Subject map

In preparing the science strategy during 2013, Science and External Relations Committee (SERC) thought about how best to map the structure of geoscience, identifying its main disciplines, sub-disciplines and key topics. Any attempt to do this cannot be exhaustive, but it provides a context onto which to map existing Geological Society science content and activities, to help to identify where we are more or less active, and to inform future decision-making. The subject map should be dynamic, responding to changes in our science base, to ensure that the Society's activities remain relevant to our community. The subject map is also helpful in characterising the 'supply/push' dimension of our science communication work (including policy and education activities).

A new model of working between the Society's Specialist Groups (Constituted Groups, Affiliated Groups and Joint Associations) and SC is outlined later in this document. The subject map presented here is based on the Specialist Groups and Networks, grouped into the 'families' through which they will in future be represented on the Science Committee (SC):

'Applications' family

- Engineering Group
- *[Environment Group – dormant]*
- Environment Network
- Forensic Geoscience Group
- Geological Remote Sensing Group
- Hydrogeological Group

'Custodians'

- Geological Curators' Group
- Geoscience Information Group
- Higher Education Network
- History of Geology Group

'Internal Earth processes'

- British Geophysical Association
- Geochemistry Group
- Metamorphic Studies Group
- Mineral Deposits Studies Group
- Tectonic Studies Group
- Volcanic & Magmatic Studies Group

'Earth Systems Processes'

- British Sedimentological Research Group
- British Society for Geomorphology
- Gaia: Earth Systems Science Group
- Marine Studies Group
- Quaternary Research Association

'Energy'

- *[Borehole Research Group – dormant]*
- *[Coal Geology Group – dormant]*
- Near Surface Geophysics Group
- Petroleum Group

To support evolution and delivery of the science strategy, Specialist Groups are asked to set out the burning fundamental scientific questions within their specialisms in their Terms of Reference, and to keep a watching brief on the currency of their area of the subject map. These fundamental questions will be identified in future editions of the science strategy, as 'level 3' of the subject map. Specialist Groups are also asked to identify potentially fruitful linkages with other specialisms and disciplines.

The families of groups identified here are not equal in size, either in terms of the number of groups in each, or in terms of the number of Fellows they represent. As the new model is implemented, SC will monitor whether the family groupings are coherent and effective in practice, and the detail of this structure may be modified accordingly.

A key role of SERC, working with SC and the Specialist Groups, is to keep a watching brief on the development of geoscience, and ensure that the Specialist Group structure is fit for purpose in covering this territory. This could lead to restructuring of the families of groups, discussions with groups about adapting their Terms of Reference (for instance, to incorporate emerging areas of science), or possibly even establishing new Specialist Groups. SERC may also wind up dormant groups. One way in which SERC may identify gaps in the Specialist Group structure is to compare it with other subject categorisations used within the Geological Society (such as those used to prioritise library acquisitions or to classify the books we publish), and with external lists (such as the main subject categories used by GeoRef).

The groupings above include two networks – the Higher Education Network and the Environment Network – which differ in structure and purpose from Specialist Groups, but nonetheless play an important role in the Society's science activities. Also listed (in square brackets) are three Specialist Groups which are now dormant, but which have not formally been wound up.

Several scientifically important entities are not currently included in the groupings. The Stratigraphy Commission of the Geological Society is currently anomalous in its status, and SC will work with it to determine how it best sits within the new structure and to discuss its role in delivering the science strategy. The Joint Committee for Palaeontology (JCP) brings together representatives of the Society and three other bodies – in the absence of a Specialist Group for palaeontology, the Society's representatives on JCP are best placed to lead on science strategy matters in this area. An important role is also played by working groups such as the Climate Change Working Group. These are usually time-limited and focused on a particular task, although they may be reconvened as the case to do so arises.

