

# Which way now?



As incoming Chief Executive, I have been asked frequently what I think about NERC's future – the vision, and whether it is different from that of my predecessor, John Lawton. I am, by training and background, an academic atmospheric scientist with physics degrees, and so obviously I have a very different disciplinary background from John's. However, as Chief Executive, I, like John, am passionate about maintaining the health of all the component disciplines that make up NERC's environmental science capabilities. I fully endorse the Earth system science approach. NERC science addresses the health of the planet and Earth system science reminds us that we need to look at the planet in a holistic and multi-disciplinary way.

Earth system science is often described as leading to 'a better understanding of how the system operates', or by using a phrase I personally prefer: 'increased knowledge about the system'. Clearly this is absolutely critical. But equally, society and the economy need this knowledge to be put to good use. NERC needs to stress how science delivers solutions to environmental problems or enables these solutions to be developed. The government rightly expects to see real advances flowing into businesses and the public good from its investments in science.

Consider climate change, to which NERC devotes a significant proportion of its budget. What society needs to know about climate change can be summarised (rather crudely) in the following way. Is there evidence that climate is changing? Are human activities playing a significant role in contributing to that change? What is the outlook for future climate change and its impacts over the next decades, both globally and regionally?

Human activities are almost certainly changing the climate. If we're to face up to and perhaps live with climate change, we'll need environmental science that lets government and business decide how to adapt.

The impacts of climate change are often felt locally and regionally, and in many unexpected ways. The summer of 2003 was a record breaker, with the UK's maximum temperature exceeding 38°C. We need to know how often such records will be broken as climate changes. During the heat wave, ozone concentrations were very high near ground level, where the gas is a respiratory irritant and damages vegetation. At these high temperatures some vegetation emits isoprenes that help convert nitrogen dioxide,

generated by exhaust fumes and power station emissions, into ozone. These natural emissions may have influenced the high ozone levels. Estimates suggest there were an additional 2045 deaths in England and Wales over the period 4-13 August, compared to expected average numbers. Netcen (on behalf of Defra) estimated that between 21-38% of these additional deaths were associated with elevated levels of ozone and particles in the atmosphere.

There is significant scientific uncertainty in our knowledge about local air quality and our ability to predict pollution levels. If we can reduce that uncertainty, this will allow an air quality action plan to be formulated in the light of climate change.

I believe NERC has a very important role in increasing knowledge so that more accurate predictions can be made of the impacts of current and future environmental change. Here I am referring to the wide range of environmental changes that NERC research encompasses including, to name but a few: water quality, biodiversity and natural hazards. Strategies for mitigating and adapting to these changes can then use the new knowledge and the predictions to identify solutions. We can be most effective in doing this if we work together. It will need us to be scientifically flexible to address emerging issues and produce outcomes on timescales required by governments and society. For me, this is one of the exciting aspects of working on such a critically important set of scientific problems.