

North-western Europe's 'central heating' falters?

The ocean current that warms north-western Europe could already have slowed by nearly a third over the last 13 years, according to Harry Bryden, Stuart Cunningham and Hannah Longworth, of the National Oceanography Centre, Southampton. Paradoxically, climate models that predict

overall global warming also suggest temperatures in Britain could drop by up to 4 degrees centigrade within a few decades of the current slowing. Harry's team analysed measurements taken from research ships in 1957, 1981, 1992, 1998 and 2004 across latitude 25 degrees north.

According to their analysis, the Atlantic meridional overturning circulation (sometimes likened to a central heating system for north-western Europe) was 6 Sverdrups less in 2004 than in 1992. A Sverdrup is equivalent to a million tonnes of water flow per second. Harry said, 'We were surprised that the

circulation in 2004 was so different from previous estimates.' The researchers are cautious about their results. Harry explained, 'It's possible the current varies by 30-50 percent each month, though I think that is unlikely.' Read the full story of this research on page 8.



A sustainable future for the Centre for Ecology & Hydrology



Centre for Ecology & Hydrology

NATURAL ENVIRONMENT RESEARCH COUNCIL

During 2005, Pat Nuttall and her team at the Centre for Ecology & Hydrology (CEH) have been considering their new science programme and have also commissioned a review of the organisation's shape and structure. They submitted a business plan to NERC's governing Council on 30 November/1 December, proposing a restructuring to achieve a more sustainable future for CEH.

The plan proposes focusing CEH's work at four of its sites: Bangor, Edinburgh, Lancaster and Wallingford. The sites at Banchory, Dorset, Monks

Wood and Oxford would close over a four-year transition period. CEH's administrative headquarters would move from Swindon to Wallingford. NERC's Council has indicated in a statement of intent that it broadly supports this plan (see www.nerc.ac.uk/secretariat-council/ceh/).

The proposed reshaping would enable CEH to continue delivering high quality research and environmental advice, via its six science programmes, which cover biodiversity, biogeochemistry, climate change, environmental informatics, sustainable economies and water. But restructuring the science

teams would inevitably mean some redundancies, not only at the centres that close, but also at those that remain, where some work would be reduced or discontinued. Some people would have the opportunity to relocate. The reshaped CEH would be around two-thirds of its current size.

NERC's Chief Executive Alan Thorpe said, 'We are consulting on these proposals. They aim to restructure CEH so that it will have a sustainable future. I think this is the right

plan to enhance the role of CEH as a world class research centre.'

Consultations on the new proposals are now open one—for external stakeholders and an internal one for staff.

These will enable the Council to have as much information as possible before it considers further the proposed changes at a special meeting on 8 March 2006.

Stakeholder consultation: www.nerc.ac.uk/consult/ceh

Staff consultation: <http://net.nerc.ac.uk/bulletinboard>

Alien fish continue to spread

Adrian Pinder and Rodolphe Gozlan, of the Centre for Ecology & Hydrology (CEH), have now identified 25 populations of the topmouth gudgeon in England and Wales. This invasive and non-native fish spreads an infectious parasite that could threaten UK fish and salmon farms (see *Planet Earth*, summer 2005, p3). Adrian said, 'Ten of these populations are thriving in ponds and lakes which, due to their location and water connections, pose a direct threat to native fish in

major UK rivers including the Trent, Severn and Yorkshire Ouse. Other rivers such as the Hampshire Test have already been invaded. The threatened rivers contain many highly valuable coarse and game fisheries and are also linked to the extensive canal network which will provide further means for topmouth gudgeon to disperse across the country.'

CEH collaborated with the Environment Agency on this study. You can read more in *Fisheries Management and Ecology* 2005, 12: 411–414.

Investigating ancient Earth

Research into conditions soon after the Earth formed could help us investigate how life got started, says David Banks, the UK co-ordinator for a new initiative from the European Science Foundation, called 'Archaeon Environmental Studies: the habitat of early life'. David said, 'We explore for life on other planets, but there is still no clear consensus of how and when life appeared in Earth's earliest oceans. We want to know about the temperature and composition of the oceans and atmosphere, how these changed during the first 2-3 billion years of our planet's history, and what to look for as

