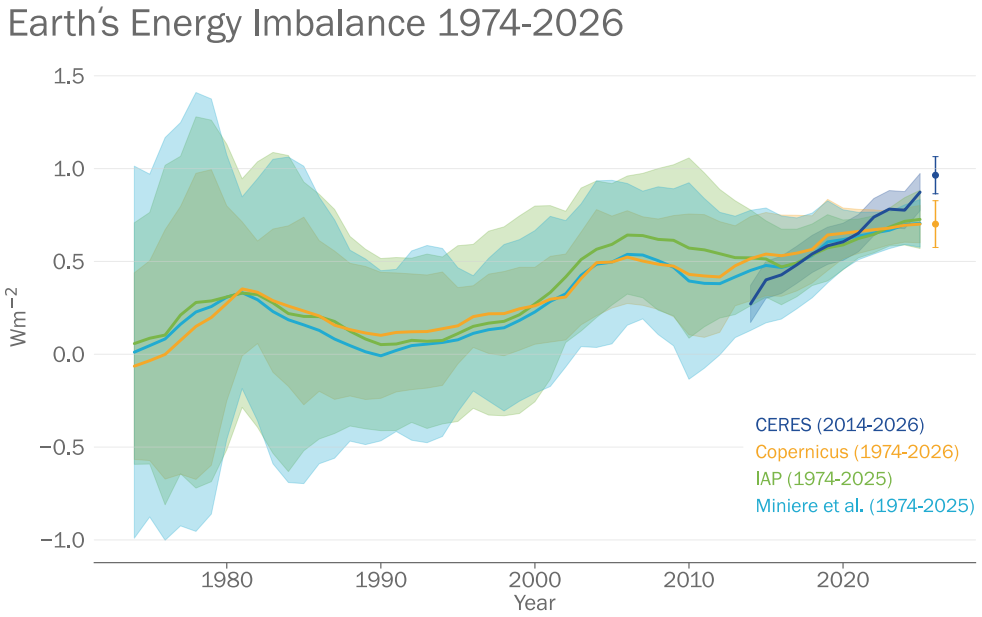


Figure 2: Earth’s energy imbalance (EEI) from 1960 to 2025 as estimated from ocean heat content (shown in orange, green and light blue), and remote sensing (shown in dark blue). Preliminary 2026 values and uncertainties (to July) are represented as dots and whiskers. Values are trends over 15 years ending in the year shown. The shaded areas indicate the 2-sigma uncertainty ranges on each estimate. A positive EEI indicates that the total amount of heat stored on Earth is increasing.

Ocean heat content in 2025 was the highest on record

Preliminary data show ocean heat has continued to rise in 2026.

Observations of ocean warming provide one of clearest signals that the Earth's energy is currently out of balance, as over 90% of that energy goes into warming the ocean.

Ocean heat content in the upper 2 000 m of the ocean in 2025 was the highest in the observed record, exceeding the 2024 value by 19 ± 11 zettajoules (ZJ). Preliminary data to July 2026 indicate that ocean heat content has continued to rise (Figure 3, shown as dots).

Ocean warming rates show a particularly strong increase over the past two decades (Figure 3). The average rate of warming over the period 1971 to July 2026 was 7 ± 1 ZJ per year, but this has increased to 11 ±1[1] ZJ per year in the latter part of the period, from 2005 to July 2026, a period during which Argo floats provide near-global coverage.

Ocean warming has far-reaching consequences, including the degradation of marine ecosystems, loss of biodiversity and a weakening of the ocean's role as a carbon sink (*Climate Indicators and Sustainable Development: Demonstrating the Interconnections* (WMO No. 1271)). It intensifies tropical and subtropical storms, accelerates sea-ice loss in the polar regions, and – together with melting land ice – drives sea-level rise. This warming is projected to continue, representing a change that is irreversible on centennial to millennial timescales.

Did you know?

Over three billion people depend on marine and coastal resources for their livelihoods.



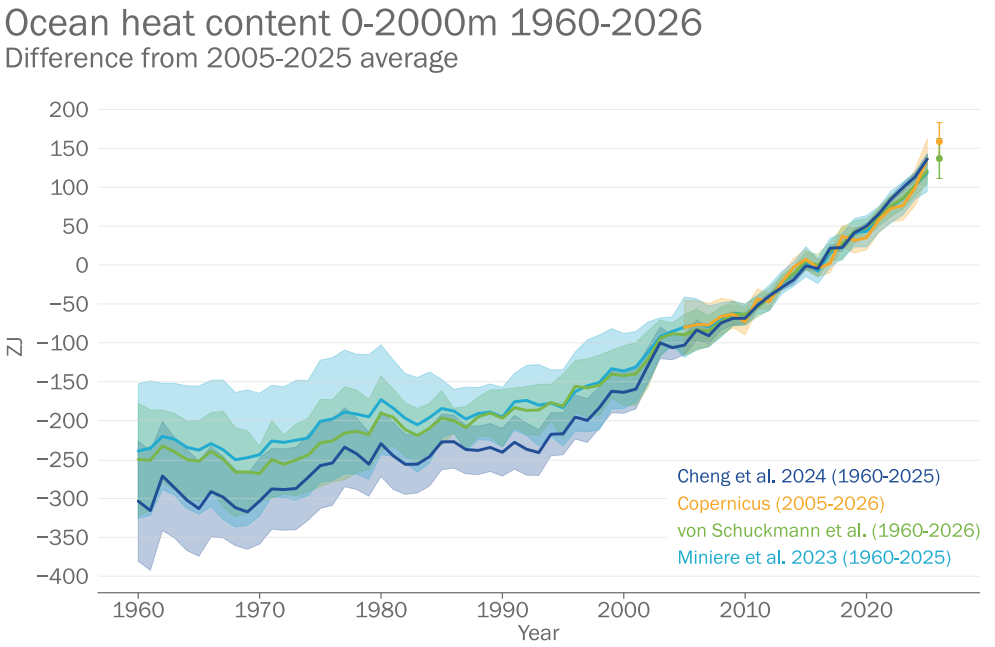


Figure 3: Annual global ocean heat content down to 2 000 m depth for the period 1960–2025, in zettajoules (10^{21} joules). The shaded area indicates the 2-sigma uncertainty range on each estimate. Preliminary 2026 values and uncertainty (to July) are shown as dots and whiskers.

[1] Changes in heat content are often expressed in units of Watts per square metre. 1 Watt per square metre is equivalent to 10.41 zettajoules per year.

Global mean sea level reached a record high in 2026

Shifts in rainfall as La Niña gives way to El Niño are bringing a surge in global sea level.

Sea-level rise has accelerated since the start of the satellite record, from a mean rate of 2.4 mm yr^{-1} between 1993 and 2002 to 3.9 mm yr^{-1} between 2017 and 2026 (Figure 4). This acceleration is the result of increased melting of glaciers and ice sheets, as well as increased upper-ocean thermal expansion.

Global mean sea level has continued to increase in 2026, and June, July and August 2026 saw the highest values since the beginning of the satellite altimetry era in 1993.[2] While the long-term increase in sea level is associated with thermal expansion and melting ice, the sharp increase in global mean sea level in the past 12 months may also reflect changes associated with the developing El Niño, including a shift in rainfall from land to ocean in the western tropical Pacific (Cazenave et al., 2012).

Observed global mean sea-level rise can be compared with the sea-level rise expected from independently measured upper-ocean warming and land-ice melt, allowing us to understand why global mean sea level has changed the way that it has. Since about 2017, observed sea-level rise has outpaced the sum of the upper-ocean warming and land-ice melt contributions, and recent studies (Cazenave et al., 2026) indicate that emerging deep ocean (below a depth of 2 000 m) warming may explain the difference.

Did you know?

Nearly 11 % of the global population, around 900 million people, live on low-lying coasts directly exposed to coastal hazards and the impacts of sea level rise.



