

Science out & about

Ants, forests and tsunamis at the Royal Society

Three NERC projects were on show at the Royal Society's summer exhibition in July. For more on these three projects, see www.royalsoc.ac.uk/exhibition.asp?id=4198

Forecasting the unpredictable

Following the devastating Boxing Day earthquake and tsunami of 2004, John McCloskey of the University of Ulster and colleagues calculated the possible impact of that event on the timing of future large earthquakes in the region. Large earthquakes change the stress on nearby geological faults and can therefore affect future events. After the Boxing Day earthquake, the team predicted an increased chance of events along two faults on Sumatra – the Sunda Trench and the Sumatran Fault.

Just 11 days after the team published their results in *Nature* in March 2005, the second biggest earthquake in the world since 1965 occurred on the Sunda Trench. 'We were not surprised that we got the size and location nearly spot on but the timing was quite unbelievable,' said John. 'Although our methods can indicate the likely location and magnitude of an earthquake, it is impossible to say when it might happen. Tying down the timing of triggered shocks is the most urgent challenge now facing earthquake scientists.'

Go to the ant and be wise

Pharaoh's ants – a common pest in blocks of flats – use three types of pheromones to form chemical trails, according to Francis Ratnieks and a team from the University of Sheffield. An attractive, short-lived pheromone allows trails to new food sources to be laid down while old trails to depleted food evaporate; an attractive longer lasting pheromone allows reestablishment of old trails; and a repellent pheromone acts as a 'no entry' signal for ants on trails that don't lead to food.

Tropical American leafcutter ants were also on display. These ants handle waste hygienically to prevent contamination of the nest. A worker taking waste out of the nest does not enter the waste dump; instead it leaves the waste in a connecting tunnel for ants that live in the dump to collect. 'There is much we can learn from the simple solutions ants have found for complex problems', says Francis. 'Ants have been solving these problems for millions of years, while we humans have only just started to need to'.



Nigel Catlin/FLPA

The breathing forest

What happens to the carbon cycle in forests when atmospheric carbon dioxide increases? Under certain conditions forests start to release more carbon dioxide than they absorb, Phil Ineson of the University of York and colleagues in Edinburgh and Sheffield discovered.

'There are vast stores of carbon held globally in trees and soils. If these stores start to become net sources of carbon dioxide as the climate changes then we will enter a frightening positive feedback situation,' explained Phil.

The carbon is transferred to the soil via the trees' roots and taken up by micro-organisms. The micro-organisms' metabolisms speed up and they emit more carbon dioxide. 'If this were to happen on a global scale then the consequences would be severe,' said Phil.



Into the unknown – science under the ice

The achievements of Autosub, NERC's high-tech robot submarine, were celebrated in June at the Royal Geographical Society, London. Autosub's 382 successful missions gave scientists a wealth of information on climate change, marine life and the mysterious world under the ice. This event was the culmination of a £5.6 million research programme lasting five years, which involved over 60 scientists from 13 institutions. An audience of 60 guests from industry, policy, academia and the general public heard about Autosub's expeditions to Greenland and Antarctica.

Talks from the event are at www.nerc.ac.uk. *Beneath the sheets: Autosub under ice* is a set of leaflets celebrating the programme's highlights.

