

## **Status Report on the Global Geoscience Initiative**

January 2010

The International Year of Planet Earth (IYPE), which has achieved considerable success in its outreach activities, has not generated a significant science programme. As the triennium reaches its end, there is a wish to explore the scope to launch a global geoscience initiative, to use the momentum generated by IYPE and three other international years (International Polar Year, International Heliophysical Year, Electronic Geophysical Year), and to take forward the aims expressed in the Tsukuba Declaration, issued jointly by participants in these programmes.

### **Summary of the London meeting**

An informal group comprising John Ludden (chair) (BGS), Tom Beer (IUGG), Nic Bilham (GSL), Ed de Mulder (IYPE) (first part of the meeting), David Dent (IYPE Board), Wolfgang Eder (IYPE Board), Manuel Grande (EGU), Jack Hess (GSA), Pat Leahy (AGI), Robert Missotten (UNESCO), Edmund Nickless (GSL) and Roland Oberhaensli (ILP) met on 16 July 2009 at the Geological Society of London, Burlington House, London

- to establish whether the concept of a global geoscience initiative is viable,
- to discuss institutional arrangements, and the roles and relationships of key organisations (including IYPE, whose activities will draw to a close in June 2010),
- to discuss how working science communities might be engaged, and
- to agree on next steps in the process.

In seeking to establish a global geoscience initiative, no new structures or institutions were identified as there are already suitable vehicles (UNESCO, the International Unions, etc). Support of these institutions will be invaluable. The continuing success of International Years depends on their being seen to have a distinct end, and a clear legacy, so IYPE (and the other years) should be used to lever support for the current initiative among existing institutions.

Institutional support from the International Unions and UNESCO is likely to be a key determinant of success. A repurposed IGCP was suggested as a possible institutional vehicle for the programme.

It was agreed that the theme(s) of the programme should be associated with clear societal goals. A useful starting point would be to consider the role of geoscience in delivering the 'Millennium Goals', at a global, national and regional level. Some broad trends in societal drivers for science are common to many countries, such as stimulating economic competitiveness, and living with environmental change – recognising these broader social agendas will help attract funding. A clear link between the science programme and societal goals will also help to sustain continuing outreach projects, and will help to show to those outside the community the vital role of Earth scientists in addressing the great challenges of the future.

While institutional support and some joined up international effort to give the project identity, stimulate new funding, etc, are essential, it was agreed that excellence in the science itself depends on allowing a more organic, 'bottom up' approach. A key challenge is to engage scientific communities, as well as funding bodies and other institutions, and to knit together these 'bottom up' and 'top down' elements. A programme which enables access to (possibly new) international infrastructure might be attractive in this respect.

The Earth sciences tend to be fragmented, and relatively restricted to disciplinary silos. The project must therefore be seen to be genuinely interdisciplinary, and will add real value if it is seen to help counter institutional as well as disciplinary fragmentation, so that there are fewer but

stronger and more cohesive voices talking to outside audiences. In order to engage a truly global community, the project must not be seen as Euro-centric or colonialist.

It was suggested that the programme should not be 'global' simply in the sense of involving activity in many countries, and being globally organised, but should also involve global processes – this has been a strength of the oceanography community.

Although it was recognised that it was not the purpose of the meeting (or of the group) to fix on a theme (or themes) for an global science programme and pre-empt discussions later in the year, it was agreed that it would be helpful to generate some ideas, which might be a useful starting point for those discussions. A number of possible themes, often inter-related, were identified and discussed.

A possible model is to identify a broad overarching theme, such as landscape, which would span the ten year lifetime, say, of the programme, with three distinct successive three-year phases (an attractive timeframe for many funding bodies) addressing more focused topics, e.g. deltas. It was noted that most of the suggested themes inevitably involve climate change/environmental change, but as a driver rather than a research topic in its own right – which clearly locates them in a societal context. It was agreed that in the end, attractive and focused themes must be identified, rather than very diffuse subject areas such as energy or water.

The need to raise political support and awareness among funding bodies was recognised, but it was agreed that this should be left until after the third Town Hall Meeting at EGU, capitalising on the process which will have taken place at Town Hall Meetings at GSA and AGU, in gathering support raised in the global geoscience community.

