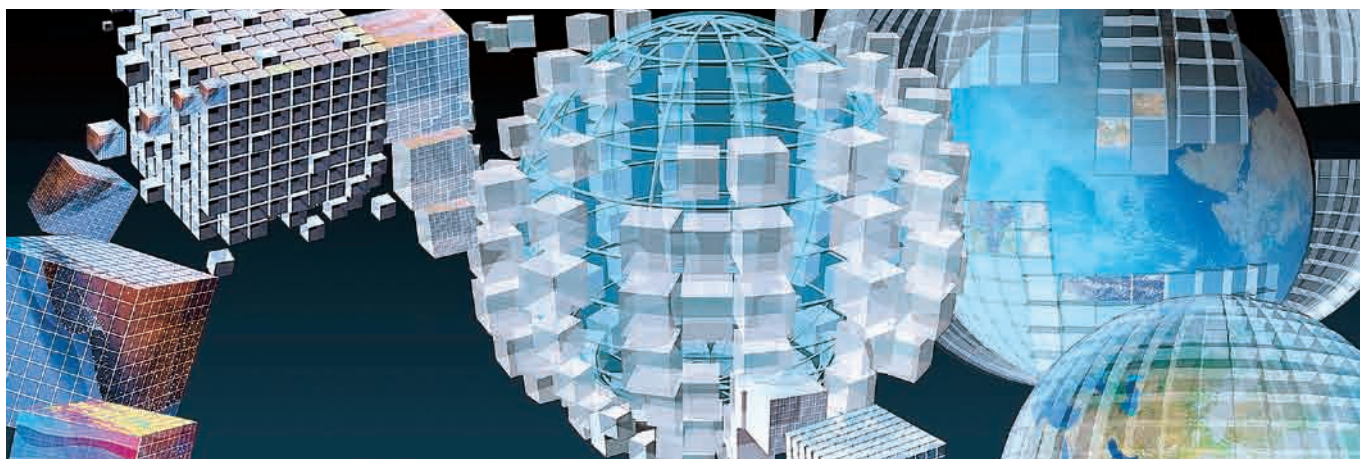


# Measures for measurements

How NERC values measurements of the environment.

Alan Thorpe, Chief Executive



MEASUREMENTS are the life-blood of environmental research. NERC is custodian of many unique and valuable long-term measurements. The environmental science community uses various terms to describe measurements and measuring, such as observations, monitoring, sensing or data. (I personally think that 'data' is a rather misleading term as we also deal with computer model outputs for which the term data is also used!) These measurements are made in the laboratory, *in-situ* in the field and remotely including from space. Their value includes the unequivocal evidence they provide of trends in the state of the environment. These trends are a vital aspect of the science, particularly at a time when environmental change is seen as challenging the sustainability of planet Earth.

NERC has made substantial investments in new measurement technologies as well as how they are used, such as the eScience programme\*, Earth observation satellites and data centres. These investments maximise the benefits of our measurements, both for the research community and for policy-makers.

With many competing priorities, any long-term measurement series needs to justify the investment. This is why the Environment Research Funders' Forum's project – the Environmental Observation Framework – to analyse environmental monitoring in the UK, is so welcome. It will provide a holistic view: we will be able to see where there are gaps and overlaps in monitoring programmes.

Research-based measurements are distinct from predominantly operational or policy-based measurements, such as meteorological measurements made from weather satellites for forecasting agencies. However, researchers can draw additional value from some operational measurements. In these cases, either the agency or NERC provides the funds to allow researchers to access the data. Things get complicated when research instruments, for example, on board satellites, make a transition from pure research to operational use. This issue arises with the new European Commission and European Space Agency initiative, Global Monitoring for Environment and Security, which plans to launch five largely operational satellite missions in the coming decades. (See pages 30 and 32.) NERC's general policy is not to fund measurements that are predominantly needed for operational use, but clearly there are grey areas.

Measurements have little value if people can't access them. NERC supports seven 'data' centres (some cover both measurements and other digital information, say from computer models). However what is becoming abundantly clear is that we are missing a trick. We all know that environmental science is multidisciplinary. It requires many disparate measurement types to complete the picture. However, bringing different types of measurements together for inter-comparison and synergy – sometimes called 'data mashing' – is

difficult. This is why we are developing a web portal for measurements and data to make access to the range of information more straightforward. It builds on an influential eScience project – The NERC Datagrid. The prospect in the future is to have a portal where many measurements of the environment can be overlaid with a high degree of interoperability.

Measurements are one thing, theory and associated model building are another. But we can add tremendous value by fusing them together. The weather forecasting community calls this type of fusion 'data assimilation' and it has led to a revolution in the accuracy of weather forecasts and other types of environmental prediction. Data assimilation is a mathematically complex process but at its heart is the concept of using our knowledge about the way the environment works to draw out significantly more information from raw measurements. NERC's new National Centre for Earth Observation (NCEO) is a centre of UK excellence in this field.

When measurements, theory and modelling are developed and used together seamlessly, we maximise the potential for significant advances in environmental science.

*\*NERC has produced a brochure aimed at policy-makers and industry containing highlights from NERC's £14.2 million eScience programme. See page 22 and back cover for details.*