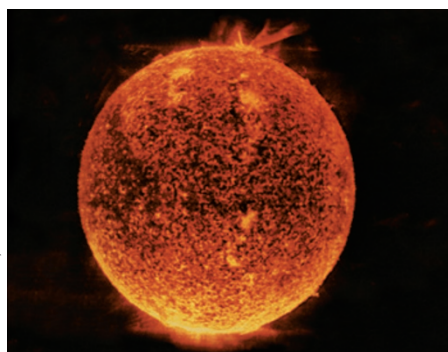


## ATTRIBUTION

### Non-solar warming

*Environ. Res. Lett.* <http://doi.org/jb3> (2012)



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The Sun has played a key role in driving the Earth's climate throughout history. In recent years, however, there have been opposite trends in solar radiation and global temperature.

An inferential method is used by Antonello Pasini, of the Institute of Atmospheric Pollution Research, Rome, Italy, and co-workers to show whether the decoupling is causal and whether it is possible to date when the decoupling began. Granger causality analysis is a statistical test for determining whether one time series can be useful in forecasting another. They tested total solar irradiance, and total radiative forcing by greenhouse gases, against global temperature.

The results show that there has been a causal decoupling between solar irradiance and global temperature which began in the 1960s. In addition, greenhouse gas radiative forcing has shown a strong causal link with temperature since the 1940s. The question remains as to the full causes of this decoupling between solar irradiation and temperature. *BW*

## PSYCHOLOGY

### Personal experience matters

*Glob. Environ. Change* <http://doi.org/jb2> (2012)

Direct experience of climate change is limited by the difficulty of discerning it from the variability of everyday weather. Yet research has shown that some people think they have personally experienced global warming.

Karen Akerlof of the George Mason University, USA, and co-workers analysed what signals of climate change people believe they are detecting, why, and whether it matters, through four studies using population survey and climate data from a county in Michigan. They found that 27% of the county's adult residents said they had personally experienced global warming and that the most frequently described experiences were changes in seasons (36%), weather (25%), lake levels (24%), animals and plants (20%), and snowfall (19%). The researchers found also that experienced changes in seasons, storm events and lake levels were consistent with the climatic record. Finally, they showed that — once controlled for demographics, political affiliation and cultural beliefs about national policy outcomes — personal experience predicts perceptions of local risk of global warming. *MC*

## ECOLOGY

### Shrubby Arctic carbon

*Ecol. Lett.* <http://doi.org/jb4> (2012)

Arctic tundra — a biome typically covered with low-lying vegetation such as mosses, sedges and dwarf shrubs — is, in many places, changing its structure towards increased shrub abundance. It is not yet clear what effect

this change in plant community structure, sometimes called 'shrubification', will have on Arctic ecosystem carbon budgets and their contribution to future climate change.

Sean Cahoon, from the Department of Biology at Pennsylvania State University, USA, and co-workers have now made inroads into this issue by investigating the midsummer carbon dioxide flux from 21 sites spanning 16° of latitude in Arctic and boreal biomes. They found that during the summer, shrub sites with warm soils (above 10 °C) were net sources of CO<sub>2</sub>, whereas shrub sites with cold soils (below 10 °C) were strong sinks. These findings indicate that the transition to a shrub-dominated Arctic will increase the rate of carbon cycling, which, the authors suggest, could lead to net carbon loss if soil temperatures rise sufficiently. *AB*

## CARBON CYCLE

### Permafrost heats up

*Nature Geosci.* <http://doi.org/jbz> (2012)



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Permafrost soils contain a large reservoir of carbon, double the current atmospheric carbon. Climate warming is likely to lead to permafrost thawing, which will allow transfer of the stored carbon to the atmosphere. This will lead to a positive feedback which will increase warming.

Andrew MacDougall and colleagues, at the University of Victoria, British Columbia, Canada, used a coupled global climate model to investigate the possible temperature increase associated with the permafrost carbon release. They investigated different warming scenarios associated with anthropogenic emissions pathways.

They found that permafrost soils could release 68–508 Pg carbon (of the estimated 1,700 Pg carbon stored) by 2100. This amount of carbon release could cause significant additional warming of 0.13–1.69 °C by 2300, independent of emissions pathways in the twenty-first century. *BW*

Written by Alastair Brown, Monica Contestabile and Bronwyn Wake

## SOCIOLOGY

### Economic and emissions trends *Am. J. Social.* <http://doi.org/jb5> (2012)

Experts are still discussing whether carbon emissions will continue to increase as a result of sustained socio-economic growth. Empirical research comparing patterns of countries can shed light on the issue and support policy makers.

Andrew K. Jorgenson and Brett Clark of the University of Utah, USA, analysed the temporal stability of the effect of economic growth on carbon dioxide emissions in both developed and developing countries, from 1960 to 2005. With a dataset including 86 countries, they estimated the impacts of per capita gross domestic product (GDP), population, urbanization and international trade on three measures of carbon emissions — total emissions, per capita emissions and emissions per unit of GDP. The results vary across the three outcomes as well as between developed and developing countries. Overall, the relationship between economic growth and emissions seems to decouple slightly in developed nations but not so in less developed countries.

The researchers suggest that both the debate and future studies on economic development and climate change would benefit from considering the effects of changes in the transnational organization of production and the structure of international trade. *MC*