Meeting of the School Executive Group  
2-4pm, November 9th 2005  
Room 352, Grant Institute

AGENDA

1. Apologies
2. Minutes of the meeting held on October 12th, 2005.
3. Matters arising
4. Remarks from the Chair

For discussion
5. Planning Review: updated plans

For approval
6. Regius and Michie Chairs
7. SAGES

For information
8. Reports from Institutes/organisations Convenors/Heads

9. A.O.B.

Papers will be circulated during the afternoon of November 7th
**Vision/aims**
CECS is an interdisciplinary research group that provides a strategic focus within the School of GeoSciences for research and teaching on the causes and impacts of environmental change and an understanding of the science, technologies and policies needed to achieve sustainable development. Our aim is to provide the scientific evidence and analysis necessary to underpin local and international environmental policies through excellence in research. CECS collaborates within the School, with other supporting Schools and Colleges and with outside organisations (including other academic institutions, government and business) in order to create the multidisciplinary teams that are necessary to address the complexities of environmental problems. CECS will continue to maintain a reputation for policy related analysis of scientific evidence and provision of underlying original research in environmental sustainability. We aim to ensure that the School of GeoSciences and the University of Edinburgh becomes a widely recognized UK focus for excellence in sustainability research.

**Current position**
The group combines expertise in ecology, land-use and socio-economics to address current research themes in: Climate Change and Sustainable Development; Sustainable Forestry; Natural Resource Management; Rural Economy, Land-use and Sustainability; Vegetation Dynamics & Management; Biodiversity and Ecosystem Modeling; Innovation in Renewable Energy Systems; Trust and Communication in Environmental Policy and Environmental Sustainability of Marine Energy. This multidisciplinary capability provides a strong base from which to develop synergies with other Research Groups to explore sustainable solutions to environmental problems.

**Achievements:** CECS has led projects in support of policy development for the Scottish Executive, SNIFTER, DEFRA, DFID, DTI, and the World Bank. We have also participated in projects led by other University departments and external organisations including private environmental consultancies, the Sustainable Development Commission, the Carbon Trust and academic units of this University including CHSS, IMPS, and IES.

CECS has prepared a number of large national scale proposals including a successful proposal with IES to co-host the £12M joint-research council UK Energy Research Centre (UKERC) which includes a project on the sustainability of offshore energy systems located in the Centre. We are highly active in knowledge transfer projects linked to sustainable development and are leading a DFID project that supports NEPADs implementation plan for the role of science and technology in Africa’s development. CECS is a partner in a Darwin Initiative project to monitor corals in the Galapagos, while at a local level CECS has completed a study of oil shale bings for the West Lothian Biodiversity Action Plan. CECS is a partner in a successful proposal to host an ESRC/NERC interdisciplinary seminar series on Addressing Environmental Inequalities in 2006-2007.

**Strengths:** CECS has an external reputation for rigorous and impartial evaluation of scientific evidence in support of policy development and maintaining an interdisciplinary perspective across environmental, economic and social aspects of the environment and sustainability. This results in invitations to tender from government departments and agencies (sometimes single-tender) on a wide range of environmental topics and invitations to collaborate on joint submissions by key academic groups (e.g. Imperial College, Policy Studies Institute, Macaulay Institute). The multidisciplinary nature of CECS and a wide range of international contacts with overseas research and development agencies makes it well placed to develop international initiatives. The established ‘brand-image’ of CECS is recognized externally and within the University.

CECS has created a truly interdisciplinary environment and reputation that has attracted external research staff to locate within the Centre including: Dr Wendy Kenyon (socio-economist and visiting Macaulay Research Fellow 2002-2007), Dr Mark Winskel (social scientist and ESRC Research Fellow 2004-2006), Dr Katie Begg (EU Research Fellow 2005-2008), and Vicki Swales (Institute for European Environmental Policy). CECS has continued to increase its numbers of research fellows, research assistants and PhD students and is expected to grow significantly.

The CECS ‘brand image’ as a Centre for studies of sustainability has supported recruitment to two very successful MSc courses that contribute to research development through external dissertations and the networking opportunities that arise through joint supervision and teaching contributions from external bodies.
Weaknesses: The successful exploitation of interdisciplinary research potential and opportunities in environmental sustainability demands a greater critical mass of staff in emerging disciplines of importance (as noted below under strategy).

External factors

Opportunities: Environmental Sustainability is a research (and teaching) area recognized to have growing and fundamental importance by research councils, by local and national governments and by private sector companies. CECS is well placed to address this growing need for such interdisciplinary research through the activities of its members and by working closely with other research groups within GeoSciences and elsewhere. CECS will therefore continue to develop a research approach, style and reputation that matches the strategic requirements of policy makers, funders and users of science in Scotland, the UK and overseas.

The UK Government Science & Innovation Investment Framework 2004-2014 (SIIF, 2004) identified ‘sustainability of our environment and energy’ and ‘international development’ as two of its key policy priorities for research (the others are health and security). These are established areas of CECS research activity supported by participation in the new UK Energy Research Centre (UKERC), the Sustainable Development Research Network (SDR- Network), the Darwin Initiative and the New Partnership for Africa’s Development (NEPAD). These provide excellent opportunities to address emerging research by developing synergies with other Research Groups within the School and with outside organizations (e.g. Macaulay Institute). In particular, participation in UKERC opens several opportunities for joint initiatives in sustainability and environmental impact and monitoring through collaboration with EEO and Subsurface Research Groups.

The SAGES initiative provides a key opportunity to integrate knowledge transfer and support for evidence-based policy within the activities of the School and thereby address these opportunities.

Threats: The expanding research (and teaching) opportunities that arise from the need for integrated appraisal of the complex interactions between environment, sustainability, technologies, economics and society have been well recognized in Research Council strategies and by competing universities. Current competing UK university initiatives include the expanding Oxford Environmental Change Institute, the new Environment Centres at Lancaster, Newcastle and Bangor and the Aberdeen Centre for Environmental Sustainability (ACES). The Centre for Ecology and Hydrology (Edinburgh) is a local partner in three of these initiatives and is actively addressing these opportunities through new appointments. There is a risk that if University/College/School management does not support the strategic opportunities outlined above, through success in the SAGES initiative or new academic appointments, that ACES may become a dominant player in environmental sustainability within Scotland (although currently ACES appears to have significant internal political, financial or organizational problems).

Strategy

The ability of CECS to realise these expanding research opportunities is compromised by lack of staff, particularly in emerging areas of importance. We therefore propose key priorities for new staff in the area of environmental sustainability in order to establish the School of GeoSciences as a leading provider of research and postgraduate training in this area. The recommendations are based upon an assessment of the research strategies and funding opportunities of key government departments, research councils and private sector companies and the opportunity to draw upon the expertise of other research groups.

Lecturer in Environmental Policy: specifically in the area of energy, carbon and emissions trading to build upon Scotland’s position as a European focus of renewable energy potential and linking School expertise in the global carbon cycle, carbon sequestration, geography and policy, and remote sensing. This post should be closely aligned with knowledge transfer and presents an opportunity for close interaction with government and agencies.

Lecturer in Environmental Management Systems: with expertise in the ‘new’ area of Strategic Environmental Assessment (SEA) to develop both research and knowledge transfer capabilities linking the research outputs from all the Research Groups within the School to underpin assessment and policy.

Michie Chair in Rural Economy & Environmental Sustainability: provides an opportunity to give a strong external signal of University and School intent in this research domain and to provide future leadership and management of interdisciplinary research, knowledge transfer and evidence-based policy formulation.

Benefit and Risk

CECS provides the School with a valuable external profile and clearly defined “interdisciplinary space” that was noted to be a preferred form of infrastructural investment by the government Science & Innovation Investment Framework (2004). By focusing on interdisciplinary research that is ‘relevant to users’, CECS provides the School with a strategic focus and track record to address the new approach to assessing research through reforms in the RAE. “The new approach to assessing research, though reforms to the RAE, which will form the basis of higher education funding from 2008, will provide greater reward, and thus stronger incentives, for academics to work on research relevant to users and work which crosses disciplinary boundaries” (SIIF, 2004).

The greatest risk is a failure of the School to build upon the existing reputation of CECS and to miss the emerging opportunities for research and expansion of teaching in environmental sustainability.
Specific actions for 2005-06

1. The move into the Crew Building has enabled co-location of CECS staff and thereby greatly improved group dynamics and the ability to interact more widely within IAES. The establishment of CECS as a Research Group has also greatly improved identity and functionality within the School. CECS staff will build upon this opportunity by expanding current research themes and knowledge transfer through wider discussion and interaction with other Research Groups and the new School Business Development Executive.

2. CECS will address the need to maximize the value of the School’s RAE submission and develop the contribution of individual members through personal academic plans in conjunction with the HoI.

3. CECS will participate in and support the development of collaborative initiatives including SAGES and the invited full proposal for a SEERAD Centre of Excellence in Land use and Greenhouse Gas Fluxes.

4. CECS will seek mechanisms to support the provision of in-house expertise through new strategic appointments that address the opportunities noted above and seek and develop strategic external partnerships where key disciplines remain unrepresented within the University (e.g. with the Macaulay Institute, the Policy Studies Institute).

5. We will maintain and improve the established reputation and ‘brand-image’ of CECS and the School through the production of a publicity brochure, through the creation of new Research Group web pages and through the provision of a high quality seminar programme.
A. Vision/aims

The aim of the EEO is to promote and support high quality, independent research that helps further our understanding of Earth and its environment through the effective integration and exploitation of both in situ and remote observations, and to inspire the next generation of geoscientists.

The EEO will strive to meet this aim by helping to:
1. pool resources (skills, expertise, knowledge, experience)
2. enhance our profile (within the disciplines and in the public perception)
3. increase success rates across the school (grant income, paper output, student numbers)

Within 3 years the EEO should have:
1. established an effective infrastructure for promoting new, interdisciplinary research (through communication, interaction, collaboration).
2. created a recognisable public image within Scotland, and a reputation for quality research within the wider UK Earth system science community.
3. made a significant contribution to the further success of the School as a whole.

B. Current position

Strengths
1. The EEO is by far the leading centre for environmental measurement and data handling in Scotland.
2. The research interests of EEO members span a diverse range of topics, with core academic strengths in: remote sensing; GIS and modelling; measuring and modelling land-atmosphere fluxes of trace gases; modelling atmospheric radiation and chemistry, and atmosphere-ocean interactions; seismology and hydrocarbon detection, and geopotential fields.
3. With over 40 associated staff, the EEO is one of the largest (the largest?) single-institution academic groups in the UK focusing on the effective exploitation of remote and in situ measurements of Earth.
4. The EEO has representation in three of the NERC Earth Observation Centres of Excellence (CTCD, CASIX, CPOM).
5. The EEO has established a clear profile within the University and developed strategic links with a number of research partners (FC, MLURI, ECRR, DE, SAMS).
6. Our biggest strength is the high number of international quality researchers.

Weaknesses
1. To attract the level of esteem necessary to allow the EEO to make the next steps to becoming an international-quality facility, it requires an established senior academic in a relevant discipline to front the EEO.
2. A lack of perceived benefit to members, many of whom have yet to see any benefit to their own research agendas arise from being part of the EEO.
3. The research interests of the EEO members span a diverse range of topics, and of length scales. They include both ‘pure’ and ‘applied’ research areas.
4. One consequence of (3) is that the Observatory has yet to find a theme that gives it unique “flavour” – a speciality that EEO can be uniquely associated with within the UK.
5. The EEO (and School generally) has so far been weak at publicising our research activities.