Global mean sea level 1993-2026
Difference from 1999-2025 average

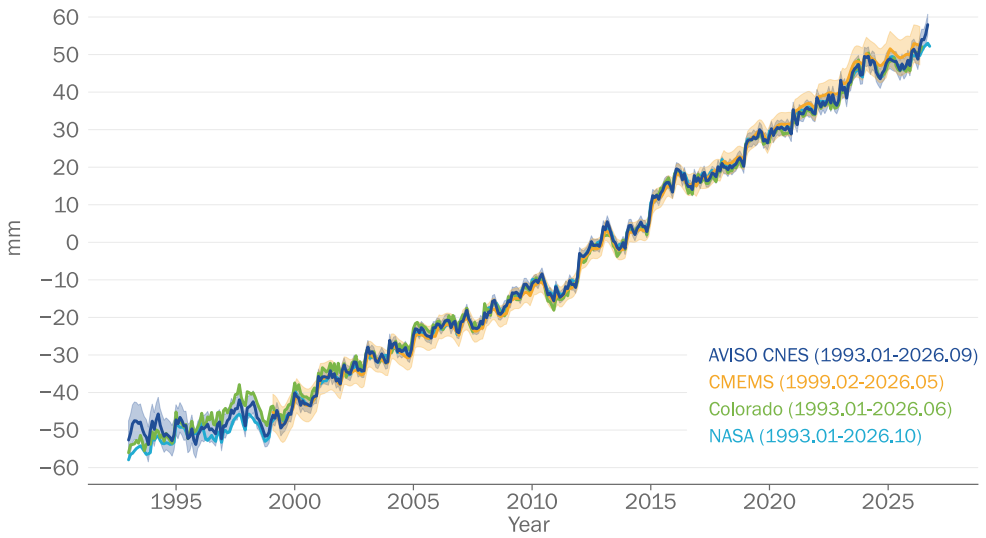


Figure 4: Seasonal global mean sea level change shown for 1993–August 2026 as a difference from the 1999-2025 average. The seasonal cycle has been removed from the data and data series have been processed consistently. The shaded area indicates uncertainty.

[2] Tide gauge reconstructions show that sea level has increased from the start of the twentieth century (see Forster et al., 2026 for further details).

Global temperature for January–September 2026 was 1.47 °C ± 0.13 °C above the pre-industrial average

The year 2026 is on track to be one of the four warmest years on record.

The year 2026 is on track to be one of the four warmest years on record globally, which would make 2023 to 2026 the four warmest years on record (Figure 5).

The global mean near-surface temperature anomaly averaged from January to September 2026 (1.47 °C ± 0.13 °C above the 1850–1900 average) is comparable to the whole-year averages for 2025 (1.43 °C) and 2023 (1.46 °C) and somewhat lower than the record-high annual average temperature recorded in 2024 (1.55 °C).

The year started with La Niña conditions in the Pacific. La Niña typically brings a temporary drop in global average temperatures of around 0.1 °C –0.2 °C, depending on the strength of the event. However, La Niña conditions were replaced by El Niño conditions by June, with a very strong El Niño established by late August (see El Niño section).

Consistent with the transition from La Niña to El Niño, global mean temperature anomalies have increased from the beginning of the year. Global monthly average sea-surface temperatures were the highest or second highest on record for the months of June, July and highest on record for August, and monthly global temperatures were among the three highest for the time of year from May through to September, the latest date available for the consolidated analysis.

El Niño is forecast to continue into early 2027. El Niño typically boosts annual global mean temperatures by around 0.1 °C–0.2 °C, so it is likely that global mean temperatures will remain exceptionally high through late 2026 and into early 2027 and that the final anomaly for 2026 will be higher than the January to September average.

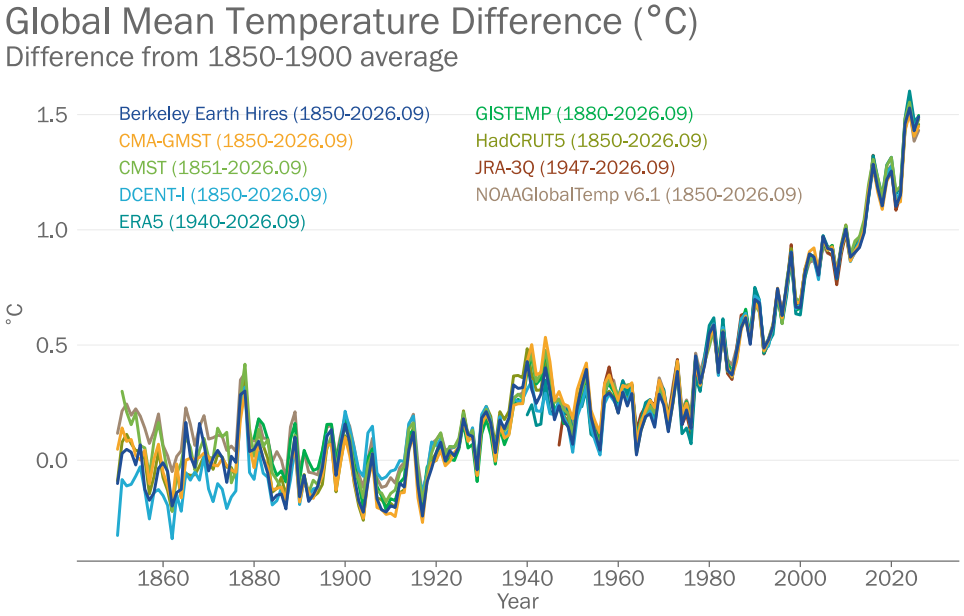


Figure 5: Annual global mean temperature (as a difference (anomaly) from the 1850–1900 average) from 1850 to 2026 from nine datasets. The 2026 average is based on data from January to September.

El Niño: From observations and monitoring to early warnings and action

The El Niño–Southern Oscillation (ENSO) is a naturally recurring climate phenomenon and a major source of year-to-year climate variability. During its warm phase, El Niño, warming of the central and eastern equatorial Pacific is accompanied by changes in trade winds and rainfall. These changes influence temperature and precipitation patterns far beyond the Pacific, altering the likelihood of droughts, floods, heat and other climate extremes in many regions.

The 2026 El Niño: Why continuous monitoring matters

Following the end of La Niña in early 2026, sea-surface temperatures (SSTs) in the central and eastern equatorial Pacific increased rapidly. SST anomalies[3] in the Niño 3.4 region rose from 0.2 °C in March to 2.5 °C by August, and the latest WMO Global Seasonal Climate Update indicated that they could reach 3.7 °C for October–December, exceptionally high within the observed record (Figure 6). The WMO El Niño/La Niña Update indicates it is near certain that El Niño will persist until February 2027 at least (see the Extreme Events, Agriculture and Health sections for emerging impacts and risks).

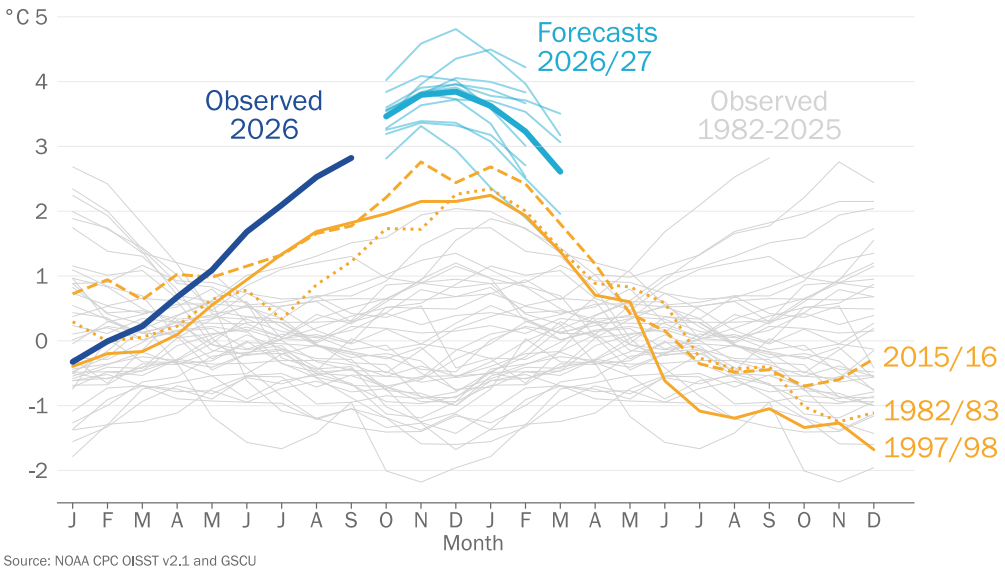
El Niño strength is not the only factor driving impacts: where and when warming occurs, the time of year, other climate drivers, and their intersection with vulnerability and exposure are all important. El Niño can compound with additional heat from long-term climate change, contributing to exceptionally high temperatures and amplifying some climate-related risks. Continuous monitoring, regularly updated forecasts, and an understanding of exposure and vulnerability are therefore essential throughout the event's life cycle.

