

Scotland's Geodiversity - promoting, celebrating, safeguarding

**A one-day conference organised by the Scottish Geodiversity Forum
Saturday 19 November 2011, 10am – 4pm, Battleby Centre, Perth**

Conference Report

This was the Scottish Geodiversity Forum's first conference, and brought together more than 50 people from across Scotland for a programme of talks and workshops.

Talks

Susan Davies, Director of Policy & Advice, SNH opened the conference with a short talk entitled "Scotland's Geodiversity - let's be creative". She welcomed the establishment of the Forum and noted that within current financial constraints there were opportunities to work together. The Forum could be an essential vehicle to keep the momentum going and unite different sectors working on common aims. She noted good progress in targeting some audiences and set us the challenge to do more to engage socially disadvantaged groups, make full use of new technologies and make the links between natural heritage, culture and history.

John Gordon from SNH introduced the proposed Scottish Geodiversity Charter. The drive to establish the Charter had come from recent geodiversity reports by SNH and BGS, and work by the Forum to raise the profile of geodiversity. A working group had been established with members from the Scottish Government, SNH, BGS and the Forum and the draft charter was now available for consultation.

Colin Ballantyne, University of St Andrews, gave an overview talk on Scotland's landscape, entitled "Rock and Ice - geodiversity at landscape scale in Scotland". His talk developed the theme that most of the diversity in Scotland's landscapes reflects the effects of successive Pleistocene ice sheets operating on rocks of widely-differing resistance to glacial erosion. Throughout the last million years of the Quaternary, Scotland has been subjected to multiple cycles of climate fluctuation that resulted in the expansion retreat of successive ice sheets. A numerical simulation "played" on screen showed the evolution of the last ice sheet, demonstrating the alternation of periods of ice thickening and periods of rapid drainage via fast-moving, wet-based ice streams. At its maximum extent 26,000-18,000 years ago, the last ice sheet covered over 70% of the present land area of British Isles, was confluent with the Fennoscandian Ice Sheet in the North Sea Basin and extended to the Atlantic shelf break west of Scotland. This model, by Dr Alun Hubbard as part of the Britice Modelling Project, is available from www.aber.ac.uk/en/iges/research-groups/centre-glaciology/research-intro/britice-model/.

The landscape variety that Scotland offers today can be explained through two main factors: (1) the diverse bedrock types which responded differently to glacial erosion, and (2) different ice-sheet behaviour between the west and east of Scotland. The first aspect is illustrated by several iconic examples of the Scottish scenery, such as the ice-scoured cnoc-and-lochan topography in areas underlain by Lewisian Gneiss in the far northwest, the alpine landscapes carved from Torridon Sandstone and Palaeogene plutonic centres, and the gentle rolling appearance of the greywacke hills in southern Scotland.

The Scottish Geodiversity Forum aims to promote Scotland's geodiversity, and seeks to widen the profile of geodiversity and influence national and local policies. It is the Scottish national forum for geoconservation groups, geoparks and other related organisations, and interested individuals. The Forum promotes the role and value of geodiversity in education, community involvement and health, the development of tourism and the wider economy.

The Forum is open to all organisations and individuals who are interested in promoting Scotland's geodiversity and the sharing of experience and good practice. It incorporates GeoConservation Scotland and the Scottish Geology Festival Organising Partnership.

www.scottishgeodiversityforum.org

The ice sheet had fast-flowing, warm-based ice streams in the west, which created deep glacial troughs and eroded almost all vestiges of the pre-glacial landscape, which is now represented mainly by accordant summits and small plateau remnants. Excavation of rock basins by erosive ice streams produced the indented fjord landscape of the west coast and the deep inland ribbon lochs of the Western Highlands. In contrast, the Eastern Highlands were generally occupied by cold-based ice that remained frozen to the underlying substrate (permafrost) during successive period of ice-sheet glaciation. In consequence, such areas are dominated by extensive high 'pre-glacial' plateaux (e.g. The Cairngorms, The Gaick Plateau, the Monadhliath Mountains) which bear little evidence of glacial erosion. In such areas, glacial erosion was focused along glacial troughs, where the basal ice was at pressure melting point. Although such areas were covered by glacier ice, it was non-erosive, possibly cold-based (frozen to the ground), and therefore helped preserve much of the pre-glacial relief.

