Structure and properties of the Earth's subsurface

Research in this area includes a range of work on the evolution of rifted margins with a current focus on an international collaborative project involving 3-D seismic profiling of the Iberian margin. The work has important implications for the role of deeply ingressing water, through serpentinization, in guiding the structural history of margins.

Fundamental research on spatial and temporal scales of mantle convection, currently extensively supported by the Irish government, focuses on Cenozoic evolution of the north Atlantic and links to global climate via both modulation of deep-water flow around Iceland and uplift-associated dissocation of gas hydrate. The development of techniques for detecting and quantifying gas hydrates and emissions of methane has been a key aspect of shallow geophysical investigations on continental slopes over the past two decades, including major participation in European programmes as well as NERC support.

Prize-winning research on igneous emplacement mechanisms integrates study of field relationships and magnetic fabrics, and has broadened to make novel uses of 3-D seismic information.

Fluvial sediment dynamics (Greg Sambrook Smith) covers two areas, each of which is supported by a NERC grant. A long-term cooperative programme of study of important braided rivers is currently focused on understanding the behaviour of one of the world's largest examples, the Rio Parana (pictured above), based on field studies including ground-penetrating radar as well as a range of modelling approaches. Flow-exchange dynamics across the surface of gravel beds are being studied using a combined theoretical-experimental approach.

Projects

- **Continental extension leading to breakup: determining the 3D structure of the west Galicia rifted margin (/research/activity/geosystems/projects/west-galicia-rifted-margin.aspx)**
- **Structure and evolution of the Sabratah and Sirte Basin, Libya (/research/activity/geosystems/projects/sabratah-sirte-basin.aspx)**
- **The role and extent of detachment faulting at slow-spreading mid-ocean ridges (/research/activity/geosystems/projects/detachment-faulting.aspx)**

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