Recent Initiatives/Changes
1. The EEO has been successful in supporting 4 new academic posts within the School:
   a. Environmental informatics
   b. Quantitative human geographer (with HGRG)
   c. Remote sensing for forestry (jointly funded by NERC and Forestry Commission)
d. Remote Sensing of the Cryosphere (jointly with GCRG)

2. The EEO Steering Group comprises at least one member from each institute, the SG should allow for timely and appropriate responses to issues that impact on the EEO.

3. The EEO held a successful high profile joint symposium with Edinburgh Consortium for Rural Research on the topic of Earth observation in May 2005.

C. External factors

Opportunities

1. The EEO is well-placed to play a full and active role in the SAGES initiative.

2. The NERC EO Centres of Excellence will come up for review within the next year. The expectation is that some of the centres will be directed to broaden their remit and include more partners (it is unlikely that any will be closed). EEO should be in a position to capitalise on any new opportunities arising from this review.

3. The possible NERC-PPARC joint funding initiative to look at comparative planetology (circa £20-30M overall). The EEO, in collaboration with other parts of the School, is well-placed to support UoE bids in these topics since most information about the other planets comes from remotely sensed data of some sort or another.

4. QUEST funding that is being directed towards “centres”.

Threats

1. The greatest threat is that as a University we will be sidelined in national funding schemes because we lack the co-ordination and synergy offered by the NERC Centres of Excellence (or their equivalent).

2. External centres and consortia that attract individual expertise from Edinburgh (their minds, if not their bodies as well!).

D. Strategy

1. The EEO lives or dies on the basis of the community of researchers it contains. We will support that community and foster the kinds of interdisciplinary collaboration that results in truly original ideas for research.

2. Recruitment of new staff to reinforce key strengths and create new opportunities across the School:

   a. Comparative planetologist to exploit School expertise in a new research field
   b. Remote sensing of the Biosphere-Atmosphere interaction to help understand the crucial land-atmosphere interactions at the large scale
   c. Data Assimilation in EO to optimise use of observational data and to support graduate level teaching
   d. Spatio-temporal data modeller to strengthen School expertise in environmental modelling
   e. Spatial Technology and Society to build on parallel strengths in human geography and spatial technologies.

3. Through a series of workshops we will identify a theme in preparation for potential new partnerships with NERC Centres of Excellence.

4. To focus on increasing our profile, through publicity and outreach.

5. Key positions in the organisation of the EEO have to be filled by willing volunteers.

E. Benefit and risk

Benefits for the School

1. The creation of a strong public image of the EEO could be exploited in the recruitment of students (both undergraduate and postgraduate) and to attract high quality researchers to the School.

2. EEO initiatives in the topics of data acquisition, processing, archiving and distribution will support the thematic questions driven by the other research groups.

What Can Go Wrong?

1. The EEO loses momentum due to lack of resources, especially staff time (high risk).
2. Inability to recruit an established senior academic into the position of Head of EEO to take the EEO forward beyond the initial 3 years (high risk).
3. Eventual disillusionment of members if there is a lack of progress (medium risk).

F. Specific actions for 2005-06

2. Support novel applications of the new ultralight research aircraft.
3. A document summarising the EEO “highlights” of 2005 to increase both internal and external perceptions of the value of the EEO.
4. To begin a series of small workshops on key topics.
5. Sounding out potential high-profile researchers about coming to Edinburgh
6. Stimulate EEO researchers to be energetic and proactive in the pursuit of this strategy and EEO goals overall"
VISION/AIMS
The issue of global change is at the centre of the international scientific agenda. The recent G8 and Africa summits identified climate change and its impacts, and soil fertility, as crucial issues for the well-being of human society and the sustainability of the global economy. They are priorities, in different forms, for all UK Research Councils and for the EU 7th Framework Programme, and their policy implications are important for both UK and Scottish governments. The success of the School of Geosciences, both in research and its capacity to attract students, will depend upon its perceived effectiveness in responding to these issues.

The Global Change Group can make a distinctive contribution to the study of global change, by integrating the strength and diversity of its research base, within a single Centre for Earth Systems Dynamics. This Centre will link existing research programmes, in atmosphere, biosphere, oceans, cryosphere and continents, through process-based modelling of the full, coupled Earth System. The Centre’s special focus will be to study system dynamics at high spatial resolution, recognising the demand for approaches that can estimate, forecast or create scenario-based probabilities of the direction and magnitude of future change in the Earth System. This is a challenge for the geosciences which, in the past, have either observed and explained the state of the modern system, or inferred and explained past change. The Centre’s mission will complement that of government bodies, such as the Hadley Centre, by focusing on improved process understanding, and defining uncertainties, rather than on operational forecasting. This focus on modelling will also provide a basis for better links with the Subsurface Group, the Earth Observatory, and CECS.

CURRENT POSITION
The Group currently has considerable impact through the activities of its sub-Groups. The Global Change Research Group is closely tied to flagship programmes in NERC, with principal investigators in three centres of excellence, DARC (Harwood, Data Assimilation Research Centre), CTCD (Grace and Williams, Centre for Terrestrial Carbon Dynamics), and CASIX (Merchant, Centre for Air-Sea Interactions and Fluxes). GCRG is linked with the NERC RAPID climate change programme (Tudhope), and has won major NERC grants for work on pollution (Farmer). The atmospheric group are involved in an intercomparison of global chemical models that will be used in the next IPCC report (Stevenson), in NERC-funded satellite projects for the Earth Observing System (Pumphrey), and in NERC-funded research on ocean surface temperatures (Merchant). This year, two new NERC Research Fellows have joined the group.

Global Change is also linked to two EU-funded Integrated Projects, ‘CarboEurope’ (Grace, Moncrieff) and the new ‘NitroEurope’ (Moncrieff, Smith). GCRG is involved in a major EU programme on sub-surface impacts (Boulton), and provides much of the drive behind the GLIMMER ice sheet modelling initiative (Hagdorn, Hulton, Boulton).

However, if the Group is to be successful in pursuing its aims and in winning funding, it needs to shift its centre of gravity by adding a much stronger modelling capability; a vital step in ensuring that the whole is greater than the sum of the parts.

EXTERNAL FACTORS
Political and public awareness of the impacts of global change, and an inter-governmental focus on natural hazards, are making demands for greater predictability and an issue- rather than discipline-based approach to complex natural systems, whilst the availability of massive computing power makes these problems tractable. These increasingly drive the trajectory of funding.

The increasing priority for knowledge transfer requires the Group to consider where its priorities should lie in this area.
If SAGES is funded, not only will posts additional to those bid for in the document become available, which will enhance the rate at which the Group can make the transition to one better able to address the global change agenda, but it will also demand a broader pattern of collaborative links with other SAGES partners in Scotland.

STRATEGY

The central and immediate strategic objective of the Group is the creation of the Centre for Earth System Dynamics, which was the core of the Group’s plan last year, which also described how the Centre might operate. The posts proposed in the next sections are a key part of the shifting of the Group’s centre of gravity by enhancing our capability in simulation modelling. This is a crucial means of generalising process studies, of understanding interactions between environmental domains in the complex, coupled system of which they are parts, of making predictions and of displaying and explaining results. We have some strength in dynamics and modelling in the biosphere, cryosphere and atmosphere sub-groups (although we will lose some from the latter two in the near future), but this is an area that must be strengthened if the Group is to prosper. In addition, such simulation capacity is also vital if CECS is to be effective in working at the interface between the geosciences and policy communities.

At the same time the Global Change group has lost, or is about to lose, five staff in relevant areas: two in atmospheric dynamics and processes, one in soil trace gas emissions and two in glaciology. Loss of the former two, if un-replaced, undermines the School’s credibility as a player in atmospheric dynamics, the crucial, short-term area for global change; and loss of the second removes a key capability from the School’s strong terrestrial carbon and biogeochemical work. The glaciology posts are associated with established chairs, over which the Group recognises that it has no special case.

RESOURCES

Posts

The following proposal is for four posts in three areas identified as central to global change work in the Group’s academic plan, two in atmospheric dynamics and modelling, and one each in palaeo-ocean modelling and in terrestrial biogeochemistry. The posts should be advertised at lecturer-reader levels. Linked to the appointment of a Chair, these posts will provide the basis for developing a world-class Centre for Earth System Dynamics.

These proposals are not coupled to the SAGES bid but are consistent with it. If SAGES is successful, these vital posts will be necessary School contributions to SAGES, the costs of these vital posts to the School will be defrayed for several years, but they must be funded even if SAGES is unsuccessful. It is suggested that the Centre for Earth System Dynamics could be presented through the planning round as a major College and University initiative deserving priority in planning and resourcing.

Two Atmospheric Modellers/Dynamicists

Nearly all the processes involved in global change involve the atmosphere. Apart from the intrinsic importance of changes to its state, it plays a crucial role in changes to the oceans, lithosphere, cryosphere and biosphere, controlling the interchange of water and ice, gases, momentum, energy, dust, wind-borne seeds and disease vectors across and between the oceans and land surfaces. It is therefore essential to studies of global change that the atmospheric response to its changing boundary conditions - on scales from the near-surface boundary layer, to the global - is well understood and properly incorporated into models. Accordingly a vital component of our strategy is to have a sufficient complement of modellers with a strong understanding of atmospheric fluid dynamics. Full exploitation of the opportunities made possible by the creation of the Global Change Group requires two appointments.

One post will concentrate on modelling on the global scale. This will underpin (a) the chemical modelling of the troposphere and stratosphere (by Stevenson and MacKenzie (NCAS-funded) resp.) and (b) the observational work on monitoring global atmospheric change and on understanding the processes thereof undertaken by Pumphrey and Harwood in collaboration with NASA’s Microwave Limb Sounders team (amongst others). This post will be particularly concerned with the role of phenomena such as the El-Nino circulations, monsoons, North Atlantic Oscillation and troposphere-stratosphere exchange of air in determining the chemical environment on the largest scale. It will also feed into our work as part of NERC’s CoE, The Data Assimilation Research Centre. That work aims to incorporate the satellite data into the forecasting models of the European Centre for Medium-range Weather Forecasting. In addition the post will be valuable to the paleo-climate group (Tudhope, Elliot, Boulton, Sinclair) in helping to interpret the implications of their data.

The other post will concentrate on modelling on the regional or smaller scale, but using versions of essentially the same model, which is configurable. This post will enable us to continue the effective collaboration with CEH undertaken by Weston and co-workers to develop models of deposition of atmospheric pollution on the scale of the UK and Europe. This work can benefit greatly by moving to the next generation of models. The dynamicist
appointed to this post is expected to have strong interactions with school members of NERC’s CoE Centre for TerrestrialCarbon Dynamics (Grace, Moncrieff) through the possibility of undertaking inverse modelling studies in which sources of trace gases - greenhouse gases or pollution - are inferred from observed winds together with measurements of concentration such as those made by Moncrieff with the “tall tower” and the School’s aircraft. Close work, including the use of data assimilation techniques, is also expected with Williams with ecological models, and again work with collaborators at CEH, and with the trace gas emissions group (Smith and Reay).