An integrated observing and prediction system

ENSO can only be monitored effectively because the tropical Pacific is observed in real time from space, at the ocean surface, through the upper ocean and within the atmosphere (Figure 7).

Sea-surface temperature anomalies in key El Niño region forecast to be warmest on record

Temperature difference from 1993-2009 average



Source: NOAA CPC OISST v2.1 and GSCU

Figure 6: Monthly Niño 3.4 sea-surface temperature anomalies (relative to the 1993–2009 average) from 1982 to 2026. The years 1982 to 2025 are shown as grey lines with strong El Niño events highlighted in orange. Observed anomalies for 2026 are shown in dark blue. Forecasts for October 2026 to early 2027 from the Global Seasonal Climate Update are shown in light blue with the multi-model mean shown as a thick line and individual models shown as thin light blue lines.

[3] A 1993–2009 baseline has been used to align with the Global Seasonal Climate Update forecast baseline.

Satellites provide a near-global view of SST, sea level, winds, clouds and rainfall. Moored buoys measure ocean and atmosphere, monitoring upper-ocean heat, winds and ocean–atmosphere coupling. Argo floats and the wider Global Ocean Observing System (GOOS) measure temperature and salinity down to a depth of 2 000 m. Ships, surface stations and upper-air networks provide complementary measurements and ground truth for other parts of the global observing system.

Observations are quality controlled, integrated into global analyses, and assimilated into coupled prediction models. Seasonal forecasts are combined by the WMO Lead Centre for Seasonal Prediction Multi-Model Ensemble, helping characterize uncertainty and providing robust guidance that feeds into the WMO Global Seasonal Climate Update and the WMO El Niño/La Niña Update. WMO Regional Climate Centres, Regional Climate Outlook Forums and National Meteorological and Hydrological Services (NMHSs) interpret and adapt global assessments for regional and national conditions and decision-making needs.

From climate intelligence to early action

The vital role of the global observing and prediction infrastructure is to extend the time available for societies to anticipate and manage risk. The critical question for agriculture, water management, health, disaster risk reduction, energy and humanitarian operations, is "What changes in climate risk are becoming more likely, where and when, and what decisions can be taken before impacts occur?"

WMO has launched an unprecedented mobilization with NMHSs, WMO centres and partner organizations, delivering forecasts and services that save lives and livelihoods. The WMO Coordination Mechanism for humanitarians (WCM) translates authoritative weather, climate and water information into actionable information for humanitarian stakeholders, providing WMO science, analysis and expert advice to humanitarian coordination processes, such as the United Nations inter-agency Global ENSO Analysis Cell.

Maintaining the capacity to monitor, forecast and analyse requires sustained investment in the whole global observing infrastructure. Gaps in any component can weaken analyses, model initialization and seasonal prediction, and ultimately compromise early-warning capability.

Monitoring El Niño is an end-to-end Earth-system enterprise underpinned by research advancing understanding of ocean–atmosphere processes, guiding the design of observing systems, improving prediction and helping translate forecasts into useful climate services. Together, research, observation, prediction and decision support exemplify the climate-risk cycle: monitor, forecast, assess, act and reassess.

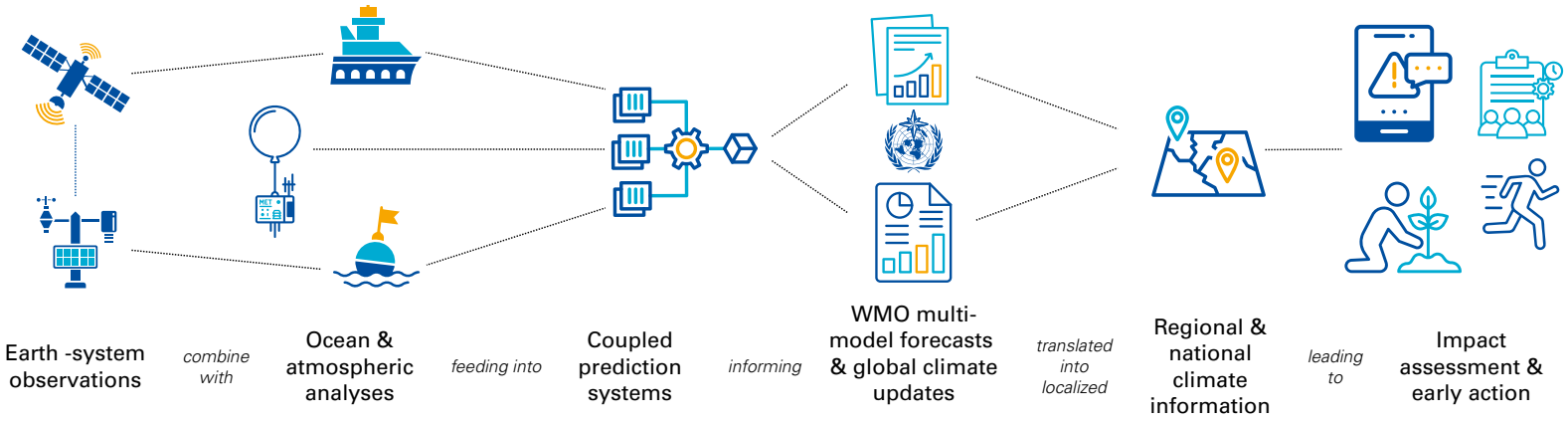


Figure 7: From observations to action: The ENSO integrated observing and prediction system.

Climate change and variability shape different regional realities

WMO regional State of the Climate reports reveal important differences in warming, climate patterns and impacts around the world.

Since 2020, WMO has published regional State of the Climate reports, which now cover Africa, Asia, Latin America and the Caribbean, and the South-West Pacific, and co-produced a report on Europe with Copernicus Climate Change Service. These reports complement the global assessment by showing how our changing climate is experienced differently around the world. Led by regional offices and produced together with National Meteorological and Hydrological Services, regional climate centres, United Nations partners and scientific experts, the reports bring together authoritative information on key climate indicators, extreme events and their regional impacts. The reports also highlight how climate information and early warnings are being translated into action to help communities and sectors prepare for and respond to weather, water and climate extremes.

Despite the temporary cooling influence of La Niña at the beginning and end of the year, 2025 was among the three warmest years on record globally, at 1.43 °C ± 0.13 °C above the 1850–1900 average. All regions experienced above-average temperatures, but the magnitude and consequences varied considerably as high temperatures interacted with different climate drivers, exposures and vulnerabilities (Figure 8). The regional reports highlight how these interactions shape distinct climate conditions and impacts around the world, while placing annual variability within long-term trends. Over the past 30 years, Europe has been the fastest-warming WMO region, while Asia is warming nearly twice as fast as it did during 1961–1990.

