

## research highlights

### PUBLIC HEALTH

#### Warming impacts the ER

*GeoHealth* **2**, 182–194 (2018)



Credit: pablohart/E+/Getty

The spectre of extreme heat in a warming climate has made the temperature–mortality relationship an area of extensive study. Temperature-related illnesses are an equally salient concern from a public health perspective, given the potentially large associated economic costs.

To address this issue, Claire Lay of Abt Associates, Inc., USA, and co-authors examine the relationship between daily maximum temperature and emergency room (ER) visits for heat-related illnesses using private insurance data for the United States. They then project ER visits for May–September temperatures under two RCP scenarios using five GCMs, and calculate the medical expenses for the projected visits. By 2050, an additional 21,000–28,000 hyperthermia ER visits are expected, with treatment costs ranging from US\$6 to US\$52 million. By 2090, the associated treatment cost for 28,000–65,000 additional

hyperthermia ER visits is between US\$9 and US\$118 million.

The authors characterize the cost estimates as conservative. Nonetheless, they highlight a need for the public health community to plan for preventable health impacts associated with climate change. *AY*

<https://doi.org/10.1038/s41558-018-0274-y>

### PHENOLOGY

#### Reaching into danger

*Nature* <http://doi.org/gdxvxs> (2018)

A lengthening growing season in response to recent warming is well documented in temperate and high-latitude vegetation, but the extent to which this trend can be expected to continue under future warming depends on whether other environmental factors become more limiting in these unprecedented conditions.

To explore climate change-related phenological shifts, Andrew Richardson from Northern Arizona University and co-authors use digital repeat photography of a whole-ecosystem warming experiment (up to +9 °C) set in a boreal *Picea–Sphagnum* bog ecosystem. They find that temperature linearly correlates with delayed autumn green-down and advanced spring green-up. This suggests an extension of the period of vegetation activity of 1–2 weeks under a ‘CO<sub>2</sub> stabilization’ scenario (RCP 4.5; +2.6 ± 0.7 °C) — and 3–6 weeks under a ‘high emission’ scenario (RCP 8.5; +5.9 ± 1.1 °C) — by the end of the century.

There was little to indicate that responses were constrained by photoperiod; this

allowed green-up and loss of frost hardiness to occur when spring frost risk was still high, suggesting that vulnerability to spring frost damage will increase in the future. *AB*

<https://doi.org/10.1038/s41558-018-0276-9>

### CLIMATE DYNAMICS

#### A stratospheric pathway

*Sci. Adv.* **4**, eaat6025 (2018)



Credit: Pavel Filatov/Alamy Stock Photo

Studies have suggested that Arctic sea-ice loss can be linked to an increased occurrence of cold extremes across Eurasia. However, the robustness of this connection has been debated due to inconsistencies between model analyses. Using perturbation experiments performed with an atmospheric model that comprehensively represents stratospheric processes (SC-WACCM4), Pengfei Zhang from Purdue University, USA, and colleagues further investigate the atmospheric response to Arctic sea-ice loss.

A robust wintertime cooling is found across Eurasia, largely in Siberia, in response to imposed ice loss in the Barents–Kara seas. This cooling pattern is attributed to an enhanced Siberian High, characterized by a ridge anomaly near the Ural Mountains and a trough over East Asia, favouring the southward advection of cold anomalies and cold air outbreaks across Siberia. The downward influence of the stratosphere is integral in producing a coherent warm Arctic–cold Siberia pattern, with simulated temperature anomalies much warmer when the stratospheric pathway is absent. These results highlight a robust Arctic–mid latitude connection, but emphasize that stratospheric processes must be incorporated when diagnosing relationships between the two. *GS*

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### CLIMATE POLICY

#### A corporate climate

*Climatic Change* <http://doi.org/csv8> (2018)

Political activities that are designed to influence government decisions on behalf of an organization include direct lobbying of politicians, funding think-tanks, grass-roots mobilization and public relations campaigns. Although lobbying has been implicated in the failure to pass legislation to limit carbon emissions in the United States, research on climate policy has typically focused on public opinion rather than the institutional dynamics that support political decision-making.

Robert Brulle from Drexel University, USA, analysed quarterly lobbying reports that are mandatory for organizations that spend money on direct lobbying efforts in the United States, and found that US\$2 billion was spent on climate lobbying from 2000 to 2016, representing 3.9% of total lobbying outlay. Lobbying expenditures varied over time, peaking in 2009–2010 when Congress and the Executive Branch were Democrat-controlled, and corresponded to the number of bills and Congressional hearings related to climate change. The limited contribution of environmental organizations to climate lobbying expenditures relative to corporations in the transportation, utility and fossil fuel sectors that made up the majority of spending raises questions about the balance of information provided to government decision-makers. *JR*

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