Further advances can be anticipated from this appointee working with MacNaughton on fundamental revisions of the theory of the atmospheric boundary layer, with Heal on the hydrology of catchment areas, with those who study the effect of weather and climate on landscape (Sinclair) and to provide a physically realistic atmospheric boundary condition for ice sheet modelling (Boulton, Hulton).

Palaeo-ocean dynamicist
The dominant role of the ocean in processes of abrupt climate change has been revealed through palaeoclimatic reconstructions. Palaeoceanographic studies document profound changes in past ocean circulation and chemistry well beyond the range provided by 150 years of instrumental data. Integrating information derived from such proxy data into dynamic climate models is at present the only way to investigate the full range of natural variability of our climate system. The ocean’s programme currently conducts internationally competitive research in the fields of paleoclimatology and palaeoceanography (Elliot; Ganeshram; Tudhope), marine biogeochemical cycles (Cowie; Ganeshram) and plankton genetic diversity and evolution (Darling). As a major component of this effort, we provide quantitative reconstructions of past climatic variables, nutrient status and biological productivity. Our efforts serve to refine environmental proxies and provide more accurate measures of past climate variables. The integration of such data into coupled models is crucial to provide a more accurate understanding of the nature, mechanisms and drivers of past, present and future climates. Such a strategy should permit us to address some key questions such as: 1) What is the precise role of the thermohaline circulation in the mechanisms of abrupt climate change? 2) What is the role of the Tropical Pacific Ocean in driving global and regional scale rapid climate transitions? 3) What role do marine biogeochemical cycles play in rapid climate oscillations? 4) How do interactions between the Atmosphere–Ocean systems participate in abrupt climate change? And finally, 5) What are the mechanisms and drivers of changes in dominant modes of interannual-centennial timescale variability in the ocean-Atmosphere climate system (e.g. ENSO, NAO)? Answers to these questions lie in the physics of our climate system and occur on timescales that cannot be attained using proxy data alone. For this reason we integrate information derived from proxy data into climate models.

We propose a post in paleo-ocean modelling to address these key issues. This person would have a specific interest in using climate models of different degree of complexity to study past climates. He/She could use fully coupled ocean atmosphere 3D models or more simple 2D models. Both types of approaches have proved to be very successful to study past climates on different timescales. This person would fully interact with all members of the Ocean’s Programme. He/She would enable us to exploit much more effectively the strength of the current paleo-oceanography programme and integrate its work with quantitative climate dynamics so as to increase understanding of the coupled processes that control climate and environmental variability and change, past, present and future. Expertise in the field of general circulation models already exists within the Atmosphere programme (e.g. Harwood; Stevenson) and the School and University are well equipped with the computational hardware and experience for modelling of complex systems. However most work conducted in this area within the school focuses on modern climate system. A person with an outlook into past climates would thus be an essential addition to the work of the Global Change research group and the Centre of Earth System Dynamics.

Terrestrial biogeochemist
Understanding and predicting global change requires a detailed knowledge of the cycling of critical elements, such as carbon and nitrogen, through the terrestrial biosphere. The Earth’s basic chemistry is changing fast due to human activity, through fossil fuel burning (carbon cycle) and fertilizer production (nitrogen cycle). These chemical changes have major implications for the functioning of the biosphere. In terrestrial environments, the soil in particular contains vast stocks of carbon, nitrogen and other key elements, and soil microbial populations control the key processes of decomposition and mineralisation that process these elements. The fate of these elements in soils, as climate and atmospheric inputs change, is a vital part of global change research. Critical research questions relating to terrestrial biogeochemistry include: 1) How will carbon mineralisation in soils respond to rising temperatures and atmospheric CO₂ concentrations? Earth system models reveal this is a key uncertainty in their predictions; 2) How does alteration in land use affect the sequestration and production of CO₂, CH₄ and N₂O, the three key greenhouse gases?; 3) How does N deposition from fossil fuel burning affect soil fertility and vegetation processes? 4) What controls other trace gas emissions (e.g. isoprene, methyl bromide) from vegetation and soils?

We propose a post in Terrestrial Biogeochemistry to provide a focus on answering these questions. The postholder will have expertise in carbon, nitrogen (and perhaps phosphorus) cycling, and in measurement and modelling of greenhouse gas fluxes, in a range of environments and ecosystems. This post will build upon knowledge already within the Global Change group relating to biogeochemical processes (NERC Fellow Reay),
and the modelling of biogeochemical cycles (Williams). The post-holder will also have strong links to the carbon flux work undertaken by Grace, Mencuccini, Moncrieff, Graham, Farmer and Meir, the environmental geochemistry of Farmer and Graham, and the hydrological work of Heal. The post holder will link with atmospheric chemists (Stevenson) through research on soil and vegetation production of reactive trace gases; with oceanographers through research on nutrient runoff from soils to coastal zones and the chemistry of sediments in estuarine regions (Cowie, Ganeshram); and with the stable isotope community within and outwith the School. A terrestrial biogeochemist will allow the School of GeoSciences to strengthen its leading position as a centre for the study of the global biogeochemical cycles and their links to climate change. The post-holder’s activities will strengthen and enhance the development of biogeochemical modelling activities already underway within the Global Change group, and thus play a key role in achieving our vision of an integrated Centre for Earth System Dynamics.

Other resources
This year co-ordinated activity in the Group has grown considerably, and we expect this to grow further in 2006/07. We encourage the School to budget for: increased numbers of seminars and more overseas visitors; helping to fund away days.

In addition, if SAGES is not funded, it is important that a computer officer is appointed, able to advise on and support optimal access the university’s high performance computing resources, in addition to workstation upgrades.

BENEFITS/RISKS
Global Change is the School’s largest group. In research, it is the one where creation of the School has the greatest potential impact. The Earth system dynamics trajectory will permit the Group to have the greatest impact in its research, in grant-winning and in knowledge transfer. The new posts represent the vital first step in this change of trajectory. If we unable to change in this way, there is a grave danger that the Group’s impact will be no greater than the sum of its parts, and that major programme grants will be beyond our reach. The benefit will be in achieving a new potential, the risk is failing to do so.

SPECIFIC ACTIONS
As the School’s largest, most diverse group, it has taken time to develop a sense of collective momentum. This is now happening. In this year:
- **The Chair and four additional posts should be advertised as soon as possible.**
- We have developed a very well attended, weekly Global Change Seminar. Part of the seminar programme of the group is also carried forward through the Hutton Club. Individual sub-groups also have weekly meetings.
- A Group away day for academic staff and postgraduate researchers is being planned for Easter time. It is designed to enhance interaction between the sub-groups, inform us about the range of our science, identify opportunities and build identity. External sponsorship is being sought, with the aid of the School’s Business Development Executive.
- An effective web-site has been created and a brochure is being prepared that is awaiting the emergence of a School template.
- A discussion meeting for postgraduate students is planned for the early New Year.

The Group will also develop a strategy for knowledge transfer. We anticipate that this will have three levels:
- Conclusions about the operation of the global system and its components that should be fed into international bodies such as IPCC and IGBP. Appropriate links will need to be created to national and international bodies.
- Meso-scale, regionally relevant results, which will depend on a capability for high spatial and temporal resolution models such as in the post descriptions. We envisage CECS to be an important collaborator in delivering such output into the policy arena.
- Specific process-based work in areas such as water quality, pollution, waste or energy. Collaboration with the Sub-Surface Group in areas such as Geohydrology should be developed.

A. VISIONS/AIM

The Human Geography Research Group seeks to:

- maintain its position at the forefront of human geography nationally and internationally;
- achieve world-wide recognition in our thematic specialisms (Geographies of Relations and Identities; Geographical Knowledges, Practices and Policies; Development and Power);
- contribute to the achievement of a top research rating for Geography in the RAE2008;
- further develop our profile through increases in research grant income;
- enhance our capacity to secure externally funded PhD studentships;
- consolidate and capitalise upon our research links with Schools in the College of Humanities and Social Science and the College of Medicine and Veterinary Medicine.

B. CURRENT POSITION

The Human Geography Research Group has core academic strengths in three thematic areas (described in the Appendix):

- Geographies of Relations and Identities;
- Geographical Knowledges, Practices and Policies;
- Development and Power.

The current mix of staff presents strengths and weaknesses:

- we have successfully appointed a distinguished human geographer, Professor Lynn Staeheli, to the Ogilvie Chair;
- we have made two appointments which bring “new blood” to the Group but which place pressure on staff in terms of mentoring and other administrative tasks for which seniority is required;
- two recent junior appointments are temporary, generating particular risks to investment in staff;
- grant income has improved but we need to continue successful achievements.

C. EXTERNAL FACTORS

- The Human Geography Research Group plays a major role in linking the School of GeoSciences to scholarship and research activity in the College of Humanities and Social Science. The Group also has links to social scientists in the College of Medicine and Veterinary Medicine.
- The refocusing of SAGES has regrettably diminished the Group’s involvement in this initiative but not weakened the resolve of the Group to seek collaboration with other School research groups and other institutions/groups as appropriate.
- The Economic and Social Research Council and the Arts and Humanities Research Council are key external influences. We have a good track record in securing grants from both bodies, reflecting a very good rate of submission of grant applications. The picture in terms of postgraduate research studentships is more mixed. The Group has sought renewed ESRC research recognition in the 2005 Recognition Exercise. Yet even should our recognition be renewed (results expected January 2006), the relationship between outcome and the intended ESRC quota system remains unclear. It is therefore vital that the Group broaden its search in support of postgraduate funding.
- A key factor affecting the Group is the intense pressure resulting from high student numbers. Because demand for the MA in Geography is far higher than for all other degree programmes in the School (and possibly in the College), there is a very real risk that this pressure might further intensify, seriously damaging our capacity to realise our research potential. This is particularly so for younger staff and has implications for RAE out-turns.
• One means of addressing the above two points would be for School to support the Group's postgraduate profile via GO and, possibly, Teaching Studentships.

D. STRATEGY

The two most important factors affecting our capacity to achieve our vision are:

• pressure from student numbers in undergraduate/taught MSc teaching;
• lack of consistent support for expanding postgraduate numbers.

The Group is advancing its vision by:

• maintaining and developing its successful programmes of seminars, symposiums, workshops and business meetings;
• mentoring junior staff;
• collaborating on new research projects internally and externally;
• promoting a 'Common Good Fund' by pooling 10% of overheads from PI research grants.

E. BENEFIT AND RISK

With appropriate support, the Human Geography Research Group has the potential to deliver to the School international recognition in our three research specialisms. Our capacity here is dependent on additional staff recruitment and staff retention. A key risk on the horizon relates to the RAE2008.

F. SPECIFIC ACTIONS FOR 2006/07

• Appoint at least two lectureships (one linked to the Ogilvie Chair, and one whose specification will depend on the mix achieved with other recent positions).
• Continue our rate of success in external grant applications.
• Enhance our recruitment of School-supported and externally-funded research students.
• Continue to provide programmes of research activity that provide coherence, direction and purpose for the Group.
• Be involved in incorporating elements of the Group's work/agenda within the remit of the Michie Chair in Rural Economy.
The Human Geography Research Group engages with substantive research questions and epistemological debates at the forefront of human geography. Methodologically we draw on quantitative and qualitative methods, making innovative contributions to both and to the relationship between them. The Group, whilst generally engaging with the themes of space, place, landscape and environment, advances new insights and perspectives in three specific inter-related areas: the spatial production of relations and identities; knowledges, practices and policies; and development and power.

