EXTREME WEATHER

## Tornado and hail exposure

*Weather Clim. Soc.* **12**, 575–595 (2020).

Tornadoes and hailstorms can be highly destructive. Owing to local topography and meteorology, eastern Colorado, USA, exhibits a local maximum of these events, and parts of this region are experiencing rapid population growth. Understanding the impacts of climate warming and population change on future human exposure to these hazard extremes is important for regional planning and adaptation.

Samuel Childs of Colorado State University, Fort Collins, USA, and co-authors estimate changes in tornado and hailstorm human exposure in eastern Colorado using simulations of historical and future weather, population change scenarios and statistical models of tornado and hailstorm spatial distributions. By 2100, the average number of days per year with tornadoes and severe hail across eastern Colorado is estimated to increase by one and three, respectively. Exposure could increase as much as 117% for tornadoes and 178% for hailstorms depending on how population growth scenarios overlap spatially with projected hazard frequency. These results highlight the importance of considering both meteorology and population for future human exposure, and this approach can be applied to other regions vulnerable to such events.

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FROZEN FOOD

## Owls' hoards rot

*Glob. Change Biol.* http://doi.org/d6hw (2020).

Credit: Szymon Bartosz / Alamy Stock Photo

For predators, climate change-induced shifts in prey numbers, behaviours and spatial or temporal locations can be a major threat to food security. For predators that hoard prey to ensure survival through harsh winters, climate variation can have a doubled effect — influencing both food capture and store stability. Although northern latitude autumn and winter temperatures have increased dramatically in recent years, the effects of climate on foraging and storing throughout winter remain understudied.

Giulia Masoero at the University of Turku, Finland, and colleagues analysed the impact of climate on Eurasian pygmy owl (*Glaucidium passerinum*) food-hoarding behaviour across 16 years. They found increased freeze–thaw frequency, lower winter precipitation and deeper snow cover were linked to greater hoard consumption. Higher autumn precipitation and an early hoarding start led to food rot, which reduced female owl recapture (indicating death or emigration).

Although owls delayed hoarding in autumns with fewer freeze–th0aw events, suggesting some potential for climate change adaptation, the study indicates that altered climates can decrease owl overwinter survival, which may in turn have vast impacts on the boreal food web. *TAM*

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HYDROCLIMATE VARIABILITY

## Six centuries of drought

*Proc. Natl Acad. Sci. USA* **117**, 16816–16823 (2020).

Climate change will lead to more frequent and severe drought in some areas of the world, with social and economic repercussions. In South America, recent droughts have had a negative impact on agricultural production in particular, yet the development of drought in South America is not well understood, in part due to the lack of long-term hydroclimate records.

Mariano Morales from the Instituto Argentino de Nivología, Glaciología y Ciencias Ambientales and colleagues combine a database of tree ring chronologies spanning over 600 years with a metric of drought severity to develop an atlas of drought for South America. They find that severe widespread droughts and rainfall are linked with the El Niño/Southern Oscillation and the Southern Annular Mode, and that droughts and wet events since the middle of the twentieth century increased in extent and severity. These results indicate the influence of anthropogenic climate change on natural hydroclimatic variability, as well as provide important context for understanding and predicting drought dynamics under further warming. *AF*

Credit: MirageC / Moment / Getty

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ARCTIC HYDROLOGY

## Emerging changes

*Geophys. Res. Lett.* **47**, e2020GL088854 (2020).

The Arctic is getting wetter — the amount of liquid freshwater has increased over the last 20 years, leading to fresher surface waters of the Arctic Ocean. However, it has been unclear if the freshening is a result of natural multi-decadal climate variability or anthropogenic climate change.

Using a model ensemble, Alexandra Jahn and Rory Laiho of the University of Colorado Boulder, USA, show that the Arctic freshwater increase is likely driven by climate change. Considering when these signals will emerge from the background variability under low and high emissions scenarios, ocean changes will be earlier than land and atmosphere. The freshwater flux to the North Atlantic will emerge first for the Nares Strait, which connects northern Baffin Bay west of Greenland with the Arctic Ocean for all ensemble members and scenarios by the end of 2020s. This is followed by the Davis Strait, which connects Baffin Bay and the Labrador Sea. The anthropogenic-driven change of freshwater fluxes is already underway, and these results suggest detection will soon be possible. *BW*

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