International “State of the Climate” report confirms record-high greenhouse gases, global sea level, and ocean heat in 2025

The report, published yearly in the Bulletin of the American Meteorological Society*, is a comprehensive “annual physical” of global climate*

Contact

Rachel Thomas-Medwid, rthomas@ametsoc.org
Katie Pflaumer, kpflaumer@ametsoc.org

10 August 2026

According to the 36th annual *State of the Climate* report, greenhouse gas concentrations, global sea level, and ocean heat content all reached record highs in 2025.

The international annual review of the world’s climate, published by the American Meteorological Society (AMS), is based on contributions from 625 scientists in 60 countries. It provides the most comprehensive update on Earth’s climate indicators, notable weather events, and other data collected by environmental monitoring stations and instruments located on land, water, and ice, as well as in space. The report is published as a supplement to the *Bulletin of the American Meteorological Society* (*BAMS*).

“The *State of the Climate* is a comprehensive, collaborative international effort to assess annual metrics for the atmosphere, oceans, and cryosphere,” says AMS President Alan Sealls. “It’s peer-reviewed data that paints a global picture of where we are, compared to benchmarks, and how fast things are changing. Consider it analogous to your annual health assessment from your physician. The *State of the Climate* connects to the health of all ecosystems. It presents critical measurements and trends which inform agencies, communities, businesses, and individuals for long-term planning.”

Read the *State of the Climate in 2025* report.

American Meteorological Society

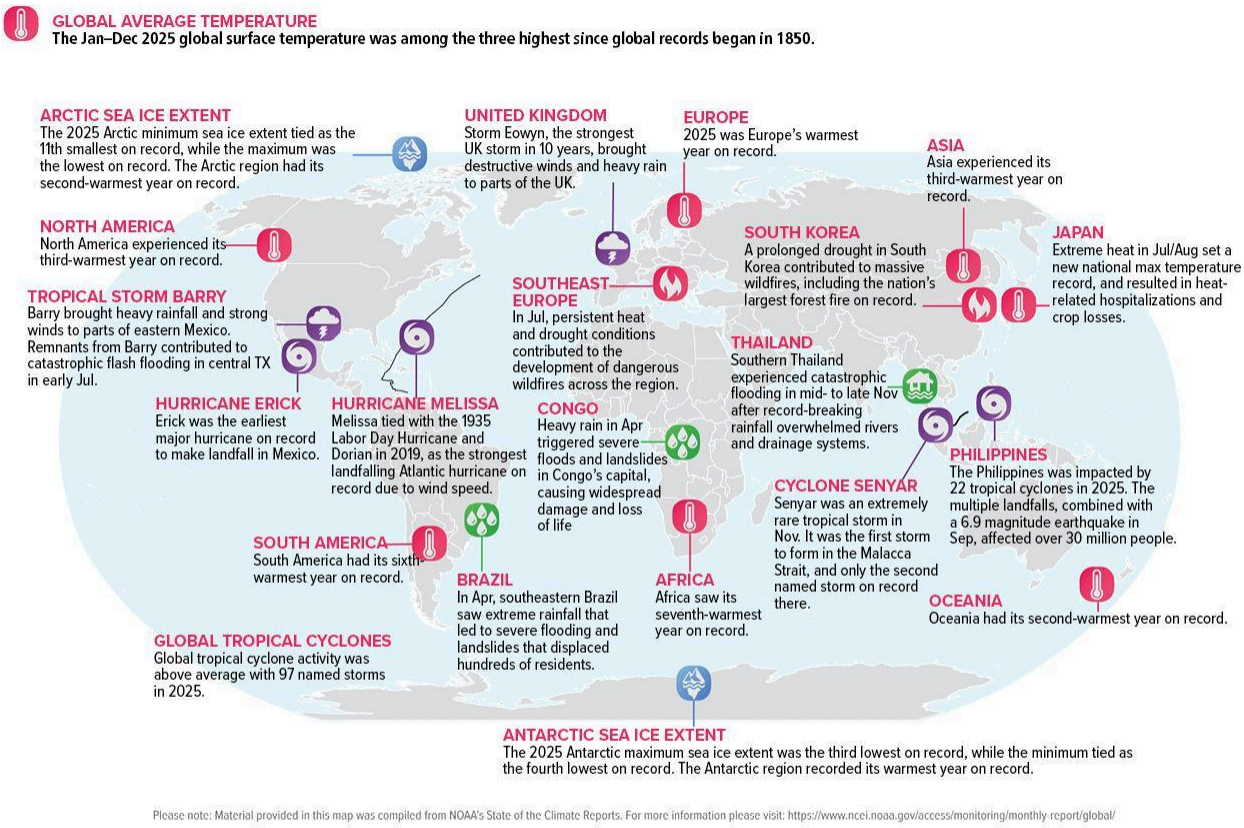


Fig. 1.1. Geographical distribution of selected notable climate anomalies and events in 2025.

"Selected Significant Climate Anomalies and Events: Annual 2025." Figure 1.1 in the State of the Climate in 2025*; see report for full caption and explanation*.