- **Geographies of Relations and Identities**

  In examining the interplay between place, space, relations and identities, the Human Geography Research Group advances understanding through research concerned with ethnicity, national identity, indigeneity, gender, caste and age as well as the intersections between them. Our research addresses the categories through which social identities are defined, illuminating their instability and contestability in, for example, studies of relations among and between peoples described as “indigenous” and “settlers” or “migrants”; between conflictual ethno-national groups in shared territories; and through scholarship that challenges dominant conceptions of (ethno)nationality and gender. Our research here also embraces the commodification of places and identities in the leisure industry; creative uses of “natural” landscapes to enhance health and wellbeing; and embodied emotional attachments between people and environments.

- **Geographical Knowledges, Practices and Policies**

  Here, our research examines the co-production of knowledges and geographies in, for example, studies of the meanings of “nature”; the production of scientific and non-scientific knowledges of the environment; historical geographies of the Enlightenment and of science; analyses of the influence of risk and risk management as spatially organising frameworks in the field of insurance. Our research here is characterised by reforging geography’s connections with the humanities and by exploring discursive practices including those associated with disciplinary boundaries. Our research here also explores the spatialities of knowledges and practices, analysing and informing policy in fields including health, education and social justice. This research engages reflexively with questions of ethics and other aspects of the production of “academic” knowledges.

- **Development and Power**

  Drawing on political economy, political ecology, critical development and postcolonial theory, our research engages with uneven processes of development, geopolitics and globalisation through processes including education and social transformation, global-local interaction and environmental resource management. Specific areas of interest include the role of education in ensuring social inclusion, land reform and empowerment, the political economy of natural and tourist resources, and regional development.

Interdisciplinary and collaborative working is an integral part of the research culture among human geographers. This has been important for developing a key strength of geography as a discipline, namely its position at the interface of the natural and social sciences. At a time when the boundaries between nature and culture, people and environment, technology and society, genetics and experience are increasingly open to question, the Human Geography Research Group is in a unique position in the School of GeoSciences in its capacity to work across disciplinary boundaries. The Group has strong links with most Schools in the College of Humanities and Social Sciences.

The Human Geography Research Group has expertise in a wide range of geographical regions including Nepal, Singapore, Australia, the Americas (especially Chile, Belize, and the Caribbean), Canada, Europe (especially Scotland and Cyprus) and the Middle East (especially Israel/Palestine). The Group has not so far been able to take full advantage of the re-emergence of Area Studies, primarily because area
PRIORITIES FOR APPOINTMENTS

The top priority for the Human Geography Research Group - to reappoint to the Ogilvie Chair – has been successfully achieved. It is now important that, in negotiation with the successful appointee, the Group take the earliest possible opportunity to fill the associated junior lectureship.

In order to maximise its further potential, the Human Geography Research Group is keen to develop bids in collaboration with other groups in the College of Humanities and Social Science, within the School of GeoSciences, and to secure posts that will help realise potential synergies within the Human Geography Research Group.

Specific priorities are as follows.

1. One lectureship in human geography with expertise in Development and Power. For this post, we seek to re-establish links with area studies groups elsewhere in the University, for example in African Studies, Central and Eastern Europe or the Middle East. The appointee will therefore be expected to contribute to relevant networks in the College of Humanities and Social Sciences, as well as to the Human Geography Research Group. This position might be the junior appointment linked to the Ogilvie Chair.

2. Lectureship in human geography with expertise in Geographical Knowledges, Practices and Policies with specific capacities to address Nature-Society relationships. This position might be the junior appointment linked to the Ogilvie Chair.

3. Lectureship in human geography with expertise in Geographies of Relations and Identities, focusing specifically on urban geography.

4. Lectureship in Spatial Technology and Society. This position would strengthen expertise in quantitative methods, and strengthen links with the Edinburgh Earth Observatory. It should be noted that the Group currently includes one member of academic teaching staff in this field, whose temporary contract expires in December 2006. A new appointment by that date is crucial. This appointment is open across the Human Geography Research Group’s three themes.

5. Lectureship in Rural Geography with a requirement to complement existing expertise in the Human Geography Research Group’s three themes. This position will help to develop links between the Human Geography Research Group and those of the School’s research groups concerned with rural environments and provide consonance between the Group’s work and the remit of the Michie Chair.

Charles W J Withers on behalf of HGRG

November, 2005
Research Strategy Document for the ‘Subsurface’ Research Group

VISION/AIMS
We are interested in the chemical and physical properties, origin and history of Earth Materials (including minerals, rocks, rock assemblages, pore fluids and melts), and their interactions, at all scales within the solid Earth and Planets. We aim to
- understand the way the interior of the Earth and Planets work, now and in the past, at all scales in space and time
- characterise Earth materials, structure, dynamics and history, using state-of-the art analytical, experimental, computational and observational techniques
- develop testable and predictive hypotheses for the interior component of the Earth system response to natural and anthropogenic forcing
- apply this knowledge to practical problems

CURRENT POSITION
The group encompasses the major disciplines of subsurface Geology, Geophysics, Geochemistry, and Geodynamics, with internationally-recognised staff in all areas covered. Special interest groupings within, and cutting across, these disciplines include: Igneous and Metamorphic Petrology; Mineralogy; Sandstone and Carbonate Diagenesis; Experimental Geoscience (including Experimental Petrology and Rock Physics/Chemistry); Petroleum GeoScience; Tectonics & Earth History; Sedimentary Basin Analysis (including hydrocarbon habitat); Seismic Sequence Stratigraphy and Seismic Anisotropy.

We have a strong multi-disciplinary capability, based firmly on primary research areas, but outward-looking in scope. For example our expertise in micro-analysis resulted in successful bids for state-of-the-art analytical facilities, now provided as a School and National resource. Experimentally, BP could find no other laboratory to carry out high-specification water flood tests on core samples required to develop oilfields in the Gulf of Mexico. Computationally, Geophysics and other staff are at the forefront of developing numerical methods to image, model and predict complexity in Earth and Planetary structure and dynamics. We maintain an outstanding field-based observation capability, routinely integrating the results of surface mapping, remote sensing, geophysical imaging and high-profile direct drilling experiments.

Our work is fundamental, but with a significant practical edge, including hydrocarbon exploration and production; improved reservoir description by seismic sequence stratigraphy and diagenesis; improved oil recovery by better understanding of fluid-rock interactions; groundwater management and land remediation; pollutant dispersion; earthquake hazards; mineral exploration; carbon dioxide capture and storage, and weathering of natural and building materials. Wed are also committed to knowledge transfer (e.g. the direct search for oil & gas – £7.5M spinout of MTEM Ltd. in 2004).

EXTERNAL FACTORS
Last year the main threats were the age profile (more than 50 % of academic staff were due to retire within the next 10 years) and damage to morale due to the rapid rate of attrition of staff (8 lost in the first 2 years of the School). This has been significantly mitigated in the past 12 months with the appointment/approval of 6 new posts – 3 by special School initiatives and 3 from the successful research pooling bid for the Edinburgh Collaborative of Subsurface Science and Engineering (ECOSSE), and the commitment to re-appoint to the Regius Chair in Geology (whose constituency will remain largely in the Subsurface group). This illustrates the flexibility of the School planning cycle, a degree of innovation and initiative in mapping teaching and research initiatives in the Natural hazards area, the School commitment to the Centre for Science at Extreme Conditions (CSEC), and the group’s success in attracting Scottish Funding Council (SFC) pooling funding. The remaining threat is to now to more specific subject areas, such as Geophysics and anticipated retirals in Micro-analysis/Metamorphic Petrology and Earth History. These will be ameliorated to some extent by the planned ‘next’ School appointment of a Planetary Geophysicist, and a stronger push for resources from SFC for the ‘Deep Earth & Time’ Association of Scottish Earth Science Institutes (ASESI) initiative.

The long-term reduction in overall funding of Subsurface GeoScience by NERC generally continues. In the last year our performance in attracting research grants and studentships from NERC and improved markedly, but there is still a need to further diversify our funding stream for grants and studentships, and improve knowledge transfer.
We remain key players in College initiatives such as CSEC and the Centre for Material Science and Engineering (CMSE) for analytical and experimental work on materials; the Contaminated Land Assessment and Remediation Research Centre (CLARRC) for pollution studies; and the Edinburgh Parallel Computing Centre (EPCC) and the e-Science initiative for high-performance computing. The new instrumentation and expertise provided by the NERC Ion and Electron Microprobe facilities on site, and the appointment of David Steele will bring many additional capabilities to the geochemistry, environmental science and global change areas, and we welcome this expansion to the existing National and School resource. We continue to press nationally and internationally (and with significant recent success) for NERC/EU funding in thematic areas, such as CO$_2$ capture and storage, target applications to the EPRSC-funded UK Energy Research Centre, and for increased industry funding following the recent increase in the oil price.

**Strategy**

Current and planned initiatives operate at different levels. Only a few examples are given here:

**Group:** Establish internal common-interest groups, e.g. tectonics and deformation, petroleum geoscience; low-temperature diagenesis; CO$_2$ capture and storage; pollution; fault studies; weathering. Establish a stronger and more integrated ‘Geochemistry’ presence, including on the website. Make the most of knowledge transfer.

**School:** Appoint the Regius Chair and press for an associated lectureship. Develop a strong synergy with the Global Change group, e.g. in examining the geological record of past climate change, and in the quantitative study of Earth dynamics between our Geophysics group and the Meteorology, Atmospheric and Fluid Dynamics elements of Global Change. Collaborate with the Edinburgh Earth Observatory e.g. for deformation, hazards, and Planetary studies; the Human Geography group, e.g. in natural hazards mitigation; and CECS, e.g. for evidence-based policy in groundwater quality. Help establish a strategy for technical support and facilities and raise awareness of the wide potential and capabilities of our facilities.

**College:** Actively participate with the College Centres named above, and with the major initiatives in Complexity and High-Performance Computing contained in the College 5-year plan. This will include pressing for specialist support under the SFC e-Data, Information and Knowledge Transformation (eDICT) scheme in the generic area of seismology support.

**National:** Make an early success of ECOSSE. Maintain and build on our existing international excellence in analytical techniques, in collaboration with the Scottish University’s Environmental Research centre (SUERC). Find an alternative funding source for enabling High-Pressure Research (‘HIPRESS’), enabling diversification into biofilms and extremophiles. Progress three major consortia: ‘GEOSPACE’, to examine Earth’s magnetic field (NERC), ‘NANIA’ (Novel Approaches to Networks of Interacting Autonomes) to model complex systems (EPSRC), and SCCS (Scottish Carbon Capture and Storage Centre, funded by NERC, EPSRC, DTI and SFC). Have a greater and more direct impact on the national economy through interaction with SME’s by participating where appropriate in Government-Industry collaborative schemes (e.g. Knowledge Transfer Partnerships (KTPs), and other Executive initiatives (SCORE, SEEKiT).

**International:** Lead or participate in high-profile, large-scale projects, for example the deep drilling of the Ontong-Java plateau, the largest igneous province in the world, and hence determine the influence of mantle processes on the evolution of the Earth’s oceans and atmosphere.

**Resources required**

The overwhelming priority is to maintain a critical mass of staff, while moving into new research areas likely to generate additional funding, and maintaining breadth and complementarity of subject area. It is particularly important to find additional funding to increase PhD student numbers, for example through the planned GO matching funding for the ECOSSE studentships due to start next year.

