

Geophysicists join search for life on the red planet

Staff at NERC's Geophysical Equipment Facility in Leicester were surprised by a request from colleagues at Imperial College for help with a forthcoming mission to Mars. Imperial researchers need a seismometer able to detect the rumble of the Mars Rover as it crosses the surface of the planet.

This will enable them to determine the near surface structure and possible conditions for supporting life. Tom Pike from Imperial College is developing seismometers etched from a silicon wafer for the mission, which will be deployed on the proposed Mars Geophysical Equipment Package.

ExoMars launch date: 2011.



A scientist from NERC's Geophysical Equipment Facility puts the Mars Rover through its paces in a quarry in Stevenage.

English Channel mystery solved

The century-old mystery of why the water in the western English Channel is less salty in summer has finally been solved by a team from the National Oceanography Centre, Southampton. The team, who installed an instrument on the passenger ferry the *Pride of Bilbao* to measure sea surface conditions between Portsmouth and Bilbao, found that low salinity water came from the River Loire, which is over 500km away from the western English Channel.

Team leader Boris Kelly-Gerreyn explained, 'In the past, research efforts have focused on either the French Atlantic area or the English Channel/Celtic Sea region, not both. The passenger ferry's route – Portsmouth to Bilbao – passes through both regions, allowing us to investigate connections between them for the first time.'

'A combination of high river flow, the correct wind direction and tidal state determines the strength of the river's intrusion into the English Channel,' continued Boris. 'We also have tantalising evidence that these flows influence the intensity of harmful algal blooms.'

NERC has also funded a computerised display in the main reception area of the ship. '100,000 passengers a year can see where they are, as well as information about water temperature, saltness, algae and carbon dioxide,' said Boris.

NERC scoops two major awards

Our very own *Planet Earth* won 'best external magazine, 2006' at a ceremony hosted by Sian Lloyd in London and organised by the Chartered Institute of Public Relations.

On the other side of the Irish Sea the Irish Taoiseach, Bertie Ahern, handed the Geological Survey of Northern Ireland the award for best public information campaign at an awards ceremony held in Mansion House, Dublin, for the Tellus project – a countrywide survey using low-flying planes. The award, the first for a government department from Northern Ireland, was given by the Public Relations Consultants Association.

Last of the dodo fossils uncovered

Scientists have uncovered dodo fossils and over 4000 bones in an excavation in Mauritius made possible with the aid of a NERC urgency grant.

The UK team travelled to the Mare aux Songes site with a group of Dutch archaeologists to recover dodo remains, several giant tortoises, giant lizards, parrots, endemic pigeons, flamingos, owls, hawks, possibly the first fossil songbird to be discovered, rails, fruit bats and the first fossil evidence of freshwater fishes.

Julian Hume at the Palaeobiology Research Group, University of Portsmouth, said, 'The looming plan to develop the site into a holiday complex with hotel and golf course had gained momentum. The construction company had already dug the foundations.'

'The loss of such an important site was in effect a scientific and historical tragedy in the making. The sediments are the only place on Mauritius where a record spanning human arrival on the island exists,' he added.

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Julian with his collection.

Raging Greek fires visible from space



This image from NERC's Dundee Satellite Receiving Station shows fires on the Halkidiki peninsula in northern Greece and their impact over the Aegean Sea 22 August 2006.

New project to estimate global water resources

Scientists will directly link hydrological and climate models for the first time in a major international project to estimate global water resources this century. The €13 million European Commission project, co-led by NERC's Centre for Ecology & Hydrology (CEH) and the Dutch Wageningen University and Research Centre will assess the vulnerability of the global

water cycle to societal and economic pressures.

Co-leader of the Water and Global Change (WATCH) project Richard Harding from CEH said, 'Researchers from the hydrological, climate, water resource and land surface communities will pull together to produce the first global picture of the planet's water resources. We will look at averages and extremes and

how water resources will change – critical information for policy and decision makers planning for the future.'

'We will bring together the best global climate data sets from the last century to drive the new hydrological models needed to simulate river flows and groundwater across the globe,' he added.

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Population explosion of pipefish in British waters

An unexplained population explosion of snake pipefish is occurring in the seas around northern Britain, according to Centre for Ecology & Hydrology scientists in the journal *Marine Biology*. But the abundance of these fish will not prevent puffins, terns and kittiwakes from starving to death, says lead author Mike Harris.

The team reports a dramatic increase in pipefish numbers over the past few years. Pipefish were once rarely seen in British waters but are now frequently caught in trawler nets, with numbers rising 100-fold since 2002, according to some trawl surveys.

Climate change is unlikely to be the primary cause of the dramatic increase as there have been changes in water temperature in the North Sea since about 1988, but large numbers of snake pipefish have only appeared during the last three or four years.

Snake pipefish may not provide an adequate alternative source of nutrition for birds. Their rigid, bony structure makes them difficult for some birds to swallow. Many young puffins and kittiwakes have been found starving even when their nests were littered with uneaten pipefish, and tern chicks have been seen choking to death, apparently unable to regurgitate fish stuck in their throats.