Societal challenges map

SERC also wanted to map the high-level challenges facing society in which our science has a contribution to make, and aspects of these challenges our community is best placed to address. This is valuable in characterising the 'demand/pull' dimension of our science communication work, and in ensuring that we use our science base as effectively as possible to help tackle these challenges. Working with External Relations Committee (ERC), others within the Geological Society and external stakeholders, SERC will monitor the societal challenges map, to ensure that

that we address new issues as they arise and that the work we do to put our science at the service of society remains relevant.

The societal challenges map is based on the main topics addressed in 'Geology for Society' (www.geolsoc.org.uk/geology-for-society), a report published by the Society in early 2014 drawing on our extensive work on 'science for policy' in recent years, including consultation responses, position statements and public meetings. This provides policy-makers and other non-geologists with an overview of the main areas in which geology is of value to society, the economy and the environment. 'Geology for Society' also addresses enabling technologies and aspects of geoscience communication, including 3D mapping and modelling, geological time, risk and uncertainty.

- Energy
  - Shale gas and other unconventional hydrocarbons
  - Carbon capture and storage
  - Radioactive waste
  - Geothermal energy
- Water
  - Groundwater
  - Water security
  - Water quality
  - The water-energy nexus
- Mineral resources
  - Rare Earth Elements
  - Feeding a growing population – fertilisers
- Engineering the future
  - The built environment
  - Urban geology – engineering tomorrow's cities
  - Competing uses of the subsurface
- Environmental health
  - Contaminated land
  - Groundwater remediation
- Valuing and protecting our environment
  - The role of the geosphere in ecosystem services
  - 'Geosystem services'
  - Marine conservation zones
- Geohazards
  - Earthquakes
  - Volcanoes (including volcanic ash hazards)
  - Landslides
  - Flooding
  - UK geohazards
- Climate change
- The Anthropocene
- The value of geology to the UK economy

This map is far from exhaustive. It does not recognise cross-cutting topics including soils and marine geoscience. Building on this science strategy, SERC and ERC will develop a science communications strategy to shape future work in this area. A priority will be to address such cross-cutting areas.

Themed years

A new initiative from 2015 onwards will be 'themed years', around which the more proactive aspects of the Society's forward science programme will be planned. The theme for each year will be cross-cutting, and will bring together both fundamental curiosity-driven science and instances of societal problems where geology has a vital role to play. We aim to focus at least one Society flagship conference on the selected theme each year, with input from Specialist Groups who wish to be involved. Specialist Groups and others are also invited to plan their own meetings and activities, and to develop proposals for Geological Society meetings for consideration by SC. We also anticipate publishing thematic sets of journal papers, and organising educational, policy and outreach activities relating to each year's theme.

Council has designated 2015 a 'Year of Mud'. There is a resurgence of interest in the science of mud-rocks, driven by a wide range of factors including:

- Shale gas, and the need to improve our understanding of pore behaviour and permeability
- The challenges of tunnelling in clay in major projects such as Crossrail
- The search for suitable geological host rocks for the disposal of radioactive waste
- Slope stability, urbanisation and development of megacities
- Diminishing soil quality
- Increasing flood risk as mud is washed into city storm water drains
- Advances in nanogeoscience and biogeology

A possible theme for 2016 is water. Council will identify the theme for each year, in good time to allow planning of meetings and other activities, advised by SERC and SC, and with input from other committees, Specialist Groups and the wider Fellowship.

Delivery of the science strategy

Proposals to hold Geological Society meetings are typically reviewed by the SC, and may originate from a number of sources.

- Specialist Groups may propose a meeting relating to the designated annual theme (proactive mode), or on any other geoscience topic (reactive mode). They may do this alone, or working with other Specialist Groups or external organisations.
- Individual Fellows or groups of Fellows may also submit proposals.
- SC itself may develop research meeting proposals relating to the annual theme (or possibly one-off meetings on other strategically important topics, although the limited resources available to deliver proactive elements of the science strategy will be strongly focused on the annual themes).
- ERC and others may also develop events, usually aimed at non-technical audiences including policy-makers and the public.
- Other organisations may approach the Geological Society to propose holding a joint meeting.