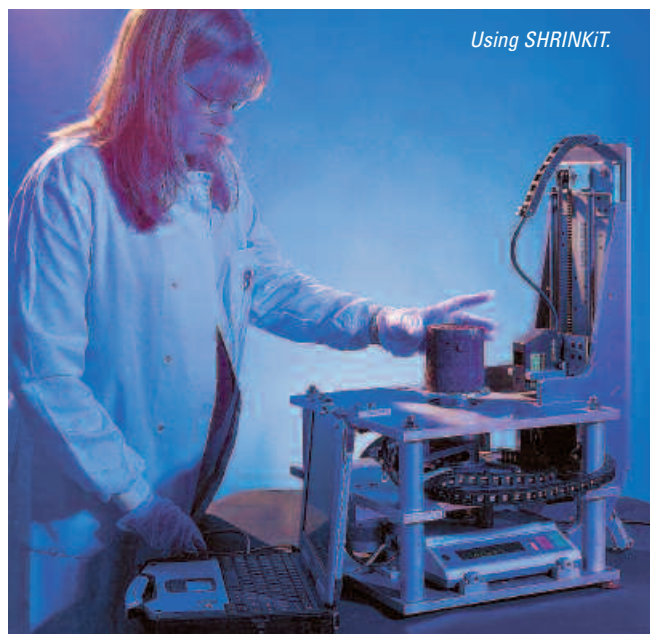
the best evidence of early life. We're also interested in why only microbes proliferated for billions of years, whether any modern environments are similar to early Earth, and how meteor and asteroid impacts affected the planet.'

The initiative, which is jointly funded by NERC and seven other European partners, is initially offering financial support for researchers visiting European colleagues for two weeks to three months. You can find out more by contacting David at d.banks@earth.leeds.ac.uk or going to www.esf.org/esf_article.php?section=2&domain=3&activity=1&language=0&article=525

Measuring shrinking soils

Peter Hobbs and colleagues at the British Geological Survey have unveiled a new way to measure how much soils can shrink, in conditions such as hot dry weather. Planners and the building industry need this information to better design new homes. Peter said, 'The old test was designed in the 1950s and used a lot of liquid mercury which made it very dangerous. Soon, changes in European Law may make it difficult for laboratories

to do this test.' The new equipment, called SHRINKiT, is fully automated and uses a laser to measure soil samples while they are moved on a special weighing platform. Peter added, 'SHRINKiT produces more detailed results than the old test, it's cheaper and, most importantly, can be done in complete safety.' For more information contact Peter at prnh@bgs.ac.uk.



The 40% House

Brenda Boardman, of the Environmental Change Institute, and colleagues have been investigating how to more than halve carbon dioxide emissions from our houses by 2050. Now, NERC has helped the team publish their results as a book.

Poppy Leeder, from NERC's knowledge transfer team, said, 'Builders, architects, the energy industry and people who make household appliances all have a role to

play in reducing domestic energy use, but they may not have access to more traditional research papers. Publishing *The 40% House* as a booklet and online should help get the word out.'

You can find out more or download the text of the full report at www.40percent.org.uk. For a booklet, contact reception, email: eci.ox.ac.uk. The Tyndall Centre supported the original research.



IN BRIEF

Still going green

In October, Cycling Scotland gave the British Geological Survey (BGS) Edinburgh a cycle-friendly employer award, whilst the Nottinghamshire Wildlife Trust awarded BGS Keyworth first prize in its environmental business category, in recognition of the environmental management system at Keyworth, particularly the ways wildlife has been encouraged onto the site.

CryoSat crashes

Disaster struck when CryoSat, the satellite designed to measure changes in the amount of sea ice (see *Planet Earth*, autumn 2005, p7), crashed into the Arctic Ocean shortly after lift-off on 8 October. With it went seven years of work and hopes for climate change research. There may have been a software problem during the second stage of the launch (an investigation is still underway). The European Space Agency has proposed a replacement satellite, and a decision will probably be taken in February.

Carry on funding...

NERC, the Biotechnology and Biological Sciences Research Council, and the Engineering and Physical Sciences Research Council are calling for applications to the research councils' follow-on fund. The fund lets scientists demonstrate how ideas coming out of their research grants could be used commercially. The closing date for applications is 17 February. Find out more at www.nerc.ac.uk/using/fofund.shtml

Earthquakes—finding fault



Scientists should soon be able to pinpoint the exact locations of earthquake faults within days, according to Barry Parsons of the Centre for the Observation and Modelling of Earthquakes and Tectonics (COMET). COMET scientists Tim Wright and Erwan Pathier used radar data from the European Space Agency's environmental monitoring satellite, Envisat, to find the fault that caused Kashmir's earthquake last October. Muzaffarabad, which suffered considerable damage, is close to the fault's north-western end. This is the region where the Himalayan mountains rise rapidly in height. The scientists found they could pin the fault's location down to within a few hundred metres. An earthquake in this area was not entirely unexpected. The region has a long history of large earthquakes, as it is where the two tectonic plates that have created the Himalayas collide.

Barry said, 'The data from Kashmir were analysed within three weeks. In future, we should be much faster. The main delay was waiting two weeks for Envisat to pass over and collect 'after' data to compare with the 'before' information already available. When there are more radar satellites giving more frequent coverage, it should be possible to produce fault locations within a day or two. In cases like the Kashmir earthquake, where land communications are disrupted, this would provide valuable information about where the damage is likely to have been greatest.'

