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Foreword



The enormity of the climate challenge is becoming increasingly clear to society and government at the moment; it has already become one of our organisation's principal research themes, and will receive increasing focus in coming years.

The magazine shows that much of our current work is of great relevance to the broad issues surrounding climate change. For example, BGS hydrogeologists are applying their expertise to modelling the effect that predicted climate change scenarios will have on groundwater resources. Our studies of soils are tackling the engineering aspects of soil stability against a backdrop of predicted wetter winters, drier summers and generally increased storminess, and are increasing our understanding of soil's role in the global carbon cycle. Changing climatic conditions

also mean that our considerable data holdings on geohazards such as landslides, shrink-swell clays and soluble rocks will become increasingly valuable to planners, homeowners and their insurers.

Many years of working on offshore geology mean that BGS is uniquely well placed to advise on the hazards and opportunities presented by gas hydrates. Naturally occurring methane hydrates are a potential geohazard — as a contributor to global warming, as well as a potential energy resource. BGS scientists are helping to find out more about these abundant, but poorly understood deposits. A further interest in hydrates is in the subsurface burial of artificial carbon dioxide in this form (cool storage) to provide a means of reducing anthropogenic carbon dioxide emissions. Our organisation is also a leader in the science and monitoring of a more immediately available carbon dioxide sequestration process — the burial of liquid carbon dioxide in saline and exhausted oil or gas reservoirs. This is all set against a review of natural carbon dioxide flow in the Earth's crust.

Studies of Earth processes recorded in rocks and sediments can give us vital information about how Earth systems respond to global change. Recent research has included analysis of the role of oceanic circulation in climate change during the Cretaceous, Palaeogene and Neogene; the use of fossils to interpret climate change during the Cretaceous in high latitudes; and examination of the full story of an ice age in the Carboniferous and Permian now preserved in the deserts of Oman.

BGS needs to further enhance its links to other NERC centres to unravel and model the causes and consequences of climate change. For example oxygen isotope studies are revealing changing patterns of ocean circulation in the North Atlantic and changing water temperatures in the North Pacific. Both were critical to the development of the Earth's most recent glaciation. On land, analysis of lignin molecules provides us with evidence of changing patterns of vegetation in the UK with fluctuating climate over the last 11 000 years, and a combination of previous investigations with modern satellite data and digital terrain models is helping us to reconstruct the history of the last British ice sheet.

I hope this issue of Earthwise will demonstrate that the BGS has much to offer climate-change science—from contributing a deep-time perspective of previous climates to offering practical solutions to reduce greenhouse gas emissions.

John N Ludden, Executive Director, BGS.