There are several types of Geological Society meeting:

- Named flagship meetings:
    - William Smith Meeting: Held annually on any branch of geological science. The event runs over two days and incorporates the William Smith Lecture, which is open to all Fellows of the Society. [To be revised.]
    - Lyell Meeting: An annual flagship event for UK Palaeontology. The meeting is co-ordinated by the Joint Committee for Palaeontology (JCP), which consists of representatives from the Geological Society, Palaeontological Association, Palaeontographical Society and The Micropalaeontological Society.
    - Fermor Meeting: Held every two or three years and usually runs over two to three days. The meeting can cover any aspect of geology relating to the Precambrian. [To be revised.]
    - Arthur Holmes Meeting: This meeting is primarily a field event with or without a conference attached. It is held on an ad hoc basis.

  It is intended that at least one of these meetings each year should relate closely to the annual theme. The terms of reference of the flagship meetings will be reviewed during 2014. SERC and SC will keep their relevance under review, and may bring forward proposals to establish additional named flagship meetings to help deliver the science strategy.
- Other Geological Society badged research meetings.
- Events driven primarily by the problem map – these may be events aimed at the geological community to advance understanding of some area of application (such as the June 2014 meeting on Communicating Contested Geoscience), conferences aimed at a wider audience (such as the March 2014 Shale UK conference), or outreach/public events.
- Event series held jointly with others (such as the PGC conferences and the joint CCS meetings with the AAPG), which may have some Specialist Group involvement.

Some meetings (in any of the categories above) may not focus entirely on the annual theme, but might include one or more sessions which are particularly relevant to the theme. (For example, a conference on tunnelling might include a session on tunnelling in mud-rocks, or a keynote talk about a case study in a mud-rock setting.) A logo will be developed for each annual theme, which can be used to highlight sessions of this kind, as well as whole themed events.

In addition to all these types of Geological Society meetings, the Specialist and Regional Groups organise many events which are not badged by the Society centrally. These events form an essential part of the Society's science programme. Groups should keep the Society informed about all these meetings, so that they can be publicised on the website, through *Geoscientist* and email newsletters, and through social media. Groups are encouraged to include events relating to the annual theme in their own meetings programmes, as well as developing proposals for Society meetings, and to highlight any sessions within their other meetings which are relevant to the annual theme.

The Society's books and journals, library collections, education and policy work and outreach activities are also important means of delivering the science strategy.

The role of the Specialist Groups and Science Committee

As set out above, the Specialist Groups have two vital roles to play in delivering the science strategy. First, they are asked to help to develop the subject map and societal challenges map within their areas, and to monitor these to ensure that these remain relevant. Second, they are asked to contribute to delivery of the themed years, both through their own programmes of activity (which may include outreach events, for example, as well as meetings aimed at their own membership) and by putting forward proposals for Geological Society meetings.

From 2014, SC will have a smaller membership than previously, and will have primary responsibility for delivering the Science Strategy and for engaging with the Specialist Groups. It will consist of five Council members and five other Fellows, in addition to the chair. Two identified Committee members will be responsible for actively liaising with each family of Specialist Groups, keeping them informed about the Society's wider science programmes and other activities, stimulating interaction and collaborative/interdisciplinary among groups, and reporting their activities, ideas and concerns to SC. An early action for the reformed SC will be to discuss the role of its members in this regard, and what mechanisms are most appropriate for communication between SC and the families of groups. An annual Specialist Groups Gathering will be held, chaired by the Science Secretary, to which all groups will be encouraged to send a representative. This is intended to keep the groups informed about development of the science strategy, stimulate their involvement in its delivery, encourage networking and collaboration, and make best use of their collective knowledge and experience.

SC will work with SERC and others to ensure that the Specialist Group structure remains relevant to the interests of the geoscience community and those of society more widely. It will also have primary responsibility for delivering themed years. It will continue to consider meeting proposals on any geoscience topic, and to ensure that those which are scientifically excellent are assigned flagship or Society badged status.

2 April 2014