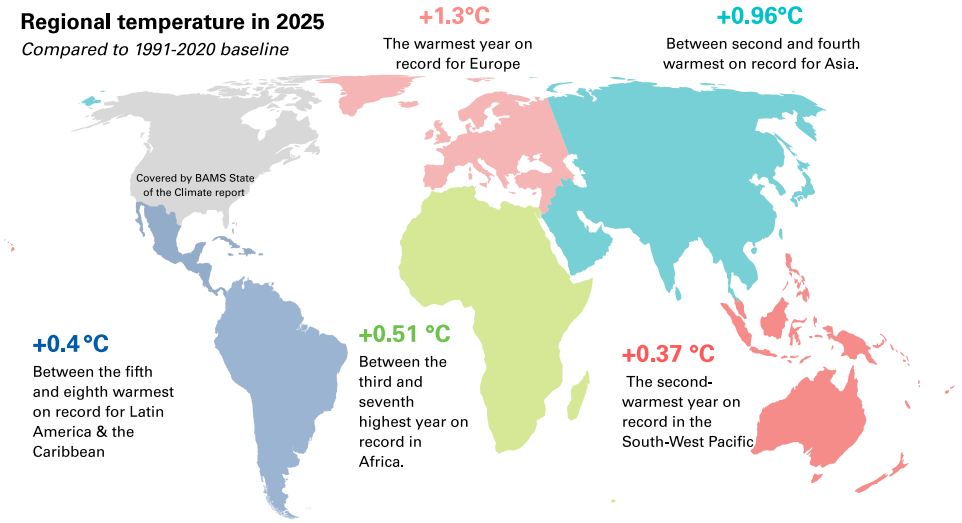


Figure 8: Regional annual average temperature anomalies for Latin America and the Caribbean, Europe, Africa, Asia and the South-West Pacific. Temperature anomalies are relative to the 1991–2020 average. Regional values refer to land-surface temperature, except for the South-West Pacific, which uses a combined land-and-ocean average (2025 State of the Climate reports for Latin America and the Caribbean, Europe, Africa, Asia and the South-West Pacific). Temperature anomalies are relative to the 1991–2020 average. Regional values refer to land-surface temperature, except for the South-West Pacific, which uses a combined land-and-ocean average.

Sea-ice extent remained mostly below average in both polar regions

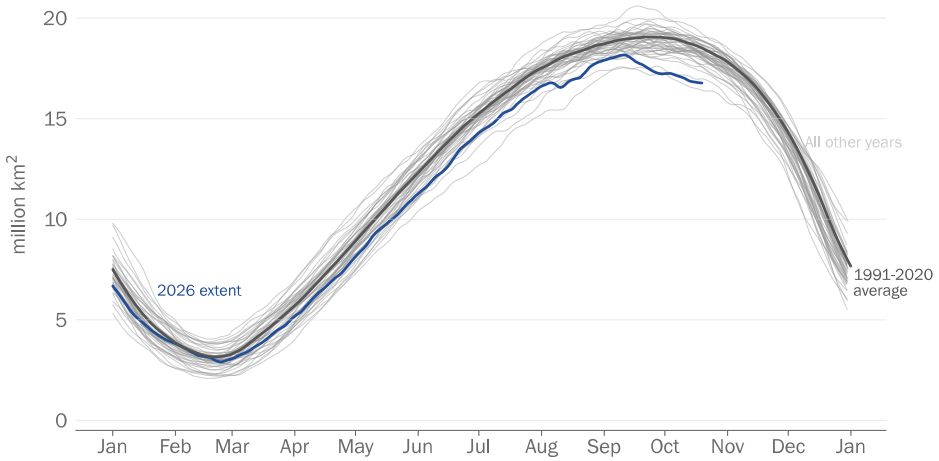
In 2026, Antarctic sea ice reached its third-lowest annual maximum on record, while the Arctic maximum was the lowest or second lowest.

Sea ice plays an important role in the global climate system and polar ecosystems, and its extent is a key indicator of climate change in the Arctic and Antarctic.

Daily Antarctic sea-ice extent remained close to the 1991–2020 average through February 2026 and subsequently reached its annual minimum of 2.72 ± 0.16 million km² around 22–24 February 2026 (Figure 9). From the summer minimum, ice froze more slowly than the long-term mean, and the annual maximum Antarctic sea-ice extent of 17.84 ± 0.35 million km² on 10 or 11 September 2026 was the third lowest in the satellite record, the lowest being in 2023.

Arctic sea-ice extent reached its annual maximum of 14.18 ± 0.42 million km² around 7–13 March 2026; this was the lowest or second lowest maximum extent in the satellite record (Figure 10). The annual minimum arctic sea-ice extent of 4.71 ± 0.36 million km², reached around 11–13 September 2026, was between the tenth and fourteenth lowest on record (NSIDC, 2026).

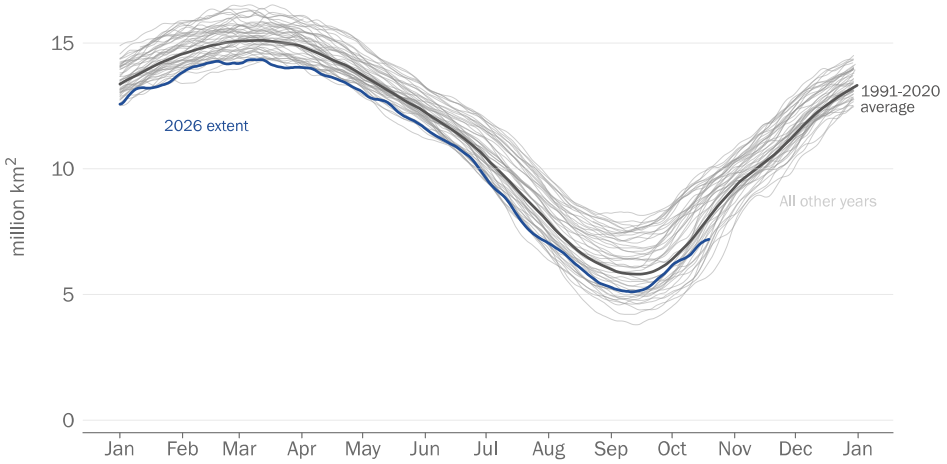
Daily Antarctic sea-ice extent through the year 1978-2026



Source: OSI SAF v3.0

Figure 9: Daily Antarctic sea-ice extents in 2026 compared to the average and historical records since 1978.

Daily Arctic sea-ice extent through the year 1978-2026



Source: OSI SAF v3.0

Figure 10: Daily Arctic sea-ice extents in 2026 compared to the average and historical records since 1978.

Precipitation varied around the world from January to August 2026

For the period January to August 2026, unusually low precipitation totals were recorded in Central and West Africa, parts of East Africa and on the East African Islands (Figure 11). Parts of southern Asia and the Maritime Continent also experienced unusually dry conditions. Central Europe received lower-than-normal precipitation amounts. Drier-than-usual conditions were observed in parts of the Canadian Arctic, central North America and the Caribbean. Lower-than-normal rainfall was recorded in the Amazon Basin, where dry conditions have persisted since 2023.

Unusually high precipitation totals were recorded in the Middle East, after dry conditions in 2025. These wet conditions extended north through Eastern Europe and Central Asia. Furthermore, wet conditions were observed in parts of south-western Europe and north-western Africa. Parts of East Asia received abnormally high precipitation amounts, as did parts of Australia and New Zealand. Precipitation amounts above the long-term mean were recorded in the north, west, south and south-east of South America. Parts of western and eastern North America and parts of northern Central America also received above-normal precipitation amounts.

Although the first half of the year reflects the change from La Niña to El Niño conditions, some typical El Niño patters are beginning to emerge. For example, South-East Asia and Central America have been drier than normal, and eastern Africa and southern South America have been wetter than normal. In the Pacific east of the dateline, islands close to the equator were generally much wetter than average and islands further to the south and west were drier than average.

While annual average differences provide a global distribution pattern, extreme precipitation events are usually recorded at daily-to-monthly timescales. Heavy rain events on these timescales are typically associated with increased flood risk. Some of these extreme precipitation events are depicted on the map in the Extreme events section below. Precipitation anomalies also directly influence river discharge, groundwater and soil moisture, described in the Terrestrial water storage section.

