research highlights

ECOLOGICAL IMPACTS
Costume change
Proc. Natl Acad. Sci. USA http://doi.org/mgz (2013)

Having a coat that changes colour with the seasons enables many mammals to maintain camouflage against contrasting white landscapes in winter versus a green/brown summer background. Changes in the pattern of the seasons — for example, earlier snowmelt — associated with climate change have the potential to mismatch seasonal coat colour with that of the environment. The degree of this mismatch depends to a large extent on whether plasticity in the initiation or rate of coat colour change can compensate for changes in seasonal timings.

Scott Mills, from the Wildlife Biology Program, University of Montana, USA and co-workers studied natural populations of snowshoe hares exposed to 3 years of varying snowpack. They found that the hares show plasticity in the rate of the spring white-to-brown moult, but not in the initiation dates of colour change or in the rate of the autumn brown-to-white moult. Mills *et al.* estimate that without evolution in the timing of seasonal colour change, the reduced snow duration will increase the number of days that white hares will be mismatched on a snowless background by four- to eightfold by the end of the century. Loss of camouflage potentially has serious implications for predation risk for these small mammals. *AB*

ENERGY POLICY
China's green jobs
Energy Policy http://doi.org/mgx (2013)

Clean Development Mechanism (CDM) ventures should boost sustainable development in the host countries. However, available evidence of success in the beneficiary regions is limited, and mostly inconclusive.

CDM projects can affect regional development by creating and/or destroying jobs, both directly — for example to build and maintain a biomass plant instead of a traditional thermal plant — and indirectly, along the supply chain of the plant, for instance. Can Wang of Tsinghua University, China, and co-workers looked at the effects on employment of the 1,384 registered CDM power-sector projects in China, as of 2011. They found that overall the projects generated losses of 99,000 net direct jobs and 3.08 million net indirect gains, resulting in a total of about 2.98 million new jobs compared with the reference scenarios. Solar projects — with the highest number of new indirect jobs created — hold large potential for development. Conversely, hydro projects led to both direct and indirect job losses, and should therefore be implemented with employment compensation mechanisms. *MC*

ECONOMICS
Impacts on roads
Glob. Environ. Change http://doi.org/mgw (2013)

Road networks are essential to the functioning of modern economies. In the USA, federal and state transport agencies spend about US$134 billion on roads annually. Understanding the impacts of climate change on road infrastructure can help planners to better allocate funds.

Paul Chinowsky of the University of Colorado at Boulder, USA, and colleagues assessed the cost of adapting roads to precipitation- and temperature-related stresses associated with climate change in the USA. They compared a baseline scenario — in which annual mean global temperature increases by 1.5 °C in 2050 relative to the historical average — with a mitigation scenario, under which this increase in mean temperature is limited to 1.0 °C. Overall they found that, in absence of policy, climate change increases the annual costs of keeping paved and unpaved roads in service by US$785 million in present value terms by 2050. If mitigation policies are in place, these costs decrease by approximately US$280 million. *MC*

CRYOSCIENCE
Glacier to sea
Nature **497,** 235-238 (2013)
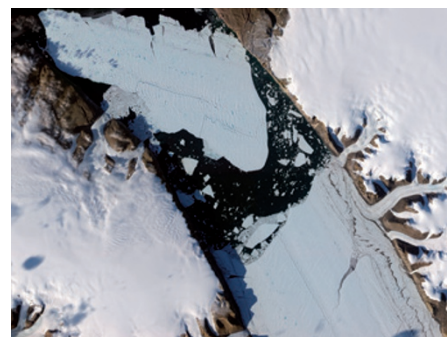
© SHOCKTREK IMAGES/THINKSTOCK

The contribution of the Greenland Ice Sheet to sea-level rise has increased in recent years. Warming has resulted in greater ice discharge — due to accelerated ice flow and thinning of fast-flowing marine-terminating outlet glaciers — and greater surface melt. However, quantifying future sea-level rise from ice melt is a challenge, as outlet glacier dynamics are poorly understood

Faezeh Nick, of the Université Libre de Bruxelles, Belgium, and colleagues use a glacier flow model to simulate the behaviour of four major marine-terminating outlet glaciers, which are responsible for draining about 22% of the Greenland Ice Sheet. They use two different warming scenarios — one mid-range and one more extreme — to predict future contributions to sea-level rise.

They project 19 to 49 mm of sea-level rise by 2200, which is lower than previous upper bounds. This comes largely from dynamic loss events of these four glaciers. There are episodic increases in calving, followed by a stabilisation to losses in the region of 0.01 to 0.06 mm yr^{-1} for each glacier. *BW*

CYROSCIENCE
Tropical connections
J. Clim. http://doi.org/mgs (2013)

Over the last 50 years, the Antarctic Peninsula has been warming at a greater rate than nearly all other locations on Earth. This has been attributed to a strengthening of circumpolar westerly winds, which is linked to human impact on the climate system.

Qinghua Ding and Eric Steig of the University of Washington, USA, use long-term weather station data from the Antarctic Peninsula to examine temperature changes. They investigate the period 1979 to 2009, and the temperature data is compared with tropical sea surface temperature from the Pacific Ocean.

Austral autumn is found to be the only season during which spatially extensive warming has occurred on the Antarctic Peninsula, accompanied by significant reduction in sea ice off the west coast. Warming in other seasons is restricted to smaller areas, with winter and spring warming observed mainly on the western side of the peninsula, reflecting the persistence of sea-ice anomalies from the autumn. The large-scale forcing behind the warming is linked to tropical Pacific sea surface temperature anomalies affecting atmospheric circulation. *BW*

Written by Alastair Brown, Monica Contestabile and Bronwyn Wake.