Outstanding academic posts are required in:
- **Planetary Geophysics** – to maintain critical mass in field geophysics allied to remote sensing data (joint with EEO), and to maximise income from the £30M NERC initiative in Planetary GeoScience.

- **Hydrogeology** – to increase our modelling capability of fluids in the subsurface; to plug a major gap in subsurface expertise, and to apply our knowledge to the groundwater industries. We see this as a strategic School appointment, and will explore the potential of a joint bid with Global Change and CECS.

- **Deformation and Tectonics** – to provide a natural bridge from the surface and near-surface brittle regime to interior ductile processes at higher temperature. We also see this as a strategic School appointment as it provides this bridge, which will be of importance not only to the Subsurface research area but also to Global Change.

Now that ECOSS has been approved, and SAGES looks likely to be funded, we will take action to progress the ‘Deep Earth & Time’ component of Geology & Geophysics via the ASESi initiative. This may fund the third post listed above.

The only part of last year’s plan to fail (at the final hurdle) was the HIPRESS bid to the SFC Strategic Research Development Grant call. This included a full laboratory upgrade, an Experimental officer and a Technician. However, during the ERP launch, David Gani of the SFC identified a suitable route to progress this, and made a specific invitation to our current lab manager to put in such a request to a separate SFC scheme.

**Benefit and Risk**

The nation, and hence the School, needs scientists who really understand the principles of how the Earth and all its components work, from the core to the upper atmosphere. The major benefit for the School in our plan is maintaining a core group centred on fundamental physics, chemistry, and dynamics of the Earth and Planets, with the potential to move into virgin areas such as subsurface bio-films (with implications from gas souring in oilfields to life on Mars). Many of the facilities first set up by members of our group have been rolled out to the School as a whole, and we are self-evidently in tune with College 5 and 10 year plans. If successful, ECOSS will produce one of the largest centres for subsurface research in Europe, well placed to be a one-stop shop for our client industries. Appointments in Planetary Geophysics, Hydrogeology and Deformation & Tectonics would help maintain a critical mass in Geochemistry, Geophysics and Geodynamics, while moving into areas capable of generating additional research funding and attractive new undergraduate courses. Our plans would maintain credible expertise in analytical, experimental, computational and field-based study in both applied and fundamental research, increasingly rare in the UK.

Given the planned scheme of retrials, we see very little long-term risk, but there is a significant short-term risk if these key posts are not filled or underwritten soon. We have consciously chosen areas with high probability of generating additional income, dovetailing into teaching need.

**Specific Actions for 05-06**

- Prepare for the RAE (to start as soon as possible)
- Progress the ASESi initiative, in collaboration with other Earth Science groups in Scotland.
- Mentoring of new staff in Exploration Seismology, Experimental Geochemistry and Volcanology.
- Appoint individuals to appointments in Carbonates, Reactive Flow Geochemistry, and Experimental Geosciences (under ECOSS), and to the Regius Chair in Geology (with Global Change).
- Press for new appointments in Planetary Geophysics (with EEO), Hydrogeology (with Global Change and CECS) and Deformation and Tectonics (ASESI).
- Further diversify funding stream, notably for PhD Studentships, EPSRC, DTI, KTPs etc.
- Contribute to the review of technical services being carried out by the School technical services committee, with a view to further improving provision
- Re-apply to SFC for Lab refurbishment in Experimental GeoSciences (HIPRESS)
Vision / Aims

The TCS is the provider of essentially all of the shared technical, analytical and computing support that enables the School to achieve its aims in all areas of activity.

A.1 Main Aims

- To provide a first-class level of technical, analytical and computing support that facilitates and enhances the quality of research and teaching in the School.
- To provide a highly skilled team that is responsive to changes in the research and teaching environment and flexible in its deployment and use of resources, conscious of and in accord with Health & Safety protocols and requirements.
- To be proactive in the provision of advice and guidance to School staff on technical, analytical and computing matters.
- To be recognised and respected across the School, and externally, for the quality of support provided to all areas of research and teaching activity.
- To have this recognition translated into concrete and transparent pathways for:
  - staff development, including training of junior staff;
  - reinvestment in infrastructure and TCS staff resources;
  - explicit involvement of TCS staff in the definition of requirements for all teaching and research activities for which TCS support is requested. This, for example, includes the definition of % recharge required for grants and other initiatives.

A.2 Position in 3-5 years

- Staffing will be increased, the security of staff improved, and the diversity of skills maintained and increased. The requirement for technical, analytical and computing support across the range of activities undertaken by the School has increased both in breadth and depth, and is unlikely to change. We will seek to enhance and diversify provision by:
  - Making successful cases for at least 3 strategic appointments that will underpin current and new research endeavours as well as teaching initiatives;
  - Converting those skilled AS staff who support diverse users and user groups but who are currently on soft-money contracts, to permanent contracts.
  - Having in place a sustainable traineeship programme, funded through recharge and / or FEC cost recovery
- A transparent charging system and structure that applies to all users and types of usage, for all areas of TCS support provision, will be in place and used by all members of the School. Where appropriate, this charging system will incorporate FEC charging rates.
- Facilities and their linking infrastructures will be underpinned by a capital reinvestment programme that is hard-wired in financial terms to research group needs and teaching imperatives. This School-driven programme of maintenance, replacement and upgrade of facilities will be complementary to, and not dependent upon, facility developments enabled through successes in specific funding initiatives (e.g. JIF, SRIF, JREI).
- TCS facilities will, following a comprehensive process of consultation and review, have been optimised in terms of space usage, siting and linkage.

Current Position

The position of the TCS and its facilities within the School, particularly in relation to other research facilities, requires explanation so that its current position can be understood. In terms of allocated financial resources the TCS includes the Computing Services (IT services and infrastructure), which has its own budget line, and the Scientific and Technical Services (STS). The STS includes that group of laboratories, services and facilities that are School-supported through the Manager of STS and his/her budget line.

The STS includes a range of facilities and services that underpin activities across the School: photographic services, lapidary, mineral / material separation, workshops, chemistry laboratories, XRF / XRD, and the servicing of teaching laboratories.
A number of other laboratories and services exist which are either not funded or only partially supported by the School. These include laboratories largely funded by research grants and with no permanent School-funded staff (e.g. marine biogeochemistry), and facilities part-funded by Research Councils, external users, and grants and to which the School commits AR and/or AS staff (e.g. microanalysis, SEM, Wolfson Laboratory, Experimental Geoscience). These facilities do not have their running costs met from the STS budget, but do have resource implications in that they utilise space and, in several cases, permanent staff salary costs.

**B.1 Strengths of current activities and capabilities**

- We have a committed, diverse and flexible team of STS staff who are highly skilled in many of the specific technical and scientific areas of importance in Geoscience.
- The School has been successful, through grants and national bids, in attracting funding which has enabled the renewal or development of our analytical/observational capabilities in key areas (microanalysis, XRF + XRD, environmental monitoring, Earth observation, terrain evolution). Some successes have included funding for technical and/or AR posts.
- We have successfully grown in our IT provision and now have a team of highly skilled IT staff who are well-placed to tackle the very real infrastructure and management problems posed in supporting an evolving mixed-platform IT capability that is user-focused.

**B.2 Weaknesses of current activities and capabilities**

- Given the levels of research and teaching activity and the increased number of research-active academic staff (AT and AR) in the School, and given recent retirements, the School is understaffed in terms of its total TCS staff complement. This means that some important areas of general and specific support previously provided are no longer covered, with consequent implications for academic staff time and quality of provision.
- The School is weak in fieldwork support, and in junior level/general technician capability.
- The School has a major weakness in the area of collections and resources curation, management and documentation. This includes digital databases and physical material.
- The STS (especially AS staff) has an old age profile. Retirements will lead to the loss of skills and flexibility unless a programme of strategic replacement and training is in place.
- Key areas of analytical capability that have implications for teaching and varied research ventures are supported by soft-money staff. No process exists to produce cases for these staff to be made permanent, and no policy is in place to prioritise any such cases.
- Current laboratory/room usage, exclusivity of use, works/services requirements and historical factors limit the utility and development potential of some of the TCS facilities. The extent to which existing laboratories are fit-for-purpose requires examination.

**B.3 Recent major initiatives / changes**

- The period 2002-2005 has seen success with major initiatives that impinge on the technical and scientific capabilities of the School. These include EMMAC, CSEC, SRIF, ECOSSE, the AMS at SUERC, the JREI and most recently the CO2 sequestration project that will deliver a new XRD and 50% of a technical post.
- 2.5 staff (2 AR, 1 AS) have been appointed on permanent School contracts in 2005, compensating in part for the loss of 3.5 staff supporting the XRF, XRD and microanalysis.
- New positions have been appointed (2005) in Cosmogenic isotope preparation and pollen analysis.

**External Factors**

- The introduction of FEC is likely to have a high impact on how TCS facilities operate, particularly in how charges are made to grants and other users. FEC may offer the opportunity to raise funds that can be invested in replacing and developing infrastructure. However, it is as yet unclear how FEC will operate to provide secure resources for STC activity, including recharge.
- Success in gaining external funding to develop laboratory facilities outside of the STS remit has space and indirect resource and personnel implications. The opportunity to develop new
facilities / laboratories has to be managed carefully to avoid this being a threat to existing productive and / or essential services (e.g. in space and deployment pressures).

- Appointment of new academic staff, welcome in itself, can lead to additional pressure on space, laboratory services and TCS staff deployment. The TCS implications of AT staff appointments must be assessed during the appointment process.

**Strategy**

- We will **review existing TCS provision**, highlighting the issues of space utilisation, staffing, and IT support arrangements to identify in what areas improvements can be made and how this will be done.
- We will **introduce a traineeship programme** in the STS area, designed to bring in junior technicians and so assist in resolving problems in the age profile, general support, and longer-term skills profile. We will request funding of this traineeship programme from recharge income, FEC income, or resources currently deployed elsewhere in the School.
- We will **appoint TCS posts** in general support, field support and curation / resource management, with each of the posts also potentially involving a specialist support component. The cases will be developed in liaison with Research Groups and Institutes.
- We will **implement new charging arrangements**. We will review current charges, refine and harmonise them, and in concert with the School Finance Office develop a coherent charging package which will be recognised as that to be adopted and used in all grant and usage applications, with and without FEC components.
- We will **initiate reinvestment in the School TCS infrastructure**. We will advocate that a significant proportion of income generated through FEC is reinvested, informed by forward plans developed by each service but with flexibility as enabled by a bid process.
- We will **reintroduce an annual Expensive Equipment Fund**. We will propose a process through which equipment is to be replaced, expensive equipment bid for, and laboratories upgraded. This process will be managed by the TCS, with bid items prioritised by a sub-committee on the basis of their value to research and teaching across the School.

**Benefit and Risk**

- The benefits of implementing the strategy outlined above are clear. Support provision across the whole range of School activity will be improved and enhanced. Staff morale will be boosted. Effective mechanisms for skills transfer, re-staffing, reinvestment and development will enhance support of both research and teaching. A clear, and effectively implemented, charging package coupled with responsible grant processing and management will lead to greater income and resources under FEC.
- The risk attached to the strategy above is that it becomes financially unsustainable. This could arise if the School chooses not to underwrite the process – for example by not allowing FEC income to flow into TCS – or if FEC does not work in the way we have been advised. The strategy assumes research performance and grant success at the current level and higher, and would be compromised if this level of success decreased.
- The risk of not adopting the strategy outlined above is that the School will be faced with a further diminished TCS resource, an ageing AS staff profile, a hiatus in support because of skills gaps, and breaks in instrumental provision as equipment fails.