Dolphins use names when communicating with each other

Dolphins name themselves using unique whistles supporting the idea that dolphins share the human characteristic of recognising others as individuals with separate identities, according to researchers at the Sea Mammal Research Unit.

The study's author, Vincent Janik, explained, 'As infants, bottlenose dolphins develop their own signature whistles to use throughout their lifetimes. Group members repeat these whistles back during vocal interactions, and we believe that the whistles are used to address other dolphins individually.'

Vincent and his American colleagues studied a group of bottlenose dolphins in Sarasota Bay, Florida, and found that not only do they appear to convey information about themselves by their whistle, but they seem to recognise each other's unique whistle. Recognition of the signature whistle can be compared to humans recognising a name.

'Signature whistle shape conveys identity information to bottlenose dolphins', *Proceedings of the National Academy of Sciences (PNAS)*, 2006.

CONTACT Vincent Janik, email: vj@st-andrews.ac.uk



New directors

NERC has appointed Professor Alan O'Neill, formerly director of NERC's Data Assimilation Research Centre, as director of the new National Centre for Earth Observation. The new centre will have responsibility for NERC's Earth observation centres of excellence.

Professor Georgina Mace has been appointed the new director of the Centre for Population Biology. Georgina is currently director of science at the Institute of Zoology.

Knighthood for NERC chairman

NERC's chairman, Robert John Margetts, was awarded a knighthood in the Queen's Birthday Honours list for services to science and business.

Lake sediment provides extraordinarily precise age determination

A NERC funded scientist, Takeshi Nakagawa, has successfully recovered a 70-metre core from the bottom of one of the most famous lakes in the field of palaeoclimatology – the study of past climates. The sediment beneath lake Suigetsu in central Japan has very fine annual banding, which allows extraordinarily precise age determination.

Takeshi said, 'We expect to establish extremely good age control. Good age control is key for reliable climate reconstruction and to compare regional changes in climate. This sort of study is

quite awaited because there is a growing body of evidence that past climate changes are often regional rather than global.' The sediment can tell scientists a great deal more than just past climates.

'The cores have already told us that major earthquakes in the region occur once every 2500 years,' he added. 'After completing the project, I hope to be able to tell something about the similarity or differences between European and Asian climate changes.'

Need £2,000 to tell the world about your science?

Grant holders, postgraduate students and research centre staff can now apply for up to £2000 to publicise their work during National Science and Engineering Week, 2007.

This year the scheme, coordinated by Research Councils UK, funded 24 successful applicants, ranging from single morning activities to whole-week events, including hands-on activities at science fairs, public exhibitions, website development, residential courses, site visits and schools workshops. Topics included photography, palaeontology and evolution, neuroscience, molecular biology, ecology, botany and sustainable development.

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Wild meerkats teach young

Zoologists have discovered that wild meerkats teach their young – only the second time scientists have observed this behaviour outside of human societies. Alex Thornton and Katherine McAuliffe used observational and experimental data to show that wild meerkats teach their pups prey-handling skills. The Cambridge team



found that adult meerkats alter the way they provide prey to pups as the pups grow older, accelerating learning.

Alex said, 'While social learning is widespread throughout the animal kingdom scientists still do not know how common it is for adults to teach their young. This is contrary to human societies where teaching is ubiquitous.'

Katherine added, 'There are so many obvious benefits of teaching that the lack of evidence for teaching in species other than humans may be down to the difficulty in observing teaching in other species rather than an absence of teaching.'

The zoologists found that adults gradually introduce pups to live prey. First they bring dead prey, for example, a scorpion or a lizard. As the pup gets older the adult will disable the prey first, perhaps biting the sting off a scorpion. And as they reach independence the pups must deal with live prey. The researchers have shown that the changes in adults' behaviour are caused by responding to changes in the pups' begging calls as the pups get older. Ants are the only other creatures known to provide similar teaching by helping their colleagues find food.

'Teaching in wild meerkats', *Science* (14 July 2006), vol. 313, p227.

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North America blamed for big chill

Lakes in North America discharged freshwater into the Atlantic 8,200 years ago causing a major ocean circulation to slow down leading to abrupt and severe climate change, according to Christopher Ellison and Mark Chapman from the University of East Anglia and Ian Hall from Cardiff University, in *Science* 30 June. The scientists, from NERC's Rapid Climate Change programme, made their discovery by studying sediment cores from the floor of the Atlantic.

'Surface and Deep Ocean Interactions During the Cold Climate Event 8200 Years Ago' *Science* 30 June 2006, vol 312.

