

Missing wind variability means future impacts of climate change may be underestimated in Europe and North America

September 20 2021



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Extratropical winds have a strong influence on climate in extratropical regions, and are known to vary from decade to decade. However, their variability is currently not factored into climate models making predictions for future climates in these regions. Researchers inserted these into predictions for how extratropical climates will change by the middle of the century, and found uncertainty increased significantly, meaning unusually hot, cold, dry or wet decades are likely to be more frequent here than previously thought.

Climate models may be underestimating the impact <u>climate</u> change will have on the UK, North America and other extratropical regions due to a crucial missing element, new research has shown.

Scientists at the University of Reading have warned that current projections of how a warming world will affect <u>regional temperatures</u> and rainfall do not take into account the fact that extratropical winds—which have a strong influence on climate in the midlatitudes—vary greatly from decade to decade.

The research team used observations of these winds over the 20th century to better represent their variability in climate model predictions of the future. They found that this made the predictions of future climate less certain in the extratropics—particularly in the North Atlantic <u>region</u> and particularly in winter—and that unusually hot, cold, wet or dry decades are projected to be much more likely by the middle of the century in this region than existing climate simulations suggest.

Dr. Christopher O'Reilly, a Royal Society University Research Fellow in the University of Reading's Department of Meteorology, said: "Variations between decades in the strength of winds in the more temperate regions of the world are a crucial missing ingredient in projections of the future climate of those regions.



"By adding this extra variability into <u>climate models</u>, we showed that these winds may be an additional source of uncertainty on top of climate change. This could mean that within these regions, temperatures are pushed to relatively extreme highs or lows more often. While in some decades they could counteract increases to temperatures and <u>heavy</u> <u>rainfall</u> caused by climate change, in other periods they could make these extremes even more extreme.

"This is yet another reminder that preparation will be crucial as we face up to more variable regional climates as an impact of climate change in the future."

The team used wind observation data from the Met Office, Copernicus Climate Data Store and NOAA, among others, to carry out their analysis and bolster the climate model predictions.

The range of temperature and rainfall most likely to occur in future decades increased by 50% across Northern Europe, Northern America and the Mediterranean—with uncertainty nearly doubling in some cases.

This strengthens previous research that suggests rainfall and temperatures that are very unlikely today will fall within the likely range in future due to climate change.

The updated projections showed that the Mediterranean would see a higher frequency of drier-than-average winters. As studies show that dry winters in this region make heatwaves in Europe more common the following summer, this has health and infrastructure implications for several countries.

The study is published in Communications Earth & Environment.

More information: Projections of northern hemisphere extratropical



climate underestimate internal variability and associated uncertainty, *Communications Earth & Environment*, <u>DOI:</u> <u>10.1038/s43247-021-00268-7</u>

Provided by University of Reading

Citation: Missing wind variability means future impacts of climate change may be underestimated in Europe and North America (2021, September 20) retrieved 6 May 2024 from <u>https://phys.org/news/2021-09-variability-future-impacts-climate-underestimated.html</u>

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