**Specific Actions for 2006-07**

- Carry out the reviews of TCS provision and organisation, targeting space allocation and usage (STS) and IT support processes in a multi-platform environment.
- Develop, prepare and present cases for TCS posts (general, field support, resources management) requested to be filled over the next 2 years.
- Develop, prepare and present detailed, costed, plans for the Traineeship Programme.
- Engage with Administration, Finance and grant holders to define the effects of FEC. Use this to inform decisions on new charging structures to be applied to users as from 2006-07.
- Prepare the case for an Expensive Equipment Fund, including details of the bid process.
- Explore and analyse the ranges and levels of support provided by non-permanent, soft-money, staff as a first stage in assessing potential cases for permanency.
School of Geosciences
Knowledge Transfer Draft Plan

Author: Stuart Simmons

3rd November 2005

Vision/Aims

- To maximise the potential academic value of the School’s knowledge including ideas, skills and expertise towards realising society and the School’s key objectives.
- To use Knowledge Transfer (KT) to successfully generate commercial value to contribute towards policy formulation and to benefit the school’s stakeholders and society in general.

Current position

- The School has world class facilities and scientific expertise which combine to deliver research programmes and consultancy to industry, UK Government and EU and UK national research funding bodies.
- The School’s KT activity is gaining experience at attracting investment attention, for example, applications to the Scottish Executive for Proof of Concept funding and the recent £7.5M Spin Out of M TEM Ltd.
- Edinburgh Research & Innovation’s (ERI) expertise at providing support at all stages of commercial activity, including contracts, technology transfer and advising on commercialisation issues.
- The existence of the KT steering group to devise strategic objectives to produce focused business development activity and to act as a reporting conduit.

External factors

- Possible reduced funding from grants and government organisations which will highlight and emphasise the importance of growing third stream funding from commercial initiatives to support future research.
- This must be considered against the possibility that increased commercial orientation and greater visibility in the market place may increase our exposure to risk.
- A clearly defined KT strategy will be necessary to address possible funding reduction from existing sources.
- Any attempt to create a more diverse and stable funding stream from KT activity must not distract knowledge resources from key research activities with global ramifications.

- Whilst ERI provides valuable and essential advice and support on contractual matters there is a misconception by the academics that it is bureaucratic and inflexible – more training and support may be necessary to demonstrate the need and value of properly constructed contracts and IPR agreements.

Marketing / Branding

- The School must have greater visibility in the market place.
- The success of research projects should be better communicated to audiences beyond the school and even between research groups internally.
- Research Group focused brochures should be published annually to inform existing and potential stakeholders of the school’s successes.

- The focus of the marketing material should develop in line with external forces and internal demand for information.

- Branding should be instantly recognisable, consistent across all material and unique

**Regional impacts**

- The School needs to emphasise knowledge resources which impact on the Scottish economy and reinforces the region’s science strategy to encourage innovation and research and development from the country’s industrial sector.

**Opportunities**

**Specific actions**

- Develop and maintain academic networks internally, across the school and between research groups, in pursuit of KT opportunities stemming from research initiatives

- Address the interface with ERI to ensure all contracts are handled efficiently by managing the expectations of both parties.

- Produce a Research Group brochure providing an overview of activities and successes

- Develop and maintain external networks with government and industry

- Develop and produce coherent internal branding and marketing to include seminar programmes and other modes of communication

- Generate contacts database for Business Development purposes which is owned by the school and not an individual.
A. Commentary against current 5-year plan

Our five year plan of 2004 had three main aims in the context of human resources,

1. To complete career and performance reviews for all academic and senior research staff as part of our RAE planning

   This objective has been achieved through questionnaires and personal interviews.

2. To improve appraisal and review processes.

   All staff close to applying for promotion have been appraised.

3. To implement an effective career development and review scheme for Personal Fellows.

   The School has agreed to offer an open-ended contract to one of our personal fellows. Career development and review for the remainder has yet to be completed.

B. Description of intended changes to the plan in the year 2006-7

   We will ensure that all academic and research staff are supported and encouraged in their working environment. Four new appraisers have been identified and two of them have been appraised so that they can now start to appraise others. Within two years we will have appraised all members of academic staff, with early emphasis on new staff members and on those academics in early or mid career. Personal fellows will be encouraged to enter the appraisal process and to participate in career development workshops or courses as is most useful to them.

C. New initiatives over the longer term

   We will work with the other Institutes within the School to improve induction for new members of academic staff and to improve the utility of their early career support for research and teaching.
Michie Chair in
Rural Economy and Environmental Sustainability

The University of Edinburgh is an exciting, vibrant, research-led academic community offering opportunities to work with leading international academics whose visions are shaping tomorrow’s world. The work of the School of GeoSciences embraces the study of the Earth’s systems, with a focus on the dynamics of the world’s oceans, lithosphere, cryosphere, atmosphere, biosphere and human societies, and their relationships with the objectives of sustainable development. As one of the UK’s largest and most highly rated groupings engaged in these interdisciplinary endeavours, the School provides an exciting environment for research and teaching.

The Michie Chair in Rural Economy and Environmental Sustainability will make a major contribution to leadership of the School’s research and teaching, particularly in the area of environmental change and sustainability. You will take advantage of the potential for interdisciplinary work within the School and the College of Science & Engineering, across the University and with external institutions. You will be an inspirational research leader of international distinction with an established track record of publication, funding, collaboration in research and impact upon policy-related issues of sustainability. You will also pursue excellence in teaching within the spectrum of undergraduate and postgraduate degrees offered in the School.

Salary will be in the professorial range.

The University of Edinburgh
School of GeoSciences
Michie Chair in Rural Economy and Environmental Sustainability

1. The University of Edinburgh (www.ed.ac.uk)

The University of Edinburgh is over 400 years old. It is a leading international centre of academic excellence, and one of the largest and most successful research universities in the UK. It is Scotland’s premier research University, graded within the top five British Universities in the 2001 National Research Assessment Exercise. It has three Colleges (Science & Engineering, Medicine & Veterinary Medicine, Humanities & Social Science) comprising twenty-one Schools, 3,872 academic and academic-related staff, 16,165 undergraduate students, 4,696 postgraduate students, and a research income of £87.8M p.a.

2. The College of Science and Engineering (www.scieng.ed.ac.uk)

The College of Science and Engineering is one of the largest science & engineering groupings in the UK, with over 900 academic staff, 500 technical, clerical and other support staff, and over 6,000 students. The College is in the front rank of UK University science and engineering groupings for research quality and research income and is a key player in European research collaborations. It is composed of seven core academic Schools (Biological Sciences, Chemistry, Engineering & Electronics, GeoSciences, Informatics, Mathematics, and Physics) with a number of smaller Centres promoting cross-disciplinary research.

3. The School of GeoSciences (www.geos.ed.ac.uk)

The School of GeoSciences encompasses the cognate disciplines of geology, geophysics, geography, ecology and atmospheric sciences. All of the School’s component units were rated as 5 or 5* (the highest numerical grading) in the most recent (2001) national (UK) Research Assessment Exercise. The School has 75 Academic Staff, 80 Research Staff, and 60 Support Staff, around 1200 undergraduate and 250 postgraduate students, and an annual external grant income of £4-6M per annum.
There are five Research Groups in the School:

- Centre for Environmental Change and Sustainability
- Edinburgh Earth Observatory
- Global Change (Dynamics of the Land-Ocean-Ice-Atmosphere-Biosphere System)
- Human Geography
- Subsurface Geoscience

3.1 Relevant Research within the School

Centre for Environmental Change and Sustainability

CECS is an interdisciplinary research group that has a reputation for rigorous and impartial evaluation of scientific evidence in support of policy development and maintaining a perspective across environmental, economic and social aspects of the environment and sustainability. The group combines expertise in ecology, land-use and socio-economics to address current research themes in: Climate Change and Sustainable Development; Sustainable Forestry; Natural Resource Management; Rural Development and Land-use Policy; Vegetation Dynamics and Management; Biodiversity and Ecosystem Modelling; Innovation in Renewable Energy Systems; Trust and Communication in Environmental Policy and Environmental Sustainability of Marine Energy. Staff have led projects in support of policy development for the Scottish Executive, SNIFTER, Defra, DFID, DTI, UKERC and the World Bank. The group collaborates widely within the University and externally to create the multidisciplinary teams that are necessary to address the complexities of environmental problems.

Edinburgh Earth Observatory

The Edinburgh Earth Observatory (EEO) focuses on the acquisition, analysis and application of environmental data using both in situ and remote techniques. The EEO is particularly strong in the fields of modelling and measuring vegetation and the exploitation of geographical information science (GIS). Current relevant research also includes the study of data collection techniques to support sustainable forestry, the sighting of offshore windfarms using satellite data, and the role of forests in the carbon cycle. The EEO Partners include the Forestry Commission, the Macaulay Land Use Research Institute and the Scottish Association of Marine Scientists. In 2005, the EEO held a successful joint symposium with the Edinburgh Consortium for Rural Research.

Global Change (Dynamics of the Land-Ocean-Ice-Atmosphere-Biosphere System)

The Global Change group undertakes research in several areas related to Rural Economy and Environmental Sustainability: the carbon sequestration potential of different land uses and landscape carbon balances; land use effects on water quality and nutrient/contaminant run-off; the productivity of forests (managed and unmanaged); atmospheric pollution; fire and ecosystem processes; climate change impacts on ecosystem states; land use effects on greenhouse gas production (methane and nitrous oxide); and anthropogenic effects upon the biogeochemical cycling of potentially harmful elements in terrestrial and freshwater environments.

Human Geography

The Human Geography Research Group provides challenging new insights to core geographical concerns through three research themes: relations and identities; knowledges, practices and policies; development and power. It draws on quantitative and qualitative methods, making innovative contributions to both approaches. In ‘Relations & Identities’, it is concerned with the role of space, place and environment in the constitution, experience and governance of social relations and identities. In ‘Knowledges, Practices and Policies’ it examines the co-production of geographies and knowledges in, for example: the meanings of “nature”; scientific and non-scientific understandings of the environment; risk and risk management. In ‘Development and Power’ it engages with work in political economy, political ecology, critical development and postcolonial theory to attend specifically to uneven processes of development at various scales. This includes consideration of the relationship between globalisation and social transformation and the multiply-scaled interactions associated with environmental resource management.

ACTION: Request Human Geography to modify (clarify and reduce in length).

Subsurface Geoscience
The Subsurface GeoScience research group is interested in the chemical and physical properties, origin and history of the Earth and its constituent minerals, rocks, rock assemblages, pore fluids and magmas, and their interactions, at all scales. Applications of our work of particular relevance to environmental sustainability include groundwater quality and land remediation, contaminant transport, processes of weathering, prediction of mineral and hydrocarbon resources, improved reservoir description and hydrocarbon reservoir management, sequestration of carbon dioxide, and the predictability of natural hazards.