After a workshop session and lunch, **Donald Fisher** from Northwest Highlands Geopark reported on a recent Churchill Fellowship project which had enabled him to visit Australia, New Zealand and North America to study sustainable geo-tourism in different countries. Donald took us in a whirlwind tour, showing many examples of high quality information and infrastructure, backed by enthusiastic and knowledgeable guides.

He finished by noting that Scotland has world-class geodiversity, an impeccable geological heritage, "cradle of geology" pedigree and skilled, passionate geoscientists, but currently is lacking recognition of the potential economic and educational benefits of exploiting these resources. He suggested that our geodiversity and geological heritage can be conserved and promoted to the wider society by developing a sustainable geotourism strategy alongside the establishment and support of Scottish Geoparks, as part of the global Geoparks movement. Above all, we must communicate clearly with the public and politicians, continue to be passionate and recognise the relevance of geodiversity to society and its value to the economy and education.

Stuart Munro, Scientific Director of Our Dynamic Earth Edinburgh closed the conference in the afternoon with a rousing and humorous look at our world-class geodiversity and, drawing inspiration from other parts of the world, how we can celebrate the tremendous story on our doorstep.

Workshops

Workshop A: Working with young people

This workshop was run very successfully in the afternoon by Peter Craig and Katerina Bruan. Peter shared ideas that he had previously used when working with young people and Katerina explained that her aim in working with young people came from trying to encourage more interest in the geology side of engineering.

The workshop was very hands-on, allowing the participants to try out the activities and discuss the outcome and further ideas with both Peter and Katerina in a relaxed and informative way.

The Curriculum for Excellence allows for interdisciplinary learning and Peter showed how social studies, language and maths could be used in a geological sense. From using rocks, shells and man-made articles in a classification exercise, to looking at the similarity and differences of rocks found in different parts of Scotland and using "interesting" looking rocks in a literacy exercise Peter incorporated knowledge with an avenue for encouraging the student to question further and widen their view on the natural world.

Katerina shared with the group some activities that had been used in the very successful Volcano and Fossil Fun Days. The activities on show included the: layered jelly mining activity, convection current activity, using hot water and food colouring, subduction zone activity.

The aim of the activities was to provide a visual, hands-on approach to teaching children about the natural world; for example the use of towels, lining paper and foil brought the subduction zone to life allowing children to be involved in the process (especially relevant to the kinaesthetic learner but equally relevant to all learners).

A lot of fun was had by the participants of this workshop and we left, not just with lots of freebies, but an enthusiasm to share the experiences of this conference with the young people we come into contact with in our daily lives.



Note: Peter Craig distributed some free North Sea drill core samples, and would like to get in touch with everyone who received these, so that he can give them access to the notes and photo-key (and other items) that should help them get the most out of using these samples with the public or with pupils. Please contact Peter for more info: pmcraig@gmail.com.

Workshop B: Engaging the general public

Angus Miller and Beverly Bergman presented this workshop, considering approaches and the practicalities of presenting information on Scotland's geodiversity to the general public. Angus started with a brief exercise to consider how we can visually represent the vastness of geological time using simple analogies. There are many different ways to do this, including walking a time string, or condensing geological time into one day or one year (with modern humans appearing at 23 minutes before midnight on Hogmanay).

Beverly talked through the different stages of designing and publishing a leaflet, based on her recent experiences of writing two leaflets on the Water of Leith in Edinburgh with Lothian and Borders GeoConservation. She highlighted the importance of checking facts and access, and focussing on the most important parts of the story which will be of interest to the general public. Her presentation is available on the Files page of Forum website www.scottishgeodiversityforum.org.

Next, the group were invited to form small groups and discuss how we could interpret the geodiversity of the island of Staffa for visitors, perhaps focussing on the formation of lava flows and columns, or connecting with the legend of Finn McCool and the Giant's Causeway in Antrim.

The workshop finished off with a brief introduction to, and trial of, a new app for smart phones, which has been developed for Holyrood Park in Edinburgh (this was part of a project called Rock Opera, exploring the story of James Hutton for schools - rockopera.org.uk). The smart phone app uses the MakkaMappa website (makkamappa.com), which offers a low-cost route to putting maps and information online so that people can find out about the geodiversity of a site as they navigate around using the GPS on their phone.