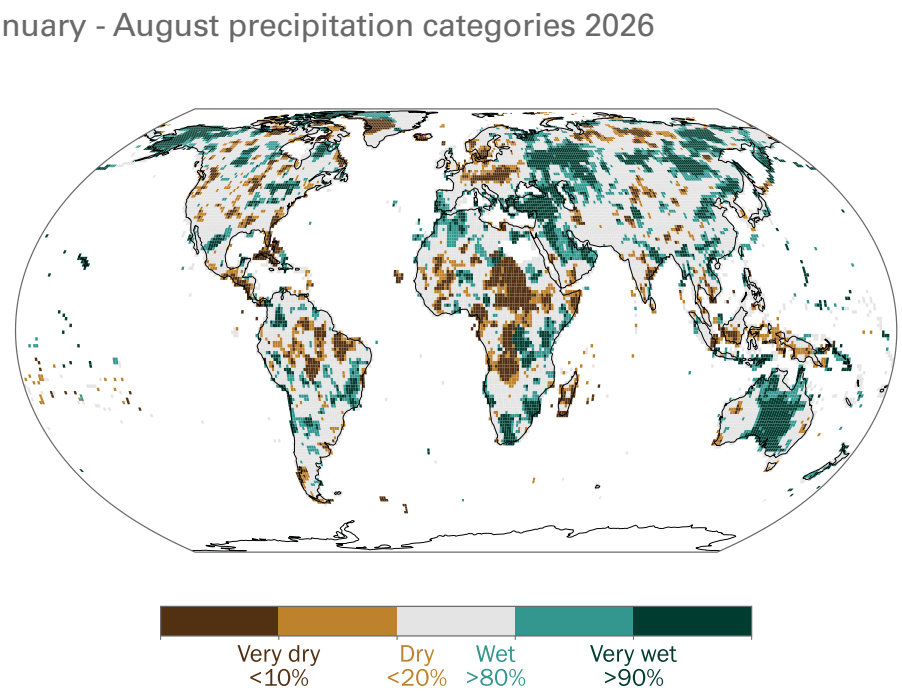
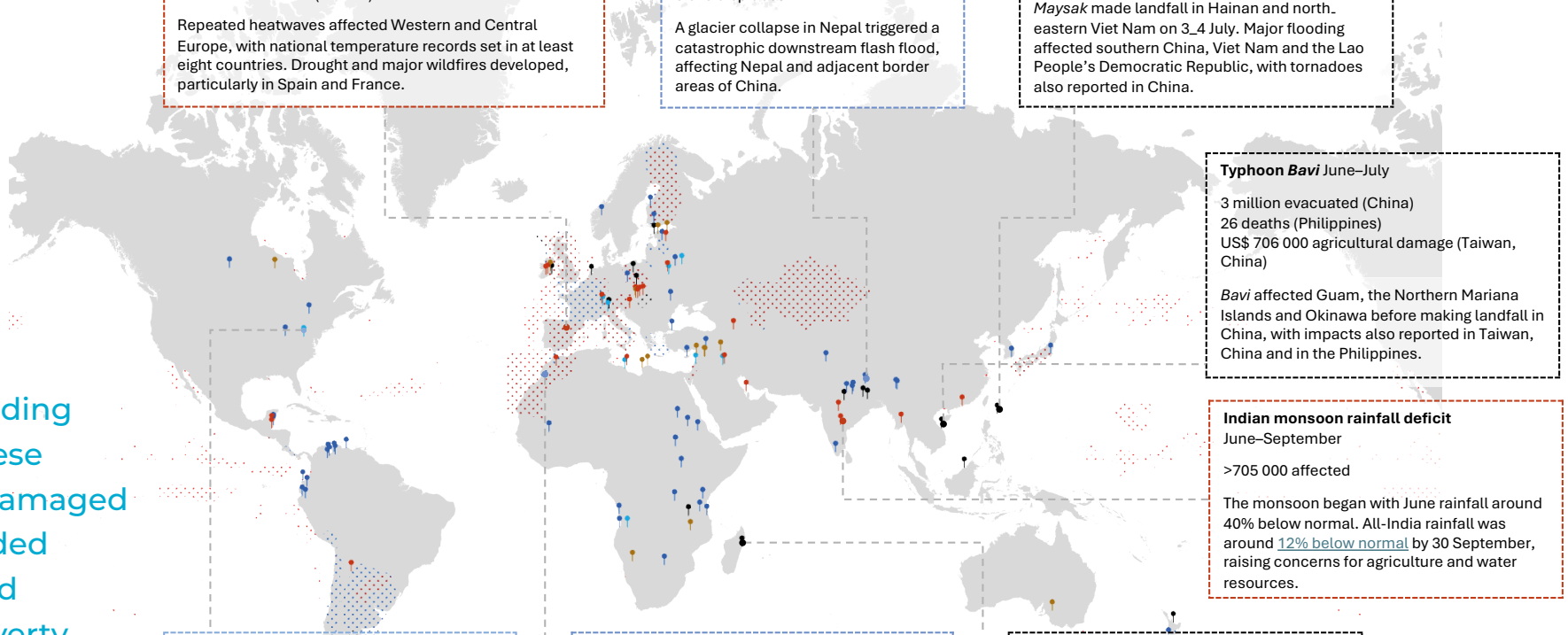


Figure 11: Precipitation from January to August 2026 expressed as percentiles of the 1991–2020 distribution. Brown areas were unusually dry. Green areas were unusually wet. *Source*: Global Precipitation Climatology Centre.

Extreme weather and climate-related events from January to August 2026 had major global impacts.

- Heat events
  Land & ocean
- Drought events
- Flood events
- Cold events
- Tropical Cyclones
  & other event types



European heatwaves, drought & wildfires May–August

>30 000 excess deaths
186 480 ha forestland burned (Spain)
220 000 evacuated (France)

Repeated heatwaves affected Western and Central Europe, with national temperature records set in at least eight countries. Drought and major wildfires developed, particularly in Spain and France.

Himalayan glacier collapse & flood
26 August

1 356 deaths; 4 894 missing
3 629 displaced

A glacier collapse in Nepal triggered a catastrophic downstream flash flood, affecting Nepal and adjacent border areas of China.

Severe Tropical Storm Maysak July

171 deaths
>US$ 3 billion in losses reported (China)

Maysak made landfall in Hainan and north-eastern Viet Nam on 3–4 July. Major flooding affected southern China, Viet Nam and the Lao People's Democratic Republic, with tornadoes also reported in China.

Typhoon *Bavi* June–July

3 million evacuated (China)
26 deaths (Philippines)
US$ 706 000 agricultural damage (Taiwan, China)

Bavi affected Guam, the Northern Mariana Islands and Okinawa before making landfall in China, with impacts also reported in Taiwan, China and in the Philippines.

Indian monsoon rainfall deficit
June–September

>705 000 affected

The monsoon began with June rainfall around 40% below normal. All-India rainfall was around 12% below normal by 30 September, raising concerns for agriculture and water resources.

North American cold & snow
January–February

174 deaths
>US$ 5 billion losses (United States)

Several major cold and snow events affected the central and eastern United States. Severe frost in Florida caused major agricultural impacts.

Western Mediterranean floods & windstorms
January–February

>110 000 ha inundated
>180 000 displaced (Morocco)

An exceptionally wet winter brought repeated flooding and major windstorms to the western Mediterranean. Extensive agricultural areas were inundated in Morocco.

Tropical Cyclone *Gezani* February

59 deaths
>20 000 displaced
478 000 affected

Gezani made landfall in Madagascar, severely damaging Toamasina, with significant impacts also reported in Mozambique.

The compounding impacts of these events have damaged cropland, eroded livelihoods and deepened poverty, and contributed to new and onward displacement across multiple regions.

Earth's glaciers lost more than 400 gigatons in 2025, equivalent to approximately 1 mm of sea-level rise

The hydrological year 2025 saw the sixth largest loss of glacier mass since global records began in 1975.

Did you know?

The annual mass loss from glaciers in 2025 would have filled five Olympic pools every second of the year.



The change in the amount of ice in glaciers is a key indicator of climate change. The melting of glaciers has implications for local and downstream geohazards, ecology, regional water resources and water quality, as well as global energy and sea-level budgets.

Earth's glaciers lost approximately 408 ± 132 Gt during the hydrological year 2025, the fourth consecutive year in which all 19 glacierized regions around the world experienced mass loss (Figure 12). The rate of glacier mass loss for the year was most extreme in Western Canada and the USA, Iceland, and Central Europe. Regional contributions to sea-level rise in 2025 were greatest from High Mountain Asia, Alaska, and the Russian Arctic (Dussaillant et al., 2025; Zemp et al., 2026). Since 1975, glaciers around the world have lost a total of 9 583 ± 1 211 Gt (equivalent to 26.4 ± 3.3 mm of sea-level rise). From 2000 to 2023, glaciers, excluding the Greenland and Antarctic ice sheets, lost about 5% of their mass globally, and between 2% and 39% regionally.

