be high, even with the volatile nature of fuel markets. The plant can also be cultivated for domestic use. They conclude that this environmentally sustainable investment is economically viable. *BW*

PHENOLOGY

Experiments in context

Nature http://doi.org/hv9 (2012)

Artificial warming experiments are a key line of evidence used to estimate plant responses to climate change. Changes in phenology (the timing of recurring life-history events), such as advances in the timing of flowering and leafing, are key ecological responses to climate change that have been widely recorded and therefore offer a useful means to investigate the ability of warming experiments to reproduce observed responses.

Elizabeth Wolkovich, of the Division of Biological Sciences, University of California San Diego, USA, and co-workers compared phenology in observational studies and warming experiments spanning four continents and over 1,600 plant species using a common measure of temperature sensitivity (change in days per °C).

The results show that compared with observations, warming experiments under-represent advances in the timing of flowering and leafing by 8.5-fold and 4.0-fold respectively. The observational data also showed that species that flower earliest in the spring have the highest temperature sensitivities — a trend that was not reflected in the experimental data. The authors caution that responses to climate change that are predicted solely from experiments should be re-evaluated. *AB*

CARBON CYCLE

Certainty about uncertainty

Environ. Res. Lett. **7,** 024002 (2012)

Key sources of uncertainty in predicting the level of expected global warming stem from difficulties in predicting greenhouse-gas emissions and the sensitivity of the climate to changes in atmospheric greenhouse-gas concentrations. The additional uncertainty in relating carbon emissions to atmospheric carbon dioxide concentrations — resulting from incomplete knowledge of the carbon cycle — is typically estimated to be smaller than those in physical climate feedbacks and emissions.

Ben Booth, from the Met Office Hadley Centre, UK, and co-workers used a fully coupled climate–carbon cycle model to systematically explore the magnitude of the various sources of uncertainty in the land carbon-cycle feedback.

The simulations indicate that the plausible range of climate–carbon-cycle feedbacks might be significantly larger than previously estimated. The range of carbon dioxide concentrations (669–1130 parts per million by the year 2100) that could arise from a single emissions scenario was estimated to be greater than conventionally estimated across the full range of different Intergovernmental Panel on Climate Change emissions scenarios if carbon-cycle feedbacks are ignored. The authors note that this reveals an urgent need for better understanding of plant photosynthetic responses to warming, as these are shown to be key contributors to the magnitude of future carbon dioxide change. *AB*

CRYOSCIENCE

Glacier speeds

The Cryosphere **6,** 467–478 (2012)

Satellite observations can reveal changes in glaciers, and repeat observations allow investigation into glacier dynamics worldwide. Studies can encompass a large number of glaciers, both in one region and across regions, to gain a better understanding of the changes taking place.

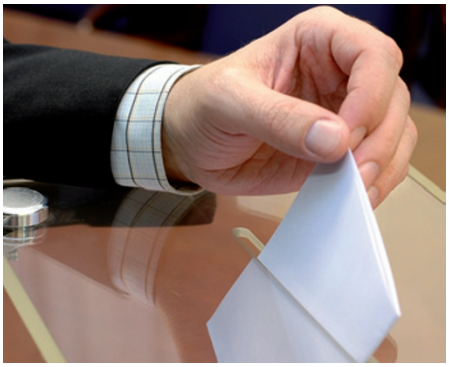
In a study by Torborg Heid and Andreas Kääb, of the University of Oslo, repeat satellite observations were used to study glacier speed in six glaciated regions — five in the Northern Hemisphere and one in Patagonia in the Southern Hemisphere.

Five of the studied regions had decreasing glacier mass. All regions with decreasing ice showed that glacier speed also decreased — up to 43% in Pamir, Asia. Less ice was transported down the glaciers, as there was decreasing mass accumulating at the top of the glacier. The decreased transport resulted in thinning and receding ice. Opposed to this are glaciers in the Karakoram region in Asia, which have generally increased speed. This increased speed was not representative of the entire region, as it has many surging and unstable flow glaciers. The study of a large number of glaciers across regions provides insights into differing glacier response to climate change. *BW*

POLITICS

Voting for climate

Econ. Inq. http://doi.org/hv2 (2012)



The US Congress has voted on a number of pieces of legislation for carbon mitigation in recent years. Economically, such legislation makes no sense, as climate change is a global problem and early action will lead to increased costs, while other countries can 'free ride'. There has been no significant carbon legislation enacted in the United States so far, but there are clear voting patterns by individual members of Congress.

Michael Cragg, of The Brattle Group, Cambridge, USA, and colleagues investigated what influences Congressional representatives to vote green on mitigation legislation. They studied two pieces of legislation (2009–2010) and used Census of Population and Housing data (2000) to obtain standard demographic information, and the 2002 Vulcan emissions data set for carbon dioxide emissions. Influencing factors included the effect of such legislation on their district, political leaning and income.

Regions with high per capita carbon emissions, for example from industry or power generation, are less likely to support legislation than those with lower per capita emissions. More liberal and richer communities, who in their own lives are making carbon reductions, are more likely to have a representative from the Green Party or Democrats. The Democrats tend to be in support of climate change legislation, whereas the Republicans are not. Further research is needed to explain this party-based divergence. *BW*

Written by Alastair Brown and Bronwyn Wake.