Workshop C: Geodiversity in planning and policy

David Liddell presented workshops entitled Geodiversity in Planning and Policy, noting that actually there is very little geodiversity in planning and none in policy. He went over the background to the National Planning Policy Framework, the latest draft of which was published for consultation which ended mid October. This has a key role in reforming the planning system to make it less complex and more accessible. He explained that the present Scottish Planning Policy was brought in by the present government and consolidated 23 previous policy documents so is a very much pared down version.

At the national level, the new emphasis on ecosystems and ecosystems services in national and international biodiversity strategies provides a good opportunity to ensure recognition that geological processes are an essential part of these systems and services. Geodiversity need not compete for attention with biodiversity – they are both essential components of our natural heritage.

The present Scottish Biodiversity Strategy is in the initial stage of revision and there is an opportunity to bring in geodiversity, with emphasis on the fact that geodiversity underpins biodiversity, with close links between the two as far as eco-system services are concerned. A combined bio/geodiversity strategy will contribute to Scotland's Planning Policy & Framework and then be taken into account in Local Planning.

David went through the stages in compiling Local Authority Development Plans. These plans are on a 5 year cycle. The production of a Main Issues Report is the first stage in producing a Local Development Plan, which once adopted replaces any existing plan. There was agreement that engaging with the development planning processes, and engaging early through the Main Issues Report, is essential if planning authorities are to have the best chance of properly reflecting geodiversity considerations in their plans and decisions. Then the draft Plan is published for public consultation and any disagreements at this stage are settled by Government Reporters based in Falkirk and their decision is legally binding.

There is very little reference to geodiversity in any Local Plan and members of the local geodiversity groups have to be aware that they are the ones who have to address this lack in their Local Plan. If there is no mention of geodiversity within a Main Issues Report or a draft Plan we must find a section to which geodiversity can be added and reply to any consultations. An example of this might be, when a planning authority is seeking information from landowners and developers on potential development sites to include in the plan, to submit details of the most important geodiversity sites which need to be protected from harmful development.

Legislation is supposed to govern the protection of SSSIs but there are many local geodiversity sites which do not

come into this category but still need a degree of protection. There was a suggestion that these sites could be termed "Sites of Scientific Interest" but at the moment the general term is local geodiversity sites (LGS). The proposed Scotland's Geodiversity Charter will draw the attention of Local Authorities, NGOs and other organisations and individuals to the geodiversity of Scotland and their role in maintaining it. This Charter is based on Scotland's Landscape Charter - www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/scotlands-landscape-charter/.

We will also have to inspire MSPs and put forward economic arguments. David suggested the way forward to ensuring that geodiversity is in any development plan right at the start is

- revising the Biodiversity Strategy to include geodiversity.
- ensuring wide support for the Charter, including the Government.

Workshop D: Citizen science - Al McGowan

Sharing geodiversity information: where we are at and where we should be going. Citizen Science is about specialists doing science with non-specialists. Not communicating science, not doing outreach. Geodiversity information gathering and sharing has lagged far behind biodiversity recording networks. Given that the likely focus for geodiversity work in Scotland is going to fall under biodiversity-led organisations and legislation, this workshop has three aims:

1. Raise awareness of the sources of information and recording systems already in place for geodiversity in Scotland
2. Compare and contrast these with biodiversity recording schemes in Scotland
3. Establish how geodiversity recording and information dissemination might benefit from being allied to current biodiversity recording networks and tools.

Workshop output

Al McGowan gave a presentation, available on the Files page of Forum website www.scottishgeodiversityforum.org and on Al's blog karsticcave.wordpress.com, that put the rise of interest and funding for biodiversity since 1992 in the context of the media coverage that came out of the 1992 Rio Earth Summit. The long history of the involvement of unpaid workers in natural history in the British Isles was discussed in both a historical context and in its current manifestation as citizen science. As geodiversity is being treated in policy circles as a dimension of biodiversity, the notion of using extant biodiversity recording schemes, systems and software was explored. Dr Diarmad Campbell (Chief Geologist, Scotland) noted that BGS had recently launched its own citizen science webtool GeoExposures (www.bgs.ac.uk/citizenScience/geoexposures.html) for reporting temporary exposures. Other members of the workshop expressed some interest and enthusiasm for geodiversity recording and monitoring but also noted that many organisations not affiliated to universities have problems accessing quite basic resources relating to earth sciences. This does raise the need for a scheme of 'book boxes' that could go out to organisations in a similar way the rock boxes go to schools. An encouraging feature of the workshop was how much people wanted to discuss issues, rather than being passive.