More generally, global glacier mass loss has accelerated from less than 100 Gt per year in 1976–1995 (with occasional years of modest mass gain), to around 390 Gt per year in 2016–2025. Glaciers have disappeared across six continents, including in Svalbard, Iceland, Norway, Germany, France, Italy, Spain, Austria, Switzerland, New Zealand, Indonesia, the United States, Canada, Peru, Bolivia and Chile (Andreassen et al., 2026). These regional findings underscore the retreat of the cryosphere and have far-reaching implications for local geohazards, regional water resources and global sea-level rise.

Global cumulative glacier mass change 1976-2025
Change since 1975

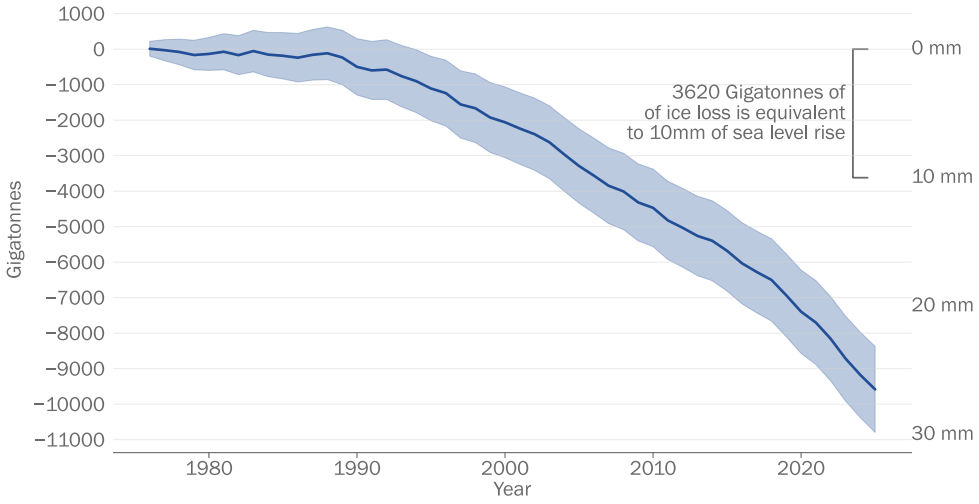


Figure 12: Cumulative global glacier mass change estimates and related contributions to sea-level rise since 1975. Cumulative mass changes in Gt (1 Gt = 10^{12} kg) and global sea-level equivalents in mm sea-level rise are shown with related uncertainties indicating the 95% confidence intervals. *Source*: World Glacier Monitoring Service

Water stored on land – in groundwater, soil, rivers, reservoirs, glaciers and snow – has declined globally since 2014

In 2025, 42% of the assessed global area had below-normal terrestrial water storage, compared to the long-term average of 25%.

Water is stored on and beneath the land surface in rivers and lakes, reservoirs, soil, groundwater, snow and ice. Terrestrial water storage (TWS) brings these together to provide an integrated measure of the freshwater held on land (Figure 13).

According to the WMO State of Global Water Resources 2025 report, TWS has declined since 2014, with an increasing area experiencing below-normal conditions (Figure 14). Throughout 2025, below-normal TWS persisted across several major regions, including northern and south-western North America, Patagonia, eastern Brazil, parts of Northern Europe, Eastern Europe, the Middle East, Central Asia, northern India, the Russian Federation, China and northern Africa, continuing the pattern of the year 2024. South America showed signs of partial TWS recovery, with conditions in the La Plata basin mostly returning to normal. Much-above-normal (≥90th percentile) TWS in Central and Southern Africa continued from 2024 into 2025.

Data from the first half of 2026 indicate a continuation and expansion of dry conditions in parts of North America and Europe as drought conditions intensified across the contiguous United States and became more widespread in Central Europe, extending into parts of Northern Europe. In contrast, parts of Southern Africa, including South Africa, Zimbabwe, Mozambique and Zambia, experienced much wetter-than-normal conditions.

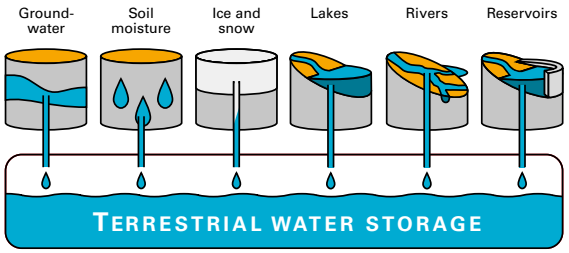


Figure 13: Components of terrestrial water storage. *Source*: German Research Centre for Geosciences (GFZ)

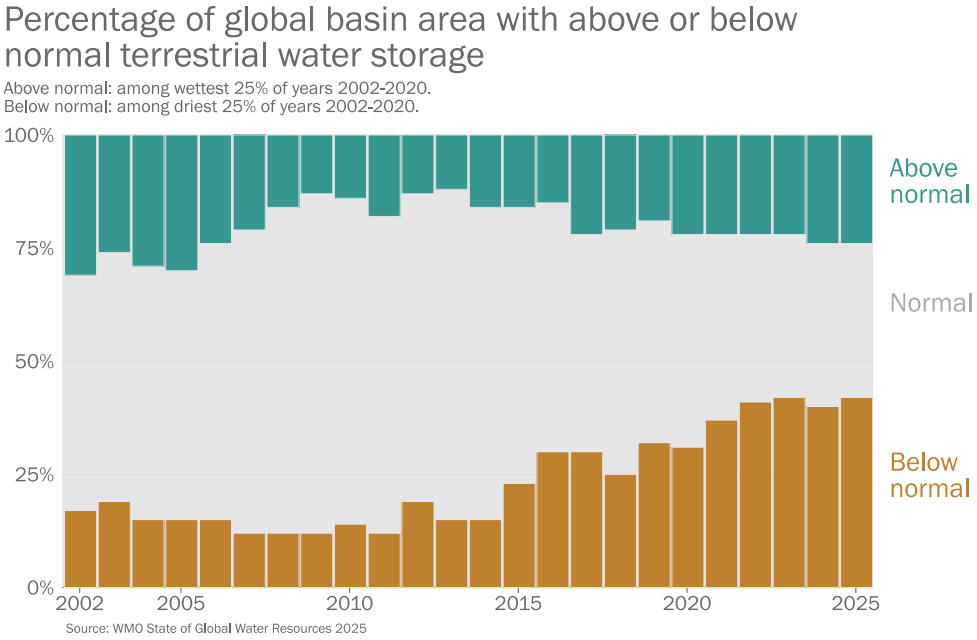


Figure 14: The distribution of global basin terrestrial water storage conditions for the years 2002–2025. Note that the percentage distribution excludes the 7% of global basin area for which no data were available. Percentiles are defined as below normal (<25th), normal (25th–75th) and above normal (>75th).

Climate variability continued to impact renewable energy production

In 2025, global annual metrics were relatively close to their long-term averages, but much larger regional and monthly differences remained.

The production of and demand for renewable energy, which is a key component of climate change mitigation, are closely tied to climate variability. Year-to-year changes in temperature, wind, precipitation and cloud cover can directly influence both the generation of renewable power and the demand for energy. The WMO–International Renewable Energy Agency (IRENA) analysis compares conditions in 2025 with the 1991–2020 average. At the global annual scale, wind power and solar photovoltaic power capacity factor (CF) indicators and the temperature-based demand indicator were close to average. The hydropower proxy was about 2% below average (Figure 15).

The global annual average, however, masks larger regional differences. In Central, Western and Southern Europe, solar photovoltaic CFs were above average and wind power CFs strongly below average, while temperature-driven demand was below average. In South-East Asia, above-average wind power and hydropower-related precipitation helped offset elevated demand, while Central and Southern Africa experienced below-average hydropower-related precipitation alongside elevated demand. Country-level monthly differences were larger still. In December, wind power CF was more than 30% above the 1991–2020 December average in Türkiye, but more than 30% below average in Mexico, even though their corresponding annual indicator was close to average. Shortfalls or surpluses lasting weeks or months can affect reserve requirements, storage, electricity trade, maintenance scheduling and prices.

