# Record-breaking north Pacific summer heatwave disrupts global climate patterns



The northern Pacific Ocean experienced its warmest summer on record in 2025, with sea surface temperatures between July and September exceeding the previous year's peak by more than 0.25°C. This marine heatwave, covering an area roughly ten times the size of the Mediterranean, has puzzled climate scientists due to its intensity and duration. Analysis of data from the European Copernicus climate service highlighted the exceptional warming of this region, sometimes termed the "warm blob," stretching from the east coast of Asia to the west coast of North America. This marked rise in sea temperatures surpasses earlier climate model predictions and is considered a rare event with less than a 1% chance of occurring in any single year, according to the Berkeley Earth group.

The warming of ocean waters is consistent with the broader trend of rising global temperatures, driven by human emissions of greenhouse gases such as carbon dioxide. Research published earlier in 2025 indicates that global warming has tripled the number of days featuring extreme ocean heat worldwide. However, the scale and rapidity of warming in the north Pacific exceed what many climate simulations had anticipated. Scientists believe that natural weather variability—such as the weaker-than-usual winds during this summer, which allowed heat to accumulate at the ocean surface—plays a role but does not fully explain the phenomenon. Additional factors, including changes in shipping fuel regulations that reduced sulphur dioxide emissions, are hypothesised to have contributed. Sulphur dioxide previously created aerosols that reflected sunlight and mitigated warming, so its reduction may have unveiled more of the human-caused warming. Similarly, decreased air pollution in Chinese cities, which once helped deflect sunlight, could have inadvertently accelerated ocean warming in the region.

This unusual marine heatwave is already influencing weather patterns on both sides of the Pacific Ocean. For example, the warm waters contributed to record summer heat in Japan and South Korea and amplified storms and thunderstorms in the western United States, particularly in California. The warm ocean feeds moisture-rich air masses called atmospheric rivers, which can lead to heavy rainfall or snow depending on the season. In the UK and Europe, this Pacific warming could also impact winter weather through atmospheric teleconnections—long-distance climate links that allow conditions in one region to affect another. Researchers suggest that the warm north Pacific might promote high-pressure systems over Europe, drawing colder Arctic air into the continent and potentially resulting in a colder start to winter. Nonetheless, this effect is uncertain and complex, as other weather influences also shape European winters, which are generally becoming milder due to climate change.

Complicating forecasts further is the concurrent development of a weak La Niña in the tropical eastern Pacific, characterised by cooler-than-average sea surface temperatures. La Niña events tend to raise the likelihood of colder early winters in the UK, before shifting toward a warmer end to the season. Scientists expect these two Pacific drivers to interact, with the extreme warmth in the north Pacific potentially playing a more dominant role this winter due to the weakness of the La Niña.

Beyond the north Pacific, July 2025 was the third-warmest July globally for ocean temperatures, with 71% of the world's oceans experiencing above-average warmth, including the North Atlantic and Indian Oceans. The Mediterranean Sea saw the highest marine heatwave intensities for July, underscoring the widespread nature of ocean warming. Similarly, August 2025 continued the trend, ranking as the third-warmest August on record worldwide. The UK’s surrounding waters also suffered a severe marine heatwave earlier in the year, from March to May, with sea surface temperatures reaching record highs of up to 4°C above the norm off the west coast of Ireland. These prolonged warm conditions are linked to persistent high-pressure weather systems that led to dry, calm, and sunny conditions, which not only heated the sea but also amplified heatwaves on land and modified rainfall patterns in the region.

The increasing frequency and intensity of marine heatwaves pose severe risks to marine ecosystems and global climate patterns. In September 2025, nearly 9% of the global ocean surface experienced strong marine heatwave conditions — the fourth-largest extent on record — again highlighting the ongoing challenge these events present to environmental stability worldwide.

