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Press releases

The first papers of the October 2008 issue of *Nature Geoscience* are now available online as advance online publication.

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September 2008

Glacier acceleration through subsurface ocean warming

The sudden acceleration in 1997 of Jakobshavn Isbræ, one of Greenland's largest outlet glaciers, was caused by subsurface ocean warming, according to research published online in *Nature Geoscience*. The study suggests that ocean temperatures may be more important for glacier flow than previously thought. The prediction of future rapid dynamic responses of other outlet glaciers to climate change may therefore require detailed knowledge of regional ocean dynamics.

David Holland and colleagues present hydrographic data that show a sudden increase in subsurface ocean temperature in 1997 along the entire west coast of Greenland. The arrival of relatively warm water that originated from the Irminger Sea near Iceland could therefore have triggered the increase in the glacier speed. The authors trace these oceanic changes back to changes in the atmospheric circulation in the North Atlantic region.

Acceleration of Jakobshavn Isbræ triggered by warm subsurface ocean waters

David M. Holland, Robert H. Thomas, Brad De Young, Mads H. Ribergaard & Bjarne Lyberth
Published online: 28 September 2008 | doi 10.1038/ngeo316
Abstract | **Full text**

Groundwater levels determine land response to climate

Groundwater depth determines the relative susceptibility of land regions to changes in temperature and precipitation, finds a modelling study published online in *Nature Geoscience*. According to the simulations, groundwater levels critically control groundwater recharge and drought in a changing climate.

Reed Maxwell and Stefan Kollet used a groundwater flow model with integrated overland flow to examine the interplay between water and energy flows in a changing climate. They compared three scenario simulations with modified climate with a present-day simulation for a case study of the southern Great Plains, USA, an important agricultural region that is susceptible to drought.

Changes in groundwater level result mainly from lateral water flow at the surface and subsurface, and have not fully been taken into account in earlier models.

Interdependence of groundwater dynamics and land-energy feedbacks under climate change

Reed M. Maxwell & Stefan J. Kollet
Published online: 28 September 2008 | doi 10.1038/ngeo315
Abstract | **Full text**

A century of artificial nitrogen fertiliser

As a result of the Haber–Bosch process for the synthesis of ammonia, billions of people have been fed, millions have died in armed conflict and a cascade of environmental changes has been set in motion, suggests a feature article published online in *Nature Geoscience*. Fritz Haber filed his patent for the process 100 years ago, on 13 October 1908, and received the 1918 Nobel Prize in chemistry for his work.

Jan Willem Erisman and colleagues reflect on the influence that Haber's invention has had on society over the past century, both the benefits and unintended consequences, such as the increase in water and air pollution, the perturbation of greenhouse–gas levels, and the loss of biodiversity that was to result from the colossal increase in ammonia production and use. They argue that today's society is dependent on a nitrogen-based economy and discuss some of the challenges we are likely to face in the next 100 years.

How a century of ammonia synthesis changed the world

Jan Willem Erisman, Mark A. Sutton, James Galloway, Zbigniew Klimont & Wilfried Winiwarter
Published online: 28 September 2008 | doi 10.1038/ngeo325
Full text

When humans control fire

Human activities since the industrial revolution have affected the amount of biomass burned in wildfires. A study published online this week in *Nature Geoscience* reports that biomass burning rose steadily after 1750, before declining abruptly around 1870.

Jennifer Marlon, Patrick Bartlein and colleagues compiled records of natural charcoal deposited in lakes and peat swamps for the past two millennia. They found that until 1750, global biomass burning patterns closely follow climate variations. However, beginning around the time of the industrial revolution, the amount of burning began to increase, which the researchers associate with increasing population and the use of slash and burn farming techniques. They link the subsequent decline with increased agriculture and livestock grazing, as well as active fire suppression. The changes since 1750 are generally not consistent with climate changes reported for the time, which the team considers as evidence for the increasing influence of human activities.

In an accompanying News and Views article, Andrew Scott writes that this work "is an important contribution to our understanding of the relationship between fire and climate".

Climate and human influences on global biomass burning over the past two millennia

J. R. Marlon, P. J. Bartlein, C. Carcaillet, D. G. Gavin, S. P. Harrison, P. E. Higuera, F. Joos, M. J. Power & I. C. Prentice
Published online: 21 September 2008 | doi 10.1038/ngeo313
Abstract | **Full text**

Terrestrial biosphere: The burning issue

Andrew Scott
Published online: 21 September 2008 | doi 10.1038/ngeo321
Full text