Preliminary 2026 data further illustrate how extreme climate conditions can affect both energy supply and demand. As highlighted in the Extreme events section, summer heat and drought affected large parts of Europe. In Romania in August, the precipitation-based hydropower proxy was about 41% below the 1991–2020 average, while the temperature-based energy-demand proxy was about 46% above average. At the same time, critically low levels of the Danube, which provides cooling water for the Cernavodă nuclear power plant, forced the temporary shutdown of both reactors. Planning renewable supply and weather-driven demand together is therefore essential for governments and operators. Observations, forecasts and early warnings – supported by data sharing between meteorological and energy institutions – can help decision makers anticipate high-risk periods and act before impacts occur.

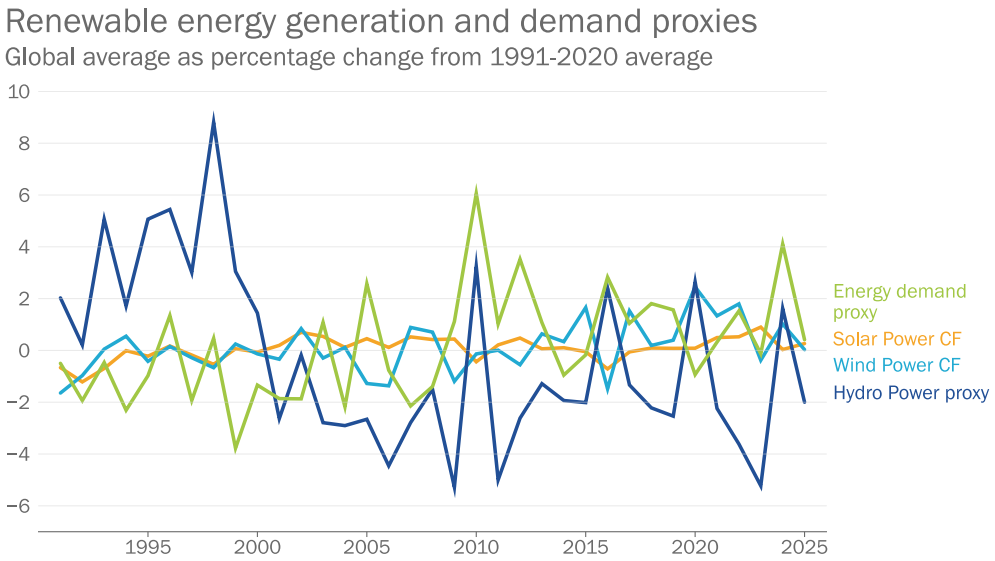


Figure 15: Global annual percentage anomalies in four climate-sensitive energy indicators, relative to 1991–2020. A value near 0% indicates conditions close to the long-term average. The indicators describe climate-related resource and demand conditions, not measured electricity generation or consumption.

Health impacts of weather and climate extremes span people, communities and health systems – but so do solutions

Extreme weather has affected health in 2026

Extreme heat has already had major health impacts across several regions in 2026. Provisional estimates of excess mortality across Europe exceeded 30 000 over the summer,[4] with approximately 16 000 excess deaths estimated during the 22–28 June heatwave alone (EuroMOMO, 2026). More than 150 million people experienced daily maximum temperatures above 35 °C (WHO, 2026). In India, an estimated 146.5 million people were exposed to extreme heat conditions during the April heatwave (Zanchi et al., 2026). Weather and climate hazards can also affect health by disrupting the systems and services people rely on. Following Cyclone Gezani in Madagascar, preliminary assessments found that 72% of assessed basic health centres (33 of 46) were affected, alongside two referral hospitals, with disruptions to access to health services (see https://healthcluster.who.int/countries-and-regions/madagascar).

El Niño is expected to amplify and shift health risks

The current El Niño is expected to act as a risk multiplier for health, with impacts varying by region and season. Increased heat, drought and heavy rainfall can contribute to heat-related illness and mortality, wildfire smoke and poor air quality, malnutrition and food insecurity, injuries, and changing risks of water- and vector-borne diseases such as cholera, malaria and dengue. The greatest impacts are expected where these hazards intersect vulnerable populations, weak health systems, displacement and humanitarian crises. In response to these risks, the World Health Organization (WHO) has, for the first time, classified the anticipated health impacts as a health emergency.

Climate information can provide critical lead time for health action

The first edition of the WHO Global Public Health Situation Analysis – El Niño 2026, developed jointly with WMO and the IASC ENSO cell,[5] uses climate forecasts to identify evolving health risks and support preparedness and anticipatory action. Timely climate information can help health authorities strengthen surveillance, protect health services and infrastructure, pre-position supplies and act before emerging risks become crises. Building these capacities into health systems also strengthens preparedness for future climate-related emergencies.

This approach extends beyond El Niño. The Global Heat Health Information Network (GHHIN), a flagship initiative hosted at WMO, is developing the first Global Synthesis Report on Extreme Heat and Health, highlighting measures such as heat–health action plans and warning systems, health-system preparedness and interventions to reduce heat exposure.



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[4] Final figures to be confirmed.

[5] The Inter-Agency Standing Committee (IASC) ENSO Cell is a collaborative humanitarian analysis and coordination group that tracks El Niño–Southern Oscillation (ENSO) events – such as El Niño and La Niña – to trigger early action and preparedness.

Agriculture and food security are under pressure from weather and climate extremes

In 2026, drought, extreme heat, floods, frost, hail and severe storms have affected crop and livestock production in several regions

In Morocco, rainfall and flooding in January and February affected approximately 105 000 ha of agricultural land (Government of Morocco, 2026). In India, despite a delayed and weak onset of the monsoon, intense rainfall in July resulted in rapid-onset floods that submerged around 21 000 ha of cropland and resulted in the death of more than 11 000 livestock (Assam University, 2026). In contrast, extreme heat, drought and wildfires placed severe pressure on agriculture across Europe during the northern hemisphere summer. In Slovenia, total yield losses in some locations reached up to 100% (KGZS, 2026). In France, more than 9 000 tonnes of dead animals (Ministry of Agriculture, 2026) were collected following the June heatwave; and there were average yield losses of 50% in many territories (Sénat, 2026).

A strengthening El Niño can add to agricultural risks

The 2026 El Niño, intersecting with underlying vulnerabilities like already high food insecurity levels and heavy reliance on rainfed agriculture in some parts of the world, is already increasing risks for agriculture in key seasons and production systems. In Honduras, severe El Niño-related drought affected the 2026 Primera growing season, with widespread soil-moisture deficits constraining planting and crop development, particularly in the southern Dry Corridor (FAO, 2026). In Peru, warmer coastal waters are altering anchovy habitat, depth and distribution, prompting the government authorities to issue an indefinite fishing ban (Ministerio de la Producción, 2026). In the northern parts of East Africa, rainfall deficits persisted from May through August 2026, contributing to soil-moisture deficits and vegetation stress and increasing risks to agriculture, pasture and pastoral livelihoods (ICPAC, 2026) (Figure 16). In India, the Occurrence of rainfall deficits and late seasonal monsoon onset, are being felt most severely in the agricultural sector, which employs more than 40% of the workforce. With sufficient warning, however, forecasts can be translated into practical action to protect crops, livestock and livelihoods. In India, the Indian Council of Agricultural Research has implemented a comprehensive action plan intended to ensure that farmers receive timely, location-specific information.

From climate information to agricultural action

Advance information on El Niño and its likely regional impacts can provide valuable windows for agricultural action. WMO and the Food and Agriculture Organization of the United Nations (FAO) are working together to connect climate information with agricultural expertise, helping translate forecasts and warnings into practical decisions. In 2026, the organizations jointly assessed the growing risks of extreme heat to crops, livestock, fisheries, forests and agricultural workers, as well as options for adaptation. The assessment highlights the importance of heat early warning systems alongside measures such as adjusting planting windows and crop choices, implementing livestock heat management measures, adapting agricultural management practices, protecting farm workers and strengthening access to financial and social protection mechanisms. Connecting improved weather and climate information with agricultural knowledge and decision-making can give farmers and other actors more time to anticipate risks and act before impacts occur.