The aims of the Town Hall Meetings are:

- to establish whether the concept of a global geoscience initiative is viable,
- to discuss institutional arrangements, and the roles and relationships of key organisations (including IYPE, whose activities will draw to a close in June 2010),
- to discuss how working science communities might be engaged, and
- to agree next steps in the process.

## **TOWARDS A GLOBAL GEOSCIENCE INITIATIVE -TOWN HALLS**

**Sponsors:** American Geological Institute (AGI), British Geological Survey (BGS), Geological Society of America (GSA) and Geological Society of London (GSL)

**Background:** The activities associated with the [International Year of Planet Earth](#) (IYPE) will shortly come to an end. Looking back over the three years of IYPE, there have been many notable successes, particularly in its Outreach program.

Several members of the IYPE board, along with representatives of some other Earth science institutions, have started to explore whether there is scope to launch a global geoscience initiative, in response to the 'call to arms' embodied in the Tsukuba Declaration put forward by participants in IYPE and three other International Years – the International Polar Year, the Electronic Geophysical Year, and the International Heliophysical Year.

Such an initiative, while independent of IYPE and the other International Years, would constitute a fitting legacy, contributing to global scientific understanding and international capacity building, and complementing the outreach achievements of IYPE.

The vision of the group developing this proposal is that it should:

- be inclusive, and involve a geoscience community which is broad both in terms of discipline and nationality,
- have a clear socio-economic context, and global societal relevance,
- focus on a globally significant science theme, and preferably involve global processes, and
- attract the support of scientific communities, funding agencies, governments and other institutions in many countries, under the umbrella of UNESCO and the geoscientific International Unions.

While some initial thought has been given to how such an initiative might work, and to possible science themes, it will only be a success if it has the support and involvement of a broader community of Earth scientists. 'Town hall' meetings are therefore being held at the GSA Annual Meeting in Portland, Oregon (October 2009), at the AGU Fall Meeting in San Francisco, California (December 2009), and at the EGU Meeting in Vienna (May 2010). The proposal will also be discussed at the closing IYPE event in Lisbon (November 2009), and at events in other parts of the world over the coming months. Discussion Summary

**GSA Town Hall Meeting:** Tuesday 20 October 2009 at 6:00 pm – 7:30 pm, Oregon Convention Center, Room B116, Portland, Oregon

*Chairs:* **Edmund Nickless** (Geological Society of London) and **Jack Hess** (Geological Society of America)

*Speakers:*

- **Suzette Kimball** (Acting Director, US Geological Survey) – *There Be DRAGONS: Delta Science in the 21st Century*
- **Murray Hitzman** (Charles F. Fogarty Professor of Economic Geology, Colorado School of Mines) – *Critical Research Challenges in Natural Resource Geosciences for the Early 21st Century*
- **John Ludden** (Executive Director, British Geological Survey) – *Applied Geosciences for Planet Earth*

Presentation can be viewed at: <http://www.agiweb.org/members/presentations/index.html>

In an hour long discussion following the three presentations, during which approximately 20 people were present representing a cross section of employment sectors and age, no one said that we should not be pursuing this initiative.

Points made include:

- Globally the challenge is the interface of food, water, and energy security.
- Is there a global geoscientific project which would command public interest?
- The challenge is adapting to and mitigating environmental change in a resource poor future coupled with sustainability.
- How can the geosciences be brought into the development of policy and to the attention of government?
- Prediction depends on integrated science.
- We will need to work with social scientists in communicating the message and in identifying socially acceptable action.
- Hazards attract attention but what is the excitement in earth observation? 3-D modelling of the Earth through time provides a challenge of scale – kilometres to nanometres.
- Remote sensing techniques can be linked to monitoring and sustainability.
- Can this initiative be grouped around 'spaceship earth' – a journey or 'mission earth' – make the earth a better place to live on. What are the indicators of quality? Reference this and say for example – "This is the best place for this desired human activity".
- In terms of status how do we move away from conspicuous consumption as an indicator? What is the role of the citizen – can we identify a topic which is engaging – citizen science as an observer, reporter of change?
- On oceans and atmosphere, what has been done and what remains to do? Food, water and energy security will be pressing topics over the next forty years. What do the public understand about long-term sustainability?
- Potential focus of an initiative might be fluids in the subsurface or the use of the geosphere.