Workshop E: More than just an interesting narrative - Colin MacFadyen

In the UK important policy and other documents of direct relevance to geodiversity, continue to be published that lack any consideration of this subject area. This is despite its generally long recognised and widely acknowledged supportive and underpinning role. In Scotland efforts have been made to address this situation, such as the recent e-petitioning of the Scottish Parliament for the creation of a Geodiversity Duty. The workshop will in the first instance seek to establish what the probable reasons could be for the apparent relegation of geodiversity and determine how these may be addressed. The focus of the workshop will then shift to consider what there is to convey beyond the provision of interesting geo-narratives in policy and other documents – why would people wish to know and care about the geodiversity?

Workshop output (notes provided by Colin MacFadyen, SNH)

Workshop participants considered that it is the erroneous perceptions of the public and policy makers alike of geodiversity, that lie at the root of the apparent relegation of the geodiversity. It was even suggested that there is a particularly strong and innate bias, based on perception, within UK statutory conservation agencies towards biodiversity conservation and promotion. Perceptions such as: the relevance of geodiversity; the perception that 'nature' is only biotic; the perception that geodiversity is too technical or difficult to appreciate and understand; and the perception that threats and challenges to nature are only relevant to the biodiversity. These perceptions combined with low levels of geodiversity awareness of individuals in positions of power were considered to underlie the apparent relegation of the subject. Education and awareness raising at all levels were regarded by participants as the obvious means of addressing erroneous perceptions; ensuring for example, that 'nature studies' in schools encompass the geodiversity, rather than focussing narrowly on biodiversity.

The lack of an appropriate RSPB equivalent as a bulwark championing geodiversity conservation, management and promotion, was suggested as being a significant hindrance in lobbying policy makers.

The undeniable links between geodiversity, landscape and biodiversity and the fact the geodiversity has determined the industrial and economic development of Scotland, has driven the pattern of human habitat, has impacted on cultural heritage, and that it will continue to have this critical role, were the answers to the question - why would people wish to know and care about the geodiversity? In addition, it was reckoned that people would wish to know and care about the geodiversity because of the effects upon its more dynamic aspects through climate change and the human reaction to such change, which will have profound effect not only on human activity, but also on ecosystems /biodiversity.

"Easily lost and gone forever" was a phrase that may be used to interest the public in conservation of the abiotic elements of nature. The potential geodiversity presents for tourism growth across Scotland, akin to geopark development, would be a particular aspect of the geodiversity that would interest people in terms of the economic benefit it could offer in rural areas.

A valuable aspect of the geodiversity, that has great relevance for humanity, and which folk may wish to know about, is the crucial 4th dimension its consideration provides. The realisation that fundamental change to the environment is not new, is inevitable and is ongoing, as evidenced from the geo record, provides a unique perspective that would help more reasoned and considered approaches for dealing with change and would help people to adjust psychologically.

The point was raised that an appreciation of the geodiversity, sets human experience in the context of the dynamic evolution of Earth, the scheme of life and helps contextualise our place in the universe. It was considered that appreciation and awareness of the geodiversity would help restore the long lost links between our human existence today with the environment from which we have been so long separated, something a bio-centric view of the world alone cannot provide – surely something that many people would wish to know and care about.

Feedback

Feedback gathered from participants at the end of the day showed that the conference had been very successful in meeting its aims, and the mix of talks and workshops was about right, people appreciated the opportunities to network and the food was great. The talks were seen as inspiring and giving a very good overview of the subject.

In general everyone enjoyed the workshops. The hands-on workshops were appreciated, especially by those who could apply them to their jobs. Overall the spread of workshops on offer gave a good choice to all interests. Adverse comments were that too much time was taken up by the presenters and one hour for the workshops was not long enough, but on the other hand some people felt that there was plenty of opportunity for discussion.



All participants who expressed an opinion said they would be keen to attend other events in the future, and the Forum Executive will now take forward some of the suggestions and plan further meetings in 2012.