# Sudden temperature whiplash events have become more frequent across the globe



Research published in Nature Communications and reported by the Financial Times reveals that sudden and intense temperature fluctuations, termed "temperature whiplash," have become increasingly common worldwide between 1961 and 2023. This phenomenon involves rapid shifts between warm and cold extremes within days, impacting over 60% of the global population.

The study quantifies these warm-to-cold and cold-to-warm “flip events” by tracking temperature changes swinging from one standard deviation above the mean temperature to one standard deviation below the mean (or vice versa) within a five-day period. The research highlights regions most affected, notably mid-latitude areas across western Europe, South and South-East Asia, South America, and the southern extremity of Africa. An example cited is the Rocky Mountains in September 2020, where a severe heatwave was abruptly followed by snowfall and a temperature plunge exceeding 20°C within hours.

Researchers attribute the intensification of these rapid temperature swings to changes in atmospheric dynamics, particularly the increased “waviness” of the jet stream—a high-altitude air current that circles the globe—and alterations in evaporation patterns as a result of global warming. A scientist not involved in the study described understanding the underlying physics as "challenging," emphasising the complex interaction of climatic factors driving the phenomenon.

Using temperature datasets from multiple sources, including the European ERA5 reanalysis, Berkeley Earth, and the US National Centers for Environmental Prediction, the research team mapped the frequency, intensity, and duration of these flip events over more than six decades. Their analysis indicates that the occurrence of these events has increased significantly and is projected to rise further in the future.

Model projections under various greenhouse gas emission scenarios show that temperature flip events will not only become more frequent but also more intense and rapid. The degree of increase depends heavily on the trajectory of future emissions. Under high emission scenarios, the global population exposed to these temperature extremes may more than double by the end of the century, with low-income countries identified as the most vulnerable.

Co-author Wei Zhang, professor at Utah State University, warned of potential "cascading effects on both natural and built environments such as croplands, ecological systems, and cities." He highlighted that the short timescale between temperature shifts leaves limited time for adaptation by humans and ecosystems, exacerbating potential damage.

The findings underscore evolving patterns in global climate variability, revealing a pressing need for further research and preparedness related to rapid temperature changes and their impacts across diverse regions.

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

## Bibliography

1. <https://www.ft.com/content/d99ce893-cb18-4f2a-bb0c-d701e89f72ce> - This Financial Times article reports on a study published in Nature Communications, highlighting the increasing frequency and intensity of 'temperature whiplash' events worldwide between 1961 and 2023, affecting over 60% of the global population.
2. <https://www.ft.com/content/3d7340bc-2900-49d5-b261-e442fa642e08> - This Financial Times article discusses the study's findings on the rise of abrupt temperature shifts, termed 'temperature whiplash,' between 1961 and 2023, impacting over 60% of the globe.
3. <https://www.ft.com/content/46db85c1-595d-4d2e-be50-353573cbd4ac> - This Financial Times article describes the phenomenon of 'hydroclimate whiplash,' characterized by rapid shifts between extreme wet and dry conditions, intensified by climate change.
4. <https://www.ft.com/content/3d7340bc-2900-49d5-b261-e442fa642e08> - This Financial Times article reports on the study's identification of regions most affected by 'temperature whiplash,' notably mid-latitude areas across western Europe, South and South-East Asia, South America, and the southern extremity of Africa.
5. <https://www.ft.com/content/d99ce893-cb18-4f2a-bb0c-d701e89f72ce> - This Financial Times article provides an example of the Rocky Mountains in September 2020, where a severe heatwave was abruptly followed by snowfall and a temperature plunge exceeding 20°C within hours.
6. <https://www.ft.com/content/3d7340bc-2900-49d5-b261-e442fa642e08> - This Financial Times article discusses the study's attribution of the intensification of rapid temperature swings to changes in atmospheric dynamics, particularly the increased 'waviness' of the jet stream and alterations in evaporation patterns due to global warming.
7. <https://www.ft.com/content/d99ce893-cb18-4f2a-bb0c-d701e89f72ce> - Please view link - unable to able to access data