3.2 The Edinburgh and Scottish Context

Home to the Scottish Parliament, Edinburgh and its immediate environs offer one of the largest groupings of researchers and policy makers in the area of environmental and rural affairs in the UK. Relevant organisations include the Scottish Executive Environment and Rural Affairs Department (SEERAD), Scottish Environment Protection Agency (SEPA), Edinburgh Consortium for Rural Research (ECRR), Scottish Agricultural Science Agency (SASA), Scottish Agricultural College (SAC), Scotland and Northern Ireland Forum for Environmental Research (SNIFER), Scottish Natural Heritage (SNH), Royal Botanic Garden Edinburgh (RBGE), NERC Centre for Ecology and Hydrology (CEH at Bush), Biomathematics and Statistics Scotland (BIOSS) Moredun Research Institute, Forest Research, Roslin Institute, British Geological Survey, Scottish Water, National Museum of Scotland, Royal Society of Edinburgh and many environmental consultancies. Strong support is also available for remotely sensed and spatial data, in data analysis and numerical modelling from the Edinburgh Parallel Computing Centre, and from the National E-Science Centre. Further afield in Scotland are organisations with which the School of GeoSciences also has excellent links: the Scottish Universities Environmental Research Centre (SUERC, East Kilbride), Scottish Association for Marine Science (SAMS, Oban) and Macaulay Institute (formerly Macaulay Land Use Research Institute, MLURI, Aberdeen).

3.3 Joint Research Initiatives

3.3.1 SAGES

In collaboration with several Scottish universities the School of GeoSciences is leading a proposal to create a Scottish Alliance for Geoscience, Environment and Society (SAGES). The SAGES alliance focuses on enhancing our research capacity for understanding and modelling of the Earth system and of environmental change. If the proposal, which is currently at an advanced stage, is successful, an investment of around £11M from the Scottish Higher Education Funding Council and the participating universities will enable better integration of environmental change research across Scotland through new senior and junior academic posts and additional research infrastructure.

3.3.2 ECOSSE (http://www.erp.ac.uk/ecosse)

ECOSSE (the Edinburgh Collaborative of Subsurface Science and Engineering) is a formal collaboration between the University of Edinburgh, Heriot-Watt University, the British Geological Survey and the Scottish Universities Environmental Research Centre. It is part of the Edinburgh Research Partnership in Engineering and Mathematics, recently funded by the Scottish Higher Education Funding Council and the two participating Universities to the tune of £24M, spread among five similar Joint Institutes. ECOSSE pursues research programmes in water systems, hydrocarbon systems (with a focus on geophysical techniques and carbonate reservoirs), subsurface storage of greenhouse gases and waste materials, natural hydrates - alternative energy source and/or hazard, and geothermal processes - sources of energy, and the formation of mineral systems.

4. Michie Chair in Rural Economy and Environmental Sustainability

The Michie Chair will maintain and enhance an international research reputation in the field of Rural Economy and Environmental Sustainability. Primarily associated with the Centre for Environmental Change and Sustainability, the successful candidate will also develop links with other research groups within and beyond the School in the University context, and with other research groups in the Edinburgh, Scottish (see above) and international contexts.

4.1 Research

You will have an international reputation for original research in the area of rural economy and environmental sustainability, with demonstrable evidence of the evaluation and use of scientific evidence in the development of policies and practices. You will provide research leadership, work with other leading world groups and make a significant contribution to overall research strategy and development in the School of GeoSciences, with particular emphasis upon the areas of environmental change and sustainability, global change and human geography. You will generate and publish original research ideas of international excellence at a rate
and of a quality commensurate with an RAE 5/5* academic unit and will secure external funding for research from a range of sources. As part of your research activities you will supervise postgraduate research students and postdoctoral research assistants.

4.2 Teaching

You will contribute to teaching and curriculum development in the School of GeoSciences, at undergraduate and masters level. You will play a leading role in developing our curriculum to expand teaching of environmental sustainability, with a view to introducing courses available across all of our degree programmes and a new honours degree stream. You will help to guide the School through this process of expansion and diversification.

In addition, the School is committed to the promotion and dissemination of its work in the wider community. It has developed outreach initiatives to schools and science festivals, and participates in a Scotland-wide initiative to provide professional development to teachers in Scottish schools. You will be encouraged to support such outreach activity and other forms of knowledge transfer.

4.3 Academic Leadership

As holder of an established Chair you will be expected from an early date to make a significant contribution to academic leadership within the School, and to act as a strong advocate and ambassador for the School and for environmental sustainability at a national and international level.

5. Further information and informal enquiries

Further information, if required, can be obtained from Professor John Farmer (Tel: 0131 650 4757 email: J.G.Farmer@ed.ac.uk)

6. Terms of employment

Salary will be on the Professorial scale.

7. Disclosure

Under the terms of the Protection of Children (Scotland) Act 2003, appointment to this post is subject to an Enhanced Disclosure check.

8. Application Procedure

Apply on line for this position at www.jobs.ed.ac.uk

In addition to the University application form available via this website, please provide the following as attachments to your application form:

a) A Curriculum Vitae and full publication list.

b) A statement of your vision and aims in research, teaching, knowledge transfer and academic leadership.

c) The names and addresses of three referees, including e-mail addresses. Please state explicitly if you need us to contact you again before taking up references from any of these referees.

You can also request an application form by contacting:

Human Resources, The University of Edinburgh, Charles Stewart House, 9-16 Chambers Street, Edinburgh EH1 1HT.

Email: jobs@ed.ac.uk

If you make an application by post, please send it to:

Ms Catherine Kirk, School of GeoSciences, Crew Building, The King's Buildings, West Mains Road, Edinburgh EH9 3JN. Tel: +44 (0)131 650 7737
In all application materials please quote reference number: ...........

The closing date for applications is .....

**ACTION: HR to complete.**
Regius Chair of Geology

The University of Edinburgh is an exciting, vibrant, research-led academic community offering opportunities to work with leading international academics whose visions are shaping tomorrow’s world. The work of the School of Geosciences embraces the Earth system, spanning the physical, environmental and social sciences. Its focus is on the dynamics of the lithosphere, oceans, atmosphere, cryosphere, biosphere and human society. As one of the UK’s largest and most highly-rated groupings in this interdisciplinary field, the School provides an innovative environment for research and teaching. The School is part of the College of Science and Engineering, which has a leading international profile of research excellence.

You will be an internationally-outstanding geologist with the breadth of vision, ability and energy to provide strong academic leadership in geology, nationally and internationally, irrespective of your particular specialisation. As a senior player in the School of GeoSciences, you will also contribute to future academic leadership across all the main strands of research in the School at a dynamic period in its development, complementing recent and prospective appointments to four other Chairs – in Human Geography, Physical Geography, Earth System Dynamics, and Rural Economy and Environmental Sustainability.

You will make a major contribution to leadership of the School’s research and teaching, particularly within the Subsurface Geoscience and/or Global Change Research Groups. You will take advantage of the interdisciplinary potential within the School of GeoSciences and across the College of Science & Engineering. You will be an inspirational research leader of international distinction with an established track record of publication, funding and collaboration in research, and will also pursue excellence in teaching within the spectrum of undergraduate and postgraduate degrees offered in the School.

The Regius Chair of Geology at the University of Edinburgh is the only such Chair in Geology in the UK. It was established by the Crown in 1871 with the appointment of Archibald Geikie. Previous incumbents include Arthur Holmes and the present chair, Geoffrey Boulton.

Salary will be in the professorial range.
The University of Edinburgh

School of GeoSciences

Regius Chair of Geology*

*The Regius Chair of Geology at the University of Edinburgh is the only such chair in Geology in the UK. It was established by the Crown in 1871 with the appointment of Archibald Geikie. Previous incumbents include Arthur Holmes and the present chair, Geoffrey Boulton.

1. The University of Edinburgh (www.ed.ac.uk)

The University of Edinburgh is over 400 years old. It is a leading international centre of academic excellence, and one of the largest and most successful research universities in the UK. It is Scotland’s premier research University, graded within the top five British Universities in the 2001 National Research Assessment Exercise. It has three Colleges (Science & Engineering, Medicine & Veterinary Medicine, Humanities & Social Science) comprising 21 Schools, 3,872 academic and academic-related staff, 16,165 undergraduate students, 4,696 postgraduate students, and a research income of £87.8M p.a.

2. The College of Science and Engineering (www.scieng.ed.ac.uk)

The College of Science and Engineering is one of the largest science & engineering groupings in the UK, with over 900 academic staff, 500 technical, clerical and other support staff, and over 6,000 students. The College is in the front rank of UK University science and engineering groupings for research quality and research income and is a key player in European research collaborations. It is composed of seven core academic Schools (Biological Sciences, Chemistry, Engineering & Electronics, GeoSciences, Informatics, Mathematics, and Physics) with a number of smaller Centres promoting cross-disciplinary research.

3. The School of GeoSciences (www.geos.ed.ac.uk)

The School of GeoSciences encompasses the cognate disciplines of geology, geophysics, geography, ecology and atmospheric sciences. All of the School’s component units were rated as 5 or 5* (the highest numerical grading) in the most recent (2001) national (UK) Research Assessment Exercise. The School has 75 Academic Staff, 80 Research Staff, and 60 Support Staff, around 1200 undergraduate and 250 postgraduate students, and an annual external grant income of £5-7M per annum.

There are five Research Groups in the School:

- Subsurface GeoScience
- Global Change (Dynamics of the Land-Ocean-Ice-Atmosphere-Biosphere System)
- Edinburgh Earth Observatory
- Human Geography
- Centre for Environmental Change and Sustainability

3.1 Relevant research within the School

Geology is spread over two of the research groups within the School, with the majority constituency being in the Subsurface GeoScience area.

The Subsurface GeoScience research group (http://www.geos.ed.ac.uk/research/subsurface/) studies the chemical and physical properties, origin and history of the Earth and its constituent minerals, rocks, rock assemblages, pore fluids and magmas, and their interactions, at all scales. The group encompasses the major disciplines of Geology, Geochemistry, Geodynamics and Geophysics, with special interests in Igneous and Metamorphic Petrology, Mineralogy, Experimental Geoscience (including Experimental Petrology and Rock Physics and Chemistry), Sandstone and Carbonate Diagenesis, Petroleum GeoScience, Basin Analysis and Seismic Sequence Stratigraphy.

The group contributes to many centres in the College, notably the Edinburgh Centre for Material Science and Engineering and the Centre for Science at Extreme Conditions (www.csec.ed.ac.uk). We have a
special cross-disciplinary interest in subsurface fluids (including melts) and Fluid-Rock Interactions. The group is active in international projects involving direct observation of the subsurface by drilling, for example into the active Aigion fault in the Gulf of Corinth, and in the Ontong-Java igneous plateau. The group is currently being re-invigorated with six new permanent appointments at the reader, lecturer, or research fellow grade approved in 2005/6.

Applications of our work include groundwater quality and land remediation, processes of weathering, prediction of mineral and hydrocarbon resources, improved reservoir description and hydrocarbon reservoir management, storage and capture of carbon dioxide, the understanding of mantle and geodynamic processes, and the predictability of volcanoes and earthquakes.

The purpose of the Global Change Research Group is to tackle one of Earth's Grand Challenges: that of understanding and predicting Global Environmental Change. The group contains five research programmes based around the atmosphere, cryosphere, biosphere, oceans and continents. Research is carried out within, but most importantly across these programmes, and is based on both measurement and modelling of the systems.

