

Expecting the unexpected could help us prepare for climate extremes

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The U.S. Pacific Northwest experienced an unprecedented heat wave in summer 2021, with many locations in the region breaking all-time maximum temperature records by more than 9 °F (5 °C). Although weather models had forecasted the warmer-than-average conditions that summer, the extreme temperatures caught the climate science community by surprise. In the past year, so have catastrophic, deadly floods in such places as Libya and China and record-breaking wildfires

in Canada.

Our collective unpreparedness for such extreme climate events should be a cause for concern, argue Sherwood et al. [In a paper published](#) in *Earth's Future*, the authors contend that a reliance on models that don't account for enough relevant factors and a tendency toward linear thinking have narrowed perceptions of climate change risks.

Central to their argument is the idea that society is too focused on the expected gradual consequences of climate change and not enough on high-impact, low-likelihood occurrences and tipping points—regime shifts in which systems can change rapidly and irreversibly. The authors suggest that as a result, we are overlooking critical potentialities in our efforts to adapt to and weigh mitigation options for a warmer future.

The authors outline two questions for [climate scientists](#) to consider. First, what are the high-impact, low-likelihood hazards and irreversible changes that society should worry about, and how can their risks be measured and communicated? Second, how can scientists identify achievable and safe pathways to a future climate that also meets human needs?

To answer these questions, climate scientists must consider a broader array of risks than they conventionally have, examining how these risks affect not just the climate but also society and the larger biosphere. This effort will likely involve working across disciplines and using new modeling approaches that better represent tipping points, low-likelihood events, and other aspects of physical and human systems compared with current approaches. The authors also emphasize that clear communication will be crucial in conveying climate risks to the public and coordinating across scientific disciplines.

More information: S. C. Sherwood et al, Uncertain Pathways to a

Future Safe Climate, *Earth's Future* (2024). DOI: [10.1029/2023EF004297](https://doi.org/10.1029/2023EF004297)

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