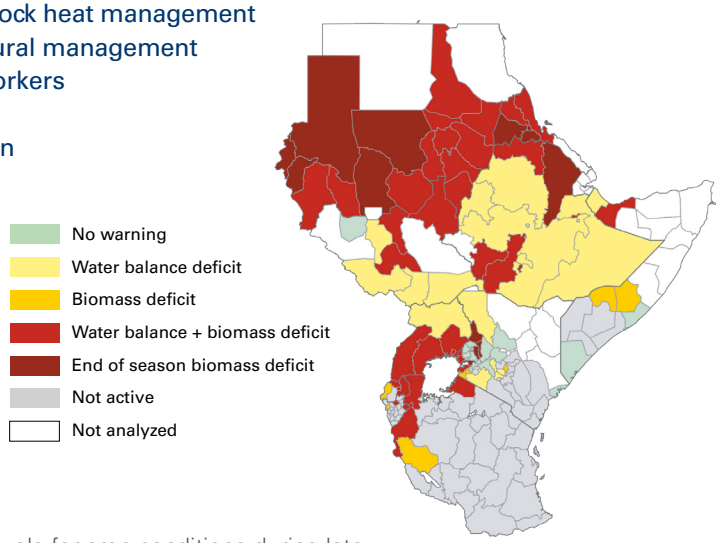


Figure 16. Observed warning levels for crop conditions during late August 2026 in East Africa. *Source:* IGAD

Early warning systems are expanding with improved observations and forecasting

The reach of multi-hazard early warning systems continues to expand, with global cooperation in data exchange and forecasting central to this progress.

The number of countries reporting the existence of multi-hazard early warning systems (MHEWSs) has increased from 56 in 2015 to 136 in 2025 (Figure 17). At least half of the countries in every region now report having MHEWSs in place, as do at least half of the least developed countries (LDCs), landlocked developing countries (LLDCs) and small island developing States (SIDSs). In 2025, the adoption of the WMO Technical Regulations on Early Warning Services established the first globally agreed regulatory framework for early warning services, supporting reliable, interoperable, impact-based, people-centred warnings. Overall, 85% of WMO Members provide early warning services, with 67% operating 24 hours a day.

Observations form the backbone of hazard monitoring and forecasting. Significant gains have been made in observation data exchange and access, with the number of Members sharing data through the WMO Information System 2.0 (WIS2) nearly tripling from 30 to 89 in the three years to 2025. Built on open standards and a cloud-ready design, WIS2 eliminates the need for costly infrastructure and equipment, enabling Members, and especially LDCs and SIDSs, to participate more fully in real-time global data sharing.

Forecasting capacity is also expanding: more than 150 WMO Integrated Processing and Prediction System (WIPPS) centres provide weather, climate, hydrological, ocean and environmental prediction products, giving countries access to advanced forecasting capabilities regardless of their own modelling capacity.

WMO's regional State of the Climate reports complement this global picture with case studies showing how early warnings and climate services are being translated into action to protect lives and livelihoods.

Despite this progress, gaps remain, particularly where financial and human resources are limited. Sustained investment, capacity development and international cooperation will be essential to achieve universal, reliable and actionable early warning coverage and better protect communities from growing weather, water and climate extremes.

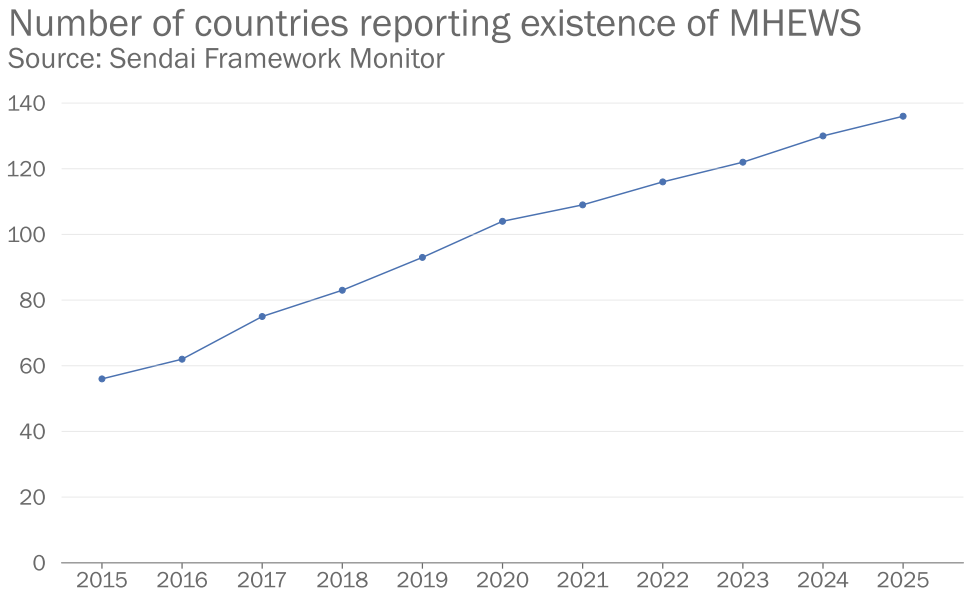


Figure 17: Cumulative number of countries reporting existence of MHEWS globally
Source: Sendai Framework Monitor, data as of August 2026

Acknowledgements and data sources

Lead coordinator: Claire Ransom (WMO)

Greenhouse gas concentration

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Data sources: *WMO Greenhouse Gas Bulletin*

Earth energy imbalance and ocean heat content

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Data sources:

Cheng et al., 2024; Copernicus; Miniere et al., 2023; von Shuckmann et al., 2020

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Sea Level

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Data sources: AVISO CNES, NASA, University of Colorado Boulder, CMEMS

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Global mean surface temperature

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Data sources: Nine global mean temperature datasets (ERA5, GISTEMP, HadCRUT5, JRA-3Q, NOAAGlobalTemp v6.1, Berkeley Earth HR, CMST v3, CMA-GMST, DCENT-I), eight sea-surface temperature datasets (ERA5, HadSST4, JRA-3Q, ERSST, CMST v3, CMA-SST, DCENT-I, ESA SST CCI v3), and eight land-surface temperatures datasets (ERA5, CRUTEM5, JRA-3Q, GHCNv4, Berkeley Earth HR, CMST, CMA-GLST, DCENT-I)

El Niño: From observations and monitoring to action

Contributors: Sarah Diouf (WMO), José Álvaro Silva (WMO), Wilfran Moufouma Okia (WMO)

Data sources: Global Seasonal Climate Update from WMO Lead Centre for Seasonal Prediction Multi-Model Ensemble, Understanding ENSO Indices in a Warming Climate

Sea Ice Extent

Contributors: John Kennedy (WMO)

Data sources: NSIDC v4, OSI-SAF 3.0, JAXA

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Precipitation

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Data sources: Global Precipitation Climatology Centre

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Data sources and references: See Extremes Supplement for full references

Glacier mass balance

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Data sources: WGMS

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Terrestrial Water Storage

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Data sources: *State of Global Water Resources 2025* provides a standardized, authoritative overview of the global water cycle based on the latest observational datasets and global hydrological modelling systems.

Renewable Energy

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Data sources: WMO and IRENA review of climate-driven global renewable energy potential and energy demand (fourth edition in preparation). This annual report examines four key indicators – wind, solar, hydropower and energy demand – relative to the 1991–2020 climate reference period.

Health

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Agriculture and food security

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Early warning systems

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Data sources: The *Early Warnings for All in Focus: Hazard Monitoring and Forecasting* report is entirely focused on Pillar 2 and captures WMO's programmatic work, including multiple case studies from projects, and data from Rapid Assessments, Country Hydromet Diagnostics and the WMO Data Collection Campaign.

The *Global Status of Multi-Hazard Early Warning Systems 2026* report (UNDRR and WMO, forthcoming) provides a global overview of progress in the development and implementation of multi-hazard early warning systems, highlighting achievements, persistent gaps and priorities for accelerating the Early Warnings for All initiative.



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