Overall, the unprecedented warming of the north Pacific this summer exemplifies the complex interplay between human-induced climate change and natural variability. The unexpected scale of this event serves as a stark reminder of the challenges scientists face in modelling and predicting climate behaviour in a rapidly changing world.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.bbc.com/news/articles/ce3xynwwx4yo?at_medium=RSS&at_campaign=rss), [[4]](https://www.mercator-ocean.eu/bulletin/ocean-temperature-bulletin-september-2025/)
* Paragraph 2 – [[1]](https://www.bbc.com/news/articles/ce3xynwwx4yo?at_medium=RSS&at_campaign=rss), [[7]](https://www.ncei.noaa.gov/news/global-climate-202507)
* Paragraph 3 – [[1]](https://www.bbc.com/news/articles/ce3xynwwx4yo?at_medium=RSS&at_campaign=rss)
* Paragraph 4 – [[1]](https://www.bbc.com/news/articles/ce3xynwwx4yo?at_medium=RSS&at_campaign=rss)
* Paragraph 5 – [[1]](https://www.bbc.com/news/articles/ce3xynwwx4yo?at_medium=RSS&at_campaign=rss), [[2]](https://www.mercator-ocean.eu/press-release/july-2025-third-warmest-july-on-record-for-global-ocean/), [[6]](https://www.mercator-ocean.eu/press-release/august-2025-third-warmest-august-on-record-global-ocean/)
* Paragraph 6 – [[3]](https://www.metoffice.gov.uk/blog/2025/uk-waters-gripped-by-prolonged-marine-heatwave), [[5]](https://earthobservatory.nasa.gov/images/154370/record-heat-in-northwest-european-waters), [[4]](https://www.mercator-ocean.eu/bulletin/ocean-temperature-bulletin-september-2025/)
* Paragraph 7 – [[1]](https://www.bbc.com/news/articles/ce3xynwwx4yo?at_medium=RSS&at_campaign=rss), [[4]](https://www.mercator-ocean.eu/bulletin/ocean-temperature-bulletin-september-2025/)

Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

1. <https://www.bbc.com/news/articles/ce3xynwwx4yo?at_medium=RSS&at_campaign=rss> - Please view link - unable to able to access data
2. <https://www.mercator-ocean.eu/press-release/july-2025-third-warmest-july-on-record-for-global-ocean/> - In July 2025, the global ocean experienced its third-warmest July on record, with a mean sea surface temperature (SST) of 20.80°C. Approximately 71% of the global ocean had above-average temperatures, notably in the North Pacific, North Atlantic, and Indian Oceans. The Mediterranean Sea also recorded the highest average marine heatwave intensity for a July month. These findings highlight the ongoing trend of rising ocean temperatures and the increasing frequency of marine heatwaves worldwide.
3. <https://www.metoffice.gov.uk/blog/2025/uk-waters-gripped-by-prolonged-marine-heatwave> - Between March and May 2025, the waters surrounding the UK experienced an extreme marine heatwave, with sea surface temperatures reaching record highs for April and May since satellite monitoring began in 1982. This prolonged event was due to persistent high-pressure systems, leading to warmer conditions by up to 4°C west of Ireland and 1.5-2.5°C around the UK coastline. Such prolonged warming can amplify land heatwaves and alter rainfall patterns.
4. <https://www.mercator-ocean.eu/bulletin/ocean-temperature-bulletin-september-2025/> - In September 2025, 9% of the global ocean surface experienced strong or higher marine heatwave conditions for at least one day, marking it as the fourth-widest extent on record. The North Atlantic, Mediterranean Sea, and North Pacific were notably affected. These events underscore the increasing prevalence and intensity of marine heatwaves, which have significant implications for marine ecosystems and global climate patterns.
5. <https://earthobservatory.nasa.gov/images/154370/record-heat-in-northwest-european-waters> - In spring 2025, a prolonged marine heatwave impacted the waters surrounding the United Kingdom and Ireland, with sea surface temperatures reaching up to 4°C above normal by mid-May. This event, which began in early March and continued into May, was one of the region's longest on record for this time of year. Persistent high-pressure systems led to sunny, dry, and calm conditions, allowing surface waters to warm significantly.
6. <https://www.mercator-ocean.eu/press-release/august-2025-third-warmest-august-on-record-global-ocean/> - August 2025 saw globally elevated sea surface temperatures, ranking as the third-warmest August ever recorded. This trend reflects the ongoing rise in ocean temperatures and the increasing frequency of marine heatwaves worldwide, with significant implications for marine ecosystems and global climate patterns.
7. <https://www.ncei.noaa.gov/news/global-climate-202507> - July 2025 had the third-highest global surface temperature in NOAA’s 176-year record, with temperatures 1.00°C higher than the 20th-century baseline. This trend underscores the ongoing impact of climate change on global temperatures and highlights the need for continued monitoring and mitigation efforts.