Specific issues are:

- Population growth,
- Communication,
- Difficulties of getting academics aligned in their priorities,
- Initiating measures of public engagement, and
- Involving the public in observational experiments – citizen science.

**AGU Town Hall Meeting:** Thursday 17 December 2009 at 7:00 pm – 8:00 pm, Moscone West, Room 2004, San Francisco, Ca.

*Chairs:* **Edmund Nickless** (Geological Society of London) and **Pat Leahy** (American Geological Institute)

*Speakers:*

- **Donald J. Depaolo**, (Director, Earth Sciences Division, University of California/Lawrence Berkeley National Laboratory) - *The Grand Research Questions in the Solid-Earth Science*

- **Mark D. Zoback**, (Benjamin M. Page Professor of Earth Science and Professor of Geophysics, Stanford University) - *Scientific Challenges Related to Energy and the Environment*.
- **Marcia K. McNutt**, (Director, US Geological Survey) - *Challenges and Opportunities for Research in the Oceans*.

Dr. Depaolo summarized a report from a review group of the US National Research Council which he had chaired. His presentation discussed ten research questions that need to be addressed by the geoscience community and covered topics as diverse as the origin of Earth to climate dynamics. The presentation provided an outstanding overview of major research questions all of which are certainly global in nature.

The major thrust of Dr. Zoback's presentation dealt with maintaining the demand for energy while at the same time reducing climate change specifically carbon emissions. He presented an analysis of what could be expected if the energy mix changed relative to carbon capture and storage, the migration to an increase in natural gas and nuclear power, and practical view of the geologic, societal and economic constraints to these changes.

Dr. McNutt highlighted some the issues and challenges associated with developing infrastructure and the stability in near-shore environments, sea-level rise associated with both climate change and other causes, the potential impacts of ocean acidification, and the opportunities for scientific breakthroughs associated with microbial communities in the oceans.

Presentation can be viewed at: <http://www.agiweb.org/members/presentations/index.html>

The presentations were followed by an open discussion of potential global geoscience initiatives that included topical areas as well as issues associated with the conduct of global research efforts. A concern was that the geoscience community is fractured but what we understand about Earth history and processes is highly relevant to the resolution of a number of issues facing society. The challenge was to identify a topic or topics that would command the broad support of the geoscience community, be multidisciplinary and link with other scientific disciplines. The audience of about two dozen individuals represented an array of interests and included a number of individuals representing the international perspective.

In a wide ranging discussion the following main points were made:

- Should a global initiative should be promoted along outstanding scientific questions or aligned with major societal issues?
- Does the initiative need to be global in scope of observation or can global teams of scientists work together in an appropriate setting? A topical subject is carbon sequestration. Currently research efforts are thought to be fragmented. Perhaps a global effort would be desirable given the magnitude of the effort that is needed and given the diversity of geologic environments globally?
- Open data access was identified as an impediment that must be overcome to ensure global cooperation.

- One commentator identified the pace of change relative to research agendas as a concern. Global geoscience institutions may not be nimble enough to set priorities quickly and to implement and encourage global cooperation.
- The engagement of younger geoscientists was identified as a challenge. The recent Young-Earth Scientists Congress was seen as a fledging effort to address this concern.
- There was concern that we are not using technology (e.g. Web 2, Web3, etc.) effectively to encourage global allegiances or to broaden the dialogue concerning geoscience initiatives.
- One individual noted that the quality of leadership dialogue at the Copenhagen Climate Summit demonstrated the need for greater effort by geoscientists to educate and inform the public more effectively. Given this continuing challenge, the prospects of developing a robust global geoscience initiative may be in doubt or at best difficult. Another suggestion was that a global information portal for the geosciences is needed. Such an effort would enhance a better dialogue between the geoscience community and the public.
- In moving forward there was an urgent need to improve dialogue with the public, identifying issues of concern with the geoscientific community providing perspective.

As a final discussion point, the audience was asked if anyone thought the idea of a global geoscience initiative was a bad idea. All thought the concept worthy of further and broader exploration though the issue of how to bring this initiative to closure is problematic.

Edmund Nickless and P. Patrick Leahy  
06 January 2010