The Geology and Resources Directorate (GRD) operates through six multidisciplinary survey and research programmes. These are designed to define the three-dimensional geology and environmental characteristics of the UK landmass and continental shelf, and provide information on the distribution and exploitation potential of energy and mineral resources. The aim is to provide a sound geoscientific ‘evidence-base’ to underpin decisions on the utilisation and protection of the land, coast and seabed and the sustainable development of the nation’s natural resources. The BGS-funded work programme in the UK is enhanced by external funding in the form of commissions from government departments, regulatory agencies and industry-sponsored research consortia. We also operate in Europe and worldwide through international research projects and commissioned contracts. The work carried out by GRD directly underpins that of the Environment and Hazards Directorate (see pages 24–39) and generates many of the publications and digital products delivered through the Information Directorate (see pages 40–49).

Two major advances during the past year have been the establishment of a National Geoscience Framework of baseline geological, geophysical and geochemical data (right) and the generation of 3D geological models as a standard output from an increasing number of projects. The value of 3D geological information was also recognised externally and has resulted in several commissions to provide detailed 3D structural models of key areas. Further advances were made in the development of digital field data capture systems for geological mapping with the successful trial of a new ruggedised tablet PC. This enables mapping teams to take an entire project GIS into the field and update the geology dynamically, based on all the available data.

A major highlight was the launch of the Tellus airborne geophysical survey in Northern Ireland and the successful completion of the western half of the province. The survey was carried out by the Joint Airborne-geoscience Capability (JAC), established between the BGS and the Geological Survey of Finland (GTK) in 2004. The Twin Otter aircraft is equipped with magnetic, radiometric and electromagnetic (EM) sensors and the initial results highlight many previously unknown features. A major upgrade of the EM system (from two to four frequencies) was also completed, providing much greater 3D resolution of conductivity anomalies in the shallow subsurface related to pollution, mineralisation and concealed structure.

In the marine domain, a major highlight was the completion of the Tahiti Sea Level Expedition for the Integrated Ocean Drilling Programme, which successfully cored Holocene reefal limestones in shallow water. Two multibeam surveys were also carried out as part of the new seabed-mapping programme. Data from around the Summer Isles (north-west Scotland) resolved spectacular submarine glacial features, such as moraine ridges and fjord troughs, that link with new mapping of the Quaternary geology onshore and provide new insight into the evolution of the British Ice Sheet.

An important milestone in the minerals sector was the completion of the flagship Mineral Information Online system for England; a web-based geographical information system providing a range of spatial, text-based and statistical information for planners and the wider community. The hydrocarbons sector remained active and a new project was established to develop a comprehensive atlas of the Southern Permian Basin in collaboration with oil companies and European geological survey organisations. Geo-heritage activities have again been prominent and continue to raise the profile and relevance of geoscience in the tourism, education and conservation sectors.

(Opposite) The NERC Twin Otter aircraft, equipped with upgraded electromagnetic survey equipment, in operation during the TELLUS airborne geophysical survey project in Northern Ireland.