Notable findings from the international report include:

- **Earth's greenhouse gas concentrations were the highest on record.** Carbon dioxide (CO_2), methane, and nitrous oxide—Earth's major atmospheric greenhouse gases—once again reached record-high concentrations in 2025. The globally averaged CO_2 level reached 425.6±0.1 parts per million, a 53% increase from the preindustrial level of ~278 parts per million. Fossil fuel emissions in 2025 were also a record high in 2025, estimated to be 10.3±0.5 petagrams of carbon per year, more than three times the 3.0±0.2 petagrams of carbon per year in the 1960s.



- **Record and near-record temperatures were notable across the globe.** The 2025 global mean temperature across land and ocean was among the three highest years on record, with records dating back as far as the mid-1800s. Near-neutral and La Niña-like conditions occurred in the eastern Pacific Ocean throughout the year, making 2025 the warmest year on record in which no El Niño conditions were present. Europe reported its warmest year on record, and Russia, China, the Republic of Korea, and Argentina each reported their second warmest. All five major global temperature datasets used for analysis in the report agree that the last 11 years (2015–25) were the 11 warmest on record.

- **Despite cool ENSO and weak La Niña conditions, sea surface temperatures were at near-record-high levels.** Cool ENSO (El Niño-Southern Oscillation) conditions were sandwiched between weak La Niña conditions during 2025. Despite the cooler conditions in the equatorial Pacific Ocean throughout much of 2025, the mean annual global sea surface temperature was the third highest in the 172-year record, and 0.38°C above the 1991–2020 average. Approximately 87% of the ocean surface experienced at least one marine heat wave in 2025. Only 26% of the ocean surface experienced at least one marine cold spell.

- **Ocean heat and global sea level were the highest on record.** Over the past half-century, the oceans have stored almost 90% of the excess energy trapped in Earth's system by greenhouse gases and other factors. The global ocean heat content, measured from the ocean's surface to a depth of 2000 meters, continued to increase, and reached new record highs in 2025. Global mean sea level was a record high for the 14th consecutive year, reaching about 111.2 millimeters above the average for 1993, when satellite altimetry measurements began. Warming oceans have contributed an average of 1.6±0.3 millimeters per year to rising sea levels since 2005, while melt from ice sheets and glaciers has contributed an average of 2.0±0.4 millimeters during that same period.

- **The Arctic saw near-record warmth.** The Arctic had its second-warmest year in the 126-year record. Surface air temperatures in the Arctic are increasing at roughly three times the global average rate. Precipitation is also increasing across the region. In response to the precipitation and temperature increases, tundra plants have been increasing; 2025 marked the third-highest value in the record with respect to greenness, a measure of the increase in plants and productivity. In Arctic waters, maximum sea ice extent in 2025 was the lowest in the 47-year record, while minimum extent was the 11th lowest. The thickness of the sea ice, which is related to its age, has also been decreasing over time. Ice older than four years old is nearly absent, with only 95,000 square kilometers of older ice in September 2025 as compared to 1.5 million square kilometers in the 1980s.

- **Antarctica saw record warmth and continued low sea ice.** Antarctica observed its warmest year since the start of the record in 1979. Surface melt on the continent was

above average on most ice shelves, and melt on the Antarctic Peninsula approached record levels in early January. Surrounding the continent, sea ice remained below average in 2025, following a nearly decade-long trend. Annual daily maxima and minima of sea ice extent were the third and fourth lowest on record, respectively.

- **Glaciers around the world continued to melt.** Land-based glaciers continued to lose ice for the 38th consecutive year, losing the equivalent of more than 1 meter of water on average for the fourth straight year. About 41% of the loss experienced by glaciers since 1976 has occurred in the last decade.

- **Tropical cyclone activity was above average.** A total of 97 named tropical cyclones were observed during the Northern and Southern Hemispheres' storm seasons, above the 1991–2020 average of 87. Five storms reached Category 5 intensity. Three of these storms occurred in the North Atlantic, tying for the second most on record for that basin. Hurricane Melissa became one of the strongest Atlantic hurricanes on record, with a maximum intensity of 190 miles per hour and a minimum central pressure of 892 hPa on October 28. Melissa made landfall in Jamaica as a Category 5 storm, causing devastation on the western part of the island. The storm caused 95 fatalities and resulted in at least $12.2 billion (U.S. dollars) in damage. There were 12 named storms in the Australian basin during the 2024/25 season, which was the most in a season since 2005/06. In February, Tropical Cyclone Zelia reached Category 5 intensity at sea and made landfall as a Category 4 storm in Western Australia. Flood heights at the town of Marble Bar due to heavy rainbands were nearly 2 meters above previous records.

The *State of the Climate* report is a peer-reviewed series published annually as a special supplement to the *Bulletin of the American Meteorological Society*. The journal makes the full report openly available online.

About the American Meteorological Society

The American Meteorological Society (www.ametsoc.org) advances the atmospheric and related sciences, technologies, applications, and services for the benefit of society. Founded in 1919, AMS has a membership of more than 11,000 professionals, students, and weather enthusiasts. AMS publishes 12 scientific journals in the atmospheric and related oceanic and hydrologic sciences; sponsors more than 12 conferences annually; and offers numerous programs and services to the weather, water, and climate community.