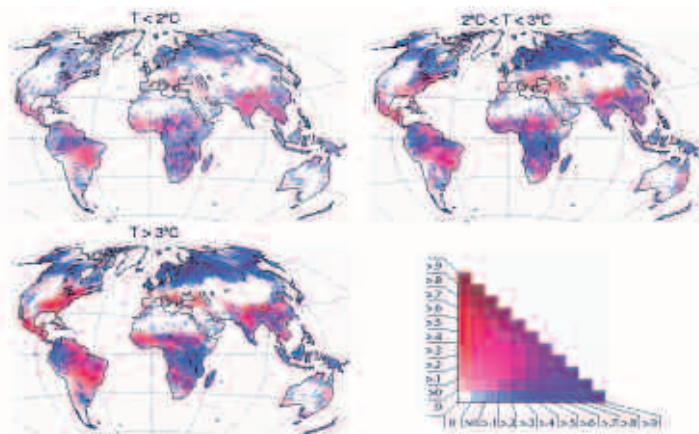
Quantifying dangerous climate change

Scientists working on NERC's Quantifying and Understanding the Earth System (QUEST) programme have made comprehensive global analyses of fire, flood and drought risks over the next 200 years based on likely climate change scenarios.

Lead author, Marko Scholze, said, 'This analysis represents

a considerable step forward for discussions about 'dangerous' climate change and its avoidance.'

'A climate change risk analysis for world ecosystems', *Proceedings of the National Academy of Sciences*, 14 August 2006.



Increased flood and drought risks this century based on possible climate change scenarios: less than 2°C, 2-3°C, greater than 3°C. Blue – wetter than now with increased flood risks, red – drier than now with water shortage risks, purple – models used for the analysis were not in agreement.

Edinburgh tastes Antarctica

More than 12,000 people got a taste of what it's like to work in the Antarctic at Discover Antarctica! – a two-week festival of more than 20 events in the Scottish capital in June.

The events – coordinated by British Antarctic Survey (BAS) for the Foreign & Commonwealth Office to mark the UK's hosting of the Antarctic Treaty Consultative Meeting – included exhibitions of Antarctic art, photography and science, as well as the chance to visit BAS's research ship *James Clark Ross*.

Competition answers

The answer to last issue's competition was: lacewing larvae. Copies of *No Nettles Required* by Ken Thompson are on their way to: Lin Ewart, V O'Shaughnessy, Lisa McManus, Robin Irelan and Ed Kendrick.

DIARY

29 October 2006

Battle Over Nature

Join us to discuss ecological footprints, carbon quotas gone mad and how we should relate to natural disasters in the Battle Over Nature, run by the Institute of Ideas (book online: www.battleofideas.co.uk). Suitable for adults.

31 January 2007

NERC event

Institute of Physics, London

NERC is holding an event for stakeholders highlighting our achievements to date and looking ahead to the future.

END OF PROGRAMME EVENTS

11 November 2006

Changing climates, evolving humans

British Museum, London

Humans have colonised every continent. We have adapted and thrived in the harshest of environments. How did this happen? And what part did the environment, including climate change, play? Come to the British Museum and find out. Suitable for 16+. Registration opens in October.

23 January 2007

Our changing atmosphere

Institute of Physics, London

Atmospheric pollution affects us all, from health to restrictions on air travel. Join us in London to find out the latest science from four of NERC's major research programmes. Suitable for adults. Registration opens in November 2006.

15 February 2007

Oil and gas exploitation

Royal Geological Society

The UK together with Ireland have a rich seam of oil and gas reserves. We need to know more about the rocks and sediments underneath the seabed in order to exploit it. For more information come to our end-of-programme event.

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New climate change institute

The University of Reading launches the Walker Institute for Climate System Research this autumn. The institute will bring together disciplines including meteorology, oceanography, agriculture, geography, hydrology and soil science. NERC funded research centres, the Environmental Systems Science Centre, the Data Assimilation Research Centre and the NERC Centres for Atmospheric Science, will be key players in the new institute.

CONTACT *Julia Slingo, email: walker_info@reading.ac.uk, tel: 0118 378 7380*

Springwatch Europe

the world's largest phenology study

Tim Sparks from the Centre for Ecology & Hydrology has co-led the world's largest phenology study involving 17 countries. The scientists examined over 125,000 datasets to show that spring is arriving earlier across Europe than it did 30 years ago.

'European phenological response to climate change matches the warming pattern' *Global Change Biology* (2006)

The *James Cook* arrives in Southampton

The *James Cook*, NERC's new research ship, arrived in Southampton on 28 August. The ship, which will replace the *Charles Darwin*, will undergo a series of sea trials before coming into service in spring 2007.



Online Antarctic photo library

For the first time the British Antarctic Survey (BAS) can proactively market its stunning collection of Antarctic pictures depicting its science and

operations. Picture editors, publishers and journalists can now search 4000 high-resolution images online and pay to download their selected photos.

Over the coming year BAS will promote the collection to commercial picture libraries and agencies. The BAS public relations team has worked recently with the NERC Commercialisation Team to identify other marketing opportunities.

CONTACT *Pete Bucktrout, email: pbu@bas.ac.uk, www.photo.antarctica.ac.uk*

Apology

Professor Liz Morris is employed by the British Antarctic Survey, not the Scott Polar Research Institute as stated in summer's *Planet Earth*.

