

METEOROLOGY

Skating on thin ice

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Outdoor skating is a favourite pastime in the Canadian winter. Increasing global temperatures threaten the formation and maintenance of ice rinks necessary for this activity.

Nikolay Damyanov and colleagues, from McGill University and Concordia University, investigated the effects of climate change on the Canadian outdoor-skating season. They used temperature data from 1951 to 2005 to calculate the start date and length of the outdoor-skating season at 210 locations across Canada. The length of the season was measured by the number of cold winter days conducive to ice formation, and the start date was measured as the first three consecutive days.

Many locations across the country have experienced a significant shortening of the outdoor-skating season. The largest decreases were in southwestern Canada and the Prairies. The start date of the season was less affected than the length of season, with

delayed starts seen in southwestern, central and eastern Canada.

Shorter winter seasons and delayed starts threaten the viability of outdoor ice rinks, which may result in the loss of this national pastime in the near future. *BW*

BIOGEOCHEMISTRY

High Arctic carbon

*Glob. Change Biol.* <http://doi.org/fz3xc2> (2012)

Reliable estimates of the level of global warming in response to a given level of anthropogenic forcing are, in part, dependant on quantifying climate feedbacks. One such potential feedback is the release of carbon dioxide and methane from northern ecosystems, which has the potential to strongly accentuate climate warming. Despite the importance of this mechanism, there remain large uncertainties in the carbon-source strength of tundra ecosystems in relation to environmental variables.

To improve quantitative understanding of these processes over a full growing season, Torbern Tagesson, from the Department of Physical Geography and Ecosystem Analysis, Lund University, Sweden, and co-workers measured the exchange of methane and carbon dioxide in a high-Arctic wet tundra ecosystem in northeastern Greenland.

They found that the wetland acted as a carbon source during the warmer and wetter part of the measurement period in 2008 and as a carbon sink for the colder and drier period during 2009. In addition to improving quantification of carbon exchange, these measurements support the idea that wet tundra ecosystems may be expected to play a more significant role in the climate in the future, as temperature and precipitation are predicted to increase in the high Arctic. *AB*

IMPACTS

Climate and health

*Proc. Natl Acad. Sci. USA* <http://doi.org/hqz> (2012)



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Climatic changes can influence human health and survival either through direct effects, such as extreme heat or floods, or through indirect means, such as changes in crop yield, infectious disease outbreaks, conflict or displacement and its consequences.

Anthony McMichael, of the National Centre for Epidemiology and Population Health at the Australian National University, investigated historical climate events and their effect on human populations over the past several thousand years. He concludes that the speed and strength at which a climatic change occurs significantly affects the outcome. Long-term climate change has contributed to the decline in civilizations, through food shortages, famine and associated unrest. Medium-term climate change has led to political upheaval as a result of hunger, infectious diseases and poverty. However, societies have generally been able to adapt to short-term climate cycles, such as El-Niño, except for extreme cases. Historically, the greatest climate threat has been drought, famine and starvation.

These historic impact patterns suggest that current human-caused climate change — which could be extreme and more rapidly evolving than previous events — can be expected to affect all human populations to some degree. *BW*

*Written by Alastair Brown, Monica Contestabile and Bronwyn Wake.*

PSYCHOLOGY

Moral dimension

*Climatic Change* <http://doi.org/hqt> (2012)

Philosophers are increasingly interested in climate change as an ethical problem, but little evidence exists about individuals' moral views of the issue. Understanding non-experts' moral perceptions can shed light on public engagement with climate change.

Ezra Markowitz of the University of Oregon, USA, analysed the extent to which non-experts perceive climate change as a moral issue. In two studies surveying a total of 922 US undergraduate students in 2010 and 2011, he found that 45% of students recognize global warming in ethical terms, 25% do not and the rest are unsure. Participants who believe that climate change is either naturally occurring or only partially anthropogenic are much less likely to state that the issue is morally significant. Moreover, those who believe climate change has a moral dimension are more inclined to pro-environmental behaviour than those who do not.

The results suggest that communicating global warming as an issue of personal responsibility could engage those segments of the population that are prone to altruism, even when they do not see climate change as anthropogenic. *MC*