New flood research programme

NERC launched its £6m Flood Risk from Extreme Events (FREE) programme in November. Paul Hardaker, chair of the programme's steering group and the Met Office's Chief Advisor to Government, said, 'We know that the risks from flooding are increasing, that they cause huge damage and create immense misery. This programme is aimed directly at helping to improve the

protection of people, property and our national infrastructure.'

The research should improve predictions about where floods are most likely, and investigate how our changing climate is increasing flood risk. It will bring together meteorologists, hydrologists and oceanographers, promoting greater interdisciplinary research. Elliot Morley, Environment Minister, said, 'We have to adapt to rising sea

levels and increasingly frequent extreme rainfall events. The Government's flood management work already takes account of our changing climate. This new programme will complement our own research work and develop knowledge about the impacts of climate change, allowing us to better protect homes and people from flooding in the future.'

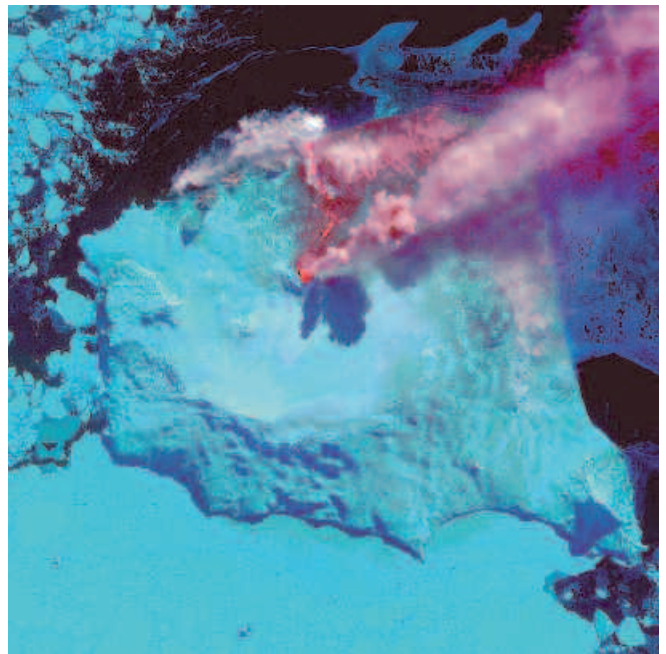
The empire strikes back

In November, pictures of Montagu Island, a volcano in the South Sandwich Islands, showed that British territory had increased again—by about 0.2 km²!

The volcano woke up in September, pouring red hot lava into the cold waters of the South Atlantic. Volcanic activity, which started in 2001, had been winding down, releasing only tiny quantities of dark ash. But then an automated monitoring system alerted scientists at the British Antarctic Survey and Hawaii Institute of Geophysics and Planetology to a large and fast-moving lava flow. An RAF plane soon confirmed that the lava had reached the sea. The satellite image (right) shows the lava flowing from the summit cone on Mount Belinda, across the broad surrounding icefield and over

the steep cliffs of the north coast, where it raises billowing clouds of steam. John Smellie, from the British Antarctic Survey, said, 'The lava is a molten river 90 metres wide and it is probably moving fast, possibly several metres per second. Because the South Sandwich Islands are so remote, and the weather is usually cloudy, satellites are the only feasible way of monitoring the volcano. This eruption is special because Montagu Island is mostly ice-covered, and it's rare that we get to make direct observations of eruptions under ice sheets.'

The island had no history of eruptions before 2001, but in 2002, satellites recorded Mount Belinda spewing out a 2.5km lava flow. The first information from researchers on the ground came only in 2003 when HMS *Leeds Castle* and the Royal



Research Vessel *Shackleton* visited. John, and Matt Patrick of the Hawaii Institute of Geophysics and Planetology, have been analysing data on the eruption. The RAF plans more flights in the New Year, and John will be on one. He said 'I'm hugely excited. These are once-in-a-lifetime opportunities, wholly unpredictable. I've spent the past 15 years of my life

examining the long-dead products of these kinds of eruptions, and observing a real one in action will be the highlight of my career. I just hope it doesn't switch off before I get there.' He added, 'Once the lava cools down, it will be fascinating to see how quickly the new land is colonised by the abundant wildlife we know occupies the islands.'

Life underground

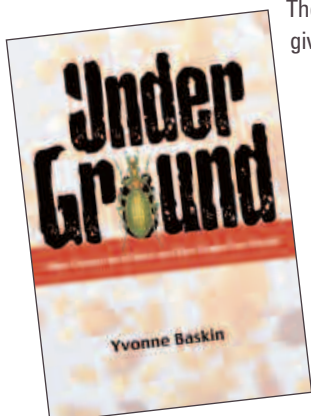
Did you know there could be more kinds of life in a fistful of garden soil than in the entire above-ground Amazon rainforest? A new book, *Underground*, by popular-science writer Yvonne Baskin, tours a frenzy of life and activity in soils, both on land and compressed under tonnes of ocean water. One chapter follows Melanie Austen and colleagues from the Plymouth Marine Laboratory sampling the mud of the English Channel, as part of a study into how fishing affects bottom-dwelling creatures, and in turn, the whole marine ecosystem.