Current research activities include terrestrial carbon cycling, modelling of atmospheric chemistry, and the reconstruction of Pacific and Atlantic ocean currents. Cryospheric research focuses on the modelling and reconstruction of ice sheet growth in NW Europe, Patagonian Andes and Antarctica. The continental programme is measuring and modelling orogenic fluxes across the Alpine-Himalayan mountain chains, and studying surface process interactions with growing structures in the Apennines. This group uses a wide range of techniques including low temperature thermochronology, cosmogenic isotopes and teprochronology.

This group collaborates with a range of research and government bodies including the Hadley Centre, DEFRA and The Tyndall Centre at UEA. It has a large research income from a range of sources dominated by NERC and the EU. In the last two years it has appointed new staff in the remote sensing of ice sheets, glacial hydrology, cosmogenic nuclides, tropical ecosystems and atmospheric dynamics. The group is currently initiating a new Centre for Earth System Dynamics and is appointing a new chair with an additional chair and six lectureships pending approval from SHEFC (see SAGES initiative below).

3.2. Teaching (www.geos.ed.ac.uk/undergraduate)

We offer discipline-based degrees in geology, geophysics, environmental geoscience, geology and physical geography, and geophysics and meteorology, and are developing new interdisciplinary courses in natural hazard.

In addition, the School is committed to the promotion and dissemination of its work in the wider community. It has developed outreach initiatives in earth science to schools and science festivals, and is developing web-based distance learning in Earth system science. The School participates in a Scotland-wide initiative (the Scottish Earth Science Education Forum) to promote the earth sciences and provide professional development to teachers in Scottish schools (www.scottishgeology.com/SESEF). You will be encouraged to support such outreach activity and other forms of knowledge transfer.

3.3 Facilities (www.geos.ed.ac.uk/facilities/)

The Grant Institute of Earth Science hosts world class research facilities, including three NERC-funded national facilities – the Ion Microprobe Facility (incorporating the Teprochronology Analytical Unit), the Geophysics Equipment Pool and the Field Spectroscopy Facility. The world-renowned ion microprobe facility is part of the JIF-funded Edinburgh Materials and MicroAnalysis Centre (EMMAC), which also
includes state-of-the-art electron microprobe and SEM instrumentation. Other modern geochemical facilities include stable isotope mass spectrometry, ICP mass spectrometry, atomic absorption analysis, X-ray fluorescence and X-ray diffraction, and organic geochemical laboratories. The Experimental Geoscience laboratories include a wide range of gas and solid media high pressure-temperature facilities and controlled-atmosphere furnaces for simulating conditions from the Earth’s surface to the deep mantle, and rock deformation presses and associated triaxial pressure cells and flow systems for experimental petrophysics. The latter facilities support the activities of the Rock Physics and Chemistry Group predominantly in the area of oil reservoir and upper crustal tectonic processes, with particular emphasis on fluid-rock chemical interaction studies. Several School staff are also members of the recently-established interdisciplinary Centre for Science at Extreme Conditions (www.cses.ed.ac.uk) which hosts complementary high pressure-temperature and analytical facilities. The School hosts the NERC pool of Geophysical equipment, and has its own Geophysical equipment in the major sub-disciplines, including a high-field magnetic laboratory, and electromagnetic and seismic imaging equipment.

### 3.4 Scottish Universities Environmental Research Centre (SUERC)

The School has strong links to the Scottish Universities Environmental Research Centre (SUERC) at East Kilbride (www.gla.ac.uk/SUERC), which hosts a further five national NERC facilities for wide-ranging stable and radiogenic isotopic analysis, including the recently established accelerator mass spectrometer that underpins the Cosmogenic Isotope Analysis Facility. SUERC staff and facilities provide support to the Scottish universities and the UK scientific community.

### 3.5 The Edinburgh Context

Edinburgh city provides one of the largest groupings of geological and geophysical researchers in the UK. There are excellent industrial links with a variety of collaborators, sponsors and employers of our graduates. Strong computational support is available for remotely sensed and spatial data, in data analysis and numerical modelling from the Edinburgh Parallel Computing Centre, and from the National E-Science Centre. There is an established collaboration with the British Geological Survey, uniquely co-located on the science campus site, and with Heriot-Watt University’s Institute of Petroleum Engineering through the ECOSSE initiative. As a place to live the City of Edinburgh has all the advantages of a European capital city with a distinctive historical and architectural heritage and a vibrant cultural life including the world’s largest arts festival. It is also within easy access of some of the most beautiful country and highland scenery to be found anywhere.

### 3.6 Joint Research Initiatives

The School of Geosciences is a member of three major joint research initiatives in partnership with other Scottish universities. These partnerships allow us to share resources and facilities and to gain greater benefit from collaboration and cross-fertilisation of ideas.

#### 3.6.1 ECOSSE http://www.erp.ac.uk/ecosse

ECOSSE (the Edinburgh Collaborative of Subsurface Science and Engineering) is a formal collaboration between the University of Edinburgh, Heriot-Watt University, the British Geological Survey and the Scottish Universities Environmental Research Centre. It is part of the Edinburgh Research Partnership in Engineering and Mathematics, recently funded by the Scottish Higher Education Funding Council and the two participating Universities to the tune of £24M, spread between five similar Joint Institutes. ECOSSE pursues research programmes in water systems, hydrocarbon systems (with a focus on geophysical techniques and carbonate reservoirs), subsurface storage of greenhouse gases and waste materials, natural hydrates - alternative energy source and/or hazard, and geothermal processes - sources of energy, and the formation of mineral systems. ECOSSE supports the three recently advertised academic posts.

#### 3.6.2 SAGES

In collaboration with several Scottish universities the School of GeoSciences is leading a proposal to create a Scottish Alliance for Geoscience, Environment and Society (SAGES). If successful, an investment of around £6M from SHEFC will focus on enhancing our capabilities in simulation and integrated modelling of the Earth system through new senior and junior academic posts and additional research infrastructure. The proposal incorporates three themes based around landscape dynamics, biosphere-terrestrial carbon and ocean-atmosphere-climate dynamics. These themes will then be integrated through the new Centre for Earth System Dynamics based in Edinburgh and representing a Scottish-wide facility. The proposal involves the appointment of three chairs and eight lectureships to Edinburgh along with substantial investment in our technical base.
3.6.3 ASES\textit{i}

In collaboration with several Scottish universities and the British Geological Survey, the School of GeoSciences is creating a formal collaborative structure – the Alliance of Scottish Earth Science Institutes (ASESI) - to drive and co-ordinate internationally competitive research to understand Earth Systems processes, their evolution and change through time and application of such knowledge to societal benefit and wealth creation. The alliance specifically addresses the Deep Earth and Deep Time components of the Earth system. ASES\textit{i} also co-ordinates outreach efforts to encourage recruitment into the Earth sciences.

4. Regius Chair of Geology

The Regius Chair will maintain an international research reputation in the field of Geology. S/he will be primarily associated with the Subsurface and/or Global Change Research Groups, and will also develop links with other research groups within and beyond the School.

4.1 Research

You will have an international reputation for original research in Geology. You will provide research leadership, work with other leading world groups, and make a significant contribution to overall research strategy, and development in the School of GeoSciences. You will generate and publish original research ideas at a rate and of a quality commensurate with an RAE 5/5* academic unit and will secure external funding for research from a range of sources. As part of your research activities you will supervise postgraduate research students and postdoctoral research assistants.

4.2 Teaching

You will contribute to teaching and curriculum development in the School of GeoSciences, at undergraduate and masters level. We are exploring ways to increase the number and level of degrees we offer, taking advantage of the interdisciplinary nature of our research across the School and beyond. We aim to be forward looking and progressive in our teaching, while retaining a first rate core geology content. Your input into this area will help to guide the school through this process of expansion and diversification.

4.3 Academic Support and Leadership

You will be expected to contribute to academic support activities such as the development of academic strategy. As holder of an established Chair you will be expected from an early date to make a significant contribution to academic leadership within the School, and to act as a strong advocate and ambassador for the School and the subject of Geology at a national and international level.

5. Further information and informal enquiries

Further information, if required, can be obtained from Professor Ian Main <ian.main@ed.ac.uk> or Sue Maclachlan <S.Maclachlan@ed.ac.uk>

6. Terms of employment

Salary will be on the professorial scale.

7. Disclosure

Under the terms of the Protection of Children (Scotland) Act 2003, appointment to this post is subject to an Enhanced Disclosure check.

8. Application Procedure

Apply on line for this position at www.jobs.ed.ac.uk

In addition to the University application form available via this website, please provide the following as attachments to your application form:

a) A statement of your vision and aims in research, teaching, and academic leadership.
b) A Curriculum Vitae and full publication list.

c) The names and addresses of three referees, including e-mail addresses. Please state explicitly if you need us to contact you again before taking up references from any of these referees.

You can also request an application form by contacting:

Human Resources, The University of Edinburgh, Charles Stewart House, 9-16 Chambers Street, Edinburgh EH1 1HT.

Email: jobs@ed.ac.uk

If you make an application by post, please send it to:

Mr Andy Rutherford, School of GeoSciences, Grant Institute, The King’s Buildings, West Mains Road, Edinburgh EH9 3JW. Tel: +44 (0)131 651 3400

In all application materials please quote reference number: ............

The closing date for applications is ......
Appendix

Regius Chair of Geology

Summary Job Description

Job Purpose

- To create knowledge by carrying out research.
- To impart knowledge by teaching, by facilitating student learning, and by publishing research.
- To contribute to academic leadership in the University.

Main Responsibilities

Academic leadership

- To lead the development of the subject of geology within the School and on a national and international stage.
- To act as an advocate and ambassador for the subject of geology and the School of GeoSciences at national and international level.
- To contribute to the development School of GeoSciences through early service in one of the major roles in the School Executive Group.

Research

- To make a substantial and high quality contribution to research in the field of Geology
- To obtain research funding, and to supervise research students and research assistants.
- To contribute to the development of research plans and strategies for the School of GeoSciences.

Teaching and Learning

- To plan, prepare and deliver effective teaching, supervision and assessment of undergraduate and postgraduate students.
- To participate in, and where appropriate to lead, development of the curriculum and of teaching methods within the School of GeoSciences.

Academic Support and Professional Development

- To contribute to or lead projects, working groups, committees, etc, on behalf of the discipline and/or the School.
- To undertake other activities in support of the School’s objectives, e.g. recruitment of students and staff, academic guidance and pastoral support, course organisation.
- To interact with the external community in academia, industry or elsewhere and to lead research, professional and educational developments within the geosciences.

Person Specification

Knowledge base

- A research background in any discipline within Geology
- Knowledge of current teaching and learning methods in higher education

Skills
• Effective written and oral communication skills in a range of contexts (e.g. teaching, research presentations and publications, representation and advocacy for the discipline)
• Demonstrated ability to conduct, publish and otherwise disseminate high-quality research in peer-reviewed journals
• Demonstrated ability to secure research funding with a proven record of collaboration
• Demonstrated ability to lead and develop a research team

Experience

• An established outstanding international reputation in Geology
• Experience of teaching at undergraduate and/or postgraduate level
• Previous experience of, or demonstrable interest in, curriculum development and innovative teaching methods
• Experience of service on national or international subject committees, peer review panels or other professional responsibilities

Attainment

• A PhD in an appropriate discipline
• A proven research record with an appropriate publication record

Personal Attributes

• Self-motivated, able to work both independently and collaboratively, able to plan and initiate activities and projects and to manage and develop self and others
• Good communication, interpersonal and leadership skills