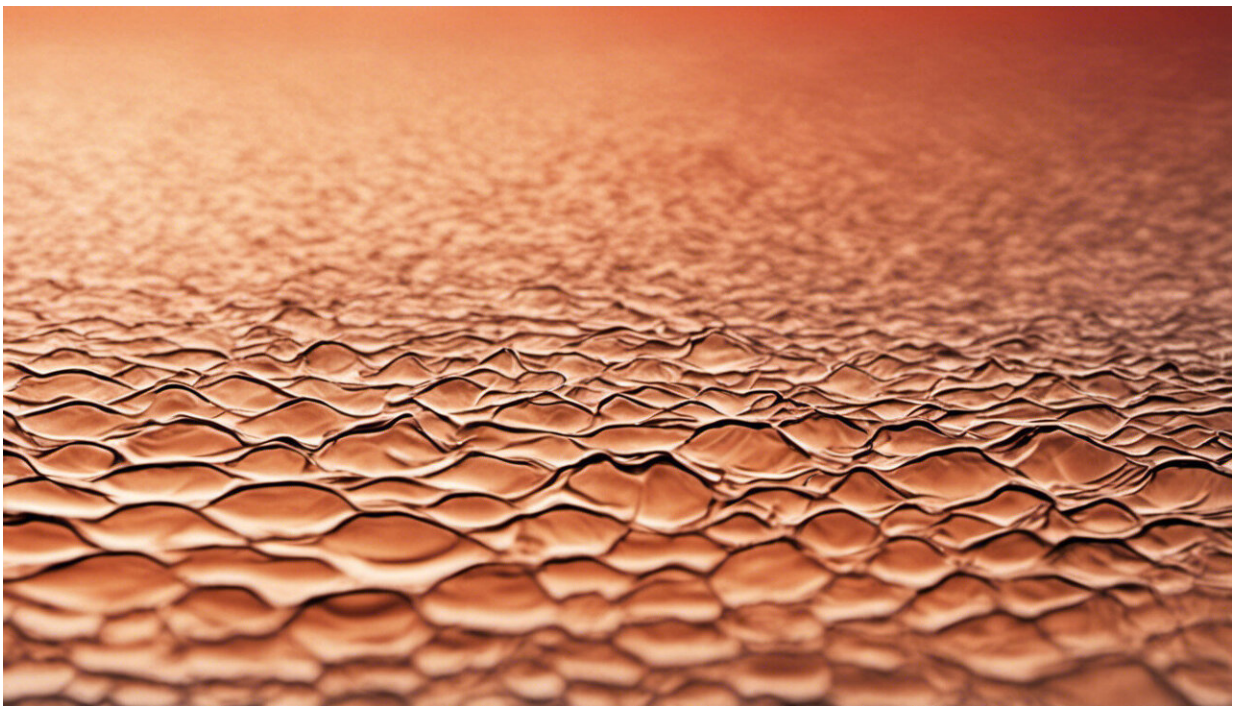


How hot could heat waves get? Climate expert discusses record-breaking temperatures

September 27 2022



Credit: AI-generated image ([disclaimer](#))

The summer of 2022 has been characterized in Europe by images of drought and wildfires brought on by heat waves, including many areas not known for such extremes. At the time of writing, Europe has already recorded over 12,000 excess deaths.

It looks like the trend is heading ever upwards, prompting concerns about the ability of people and infrastructure to cope.

"Weather observations provide overwhelming evidence that heat waves are becoming more frequent and more intense in almost all regions of the world," explains Markus Donat from ICREA and the Barcelona Supercomputing Center. "Concurrent heat waves are also increasing, making coordinated transnational responses difficult."

Donat's research shows that the intensity and frequency of heat waves will continue to increase with every 10th of a degree Celsius of [global warming](#), with land regions warming faster than the [global mean temperature](#) (which includes the oceanic regions, which are slower to warm).

"In the Mediterranean region for example, hot extremes will increase by about 1.5 °C for each degree of global warming. If [global temperatures](#) increase by 2 °C, Mediterranean heat extremes are expected to be 3 °C hotter, or 6 °C hotter if global warming hits 4 °C," Donat says. "In short, southern Europe could see temperatures over 50 °C in the coming decades."

Worryingly, Donat adds that there doesn't seem to be a naturally enforced limit to how hot things can get: "As long as global temperatures continue to rise, heat waves will become even hotter."

Predicting the next heat wave

As weather and climate modeling benefits from increasingly sophisticated algorithms, fed by more detailed data, so extreme event predictions become more accurate. But as Donat remarks, "to accurately predict heat waves we also have to account for the atmospheric circulation patterns which drive them."

Owing to the sheer number and complexity of factors involved, these are complicated to model. Through the PROTECT project, Donat investigated the ability of the jet stream to trap naturally occurring atmospheric waves called Rossby waves, prolonging and intensifying heat waves.

Current models simulate a wide range of atmospheric and ocean variables, and are getting better at predicting other weather events, such as extreme cold snaps or heavy rainfall.

This could help inform a range of mitigation and adaptation measures, such as tree planting in cities to create shaded areas. But as Donat concludes, "the [climate models](#) are clear: the most effective mitigation would be to cut emissions, avoiding further warming."

Provided by CORDIS

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