Underground: how creatures of mud and dirt shape our world is published by Island Press, www.islandpress.org/ ISBN 1-59726-003-7.

The publishers have sent us three copies to give away. To win one, tell us:

How much of the seabed do researchers estimate is dredged or trawled each year? Is it half a million, three million, or six million square miles?

Send your answers by 14 February to editors@nerc.ac.uk or Editors, NERC, Polaris House, North Star Avenue, Swindon SN2 1EU. Don't forget to include your address!



Filming documentaries in the Antarctic

The British Antarctic Survey is helping the Canadian Broadcasting Corporation produce two documentary series on Antarctica. One will show, over 13 half-hour episodes, how people live and work in Antarctica. The other will be a three-part series on climate change. Both series will be broadcast worldwide during the International Polar Year

2007-2008. The film crew visited Bird Island Research Stations in December and will visit Rothera Research Station in February. The United States' National Science Foundation is also collaborating on the project, and the crew will spend time at its Palmer Research Station, as well as visiting Antarctic stations run by other nations.

No refuge – ice ages scoured seafloor communities

Ice ages wiped out whole communities of seafloor animals, according to researchers from the National Oceanography Centre, Southampton (NOC) and the British Antarctic Survey (BAS).

Until now, scientists thought that these communities somehow dodged the ice sheets that scoured the sea floor by hanging on in nearby unaffected habitats. But new research in Antarctica suggests destruction was wholesale with very little surviving.

The scientists argue that shallow water animals retreated to the deep ocean and then returned to recolonise Antarctica's shelf seas. Seafloor organisms that couldn't live in the deep sea were either erased by the advancing ice or starved to death as permanent ice cover broke links in the food chain.

Sven Thatje, of NOC, said, 'From deep water, organisms may have invaded open marine parts of the Antarctic shelf, which were not affected by the advance of ice masses. Or these animals may have recolonised the Antarctic shelf from the deep sea during the warm period following each ice age. 'Either way it is an impressive feat against the odds as the extreme cold



Diver inspecting a benthic community 20m under the sea ice near Rothera Station, Marguerite Bay.

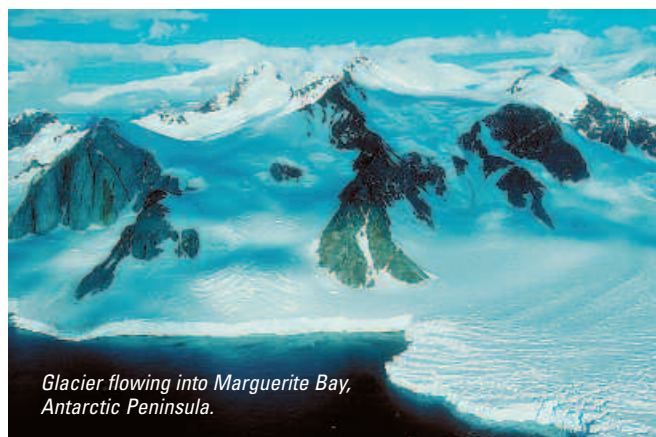
means that these animals respond slowly to the destruction of their habitat. They have low metabolic rates that lower their growth and reproductive rates. Elsewhere in the oceans, a brisingid starfish would reproduce annually and live for ten years. In the Antarctic these starfish can reach 100 years old but reproduce only once every ten years. This means that it can take hundreds of years for communities to recover.'

Exploring 'cradle to grave' carbon emissions from power stations

Researchers at the Tyndall Centre are developing a new 'carbon footprinting' approach to assess the total climate impacts of the way we generate electricity. Sarah Mander, the lead researcher, said, 'The UK's coal and nuclear power stations rely on imported fuels, and when considering how sustainable these technologies are, we usually overlook the emissions generated when the fuel is

extracted, processed or transported because these occur outside the UK.'

The new research will address this problem. Sarah added, 'At a time when the UK is deciding which type of power station will replace existing coal and nuclear plant, it is vital that politicians and energy industry decision-makers understand the full carbon dioxide implications of their choices.'



Glacier flowing into Marguerite Bay, Antarctic Peninsula.

Winners

We have three winners of our competition, who have won a copy of *Climate Change Begins at Home* by Dave Reay. Mrs D Thomas of Downham Market, Simon Battman of Basingstoke and Adrian Buckland of Wolverhampton were among many readers who knew that if the West Antarctic Ice Sheet disintegrates, sea levels are likely to rise by around 5m.