The Association of Geological Surveys of the European Union
(EuroGeoSurveys)
in their position as
custodians to their national natural resources
and
guardians of their terrestrial environment

present their contribution

The work of EuroGeoSurveys -
the Association of the Geological Surveys of the European Union

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The role of EuroGeoSurveys

In 1992, in the light of the importance of geoscience issues to sustainable development, the Directors of the European Geological Surveys offered their services to the EU institutions as a single, neutral body which could provide balanced advice and information on the formulation of forward policy in contributory issues such as natural resources (minerals, energy, water and soils) and the environment (natural hazards, climate change, pollution and contamination) [1].

The Directors offered the EU institutions the geological survey organisations' (GSOs) ability to provide key pan-European views and advice to in order to promote the effective application of geoscientific knowledge to European forward policy. Key advantages agreed were that unified Opinions from the GSOs could cut down the time spent on consultation by the EU institutions, would be neutral and would avoid the risk of misinterpreting the significance of environmental phenomena viewed out of a geoscientific context.

In 1996 EuroGeoSurveys was registered in France as a non-profit organisation and opened a Bureau to represent it in Brussels. From this base the association now provides advice and information to the European Commission and European Parliament as well as the Committee of the Regions and the European Environment Agency in Copenhagen. Operating as a two-way information exchange, it also familiarises its 6300 members with the policy needs and methods of the EU institutions.

The representation provided by the EuroGeoSurveys Bureau is funded by annual contributions from the 18 member GSOs: the 15 EU countries plus Iceland, Norway and Switzerland. Outside the opportunities for applied earth science work in the four-year EU RTD Framework Programmes lies a huge field in which the EU is still shaping its future environmental, natural hazard and natural resource policies. GSO experience and knowledge is obviously of key importance here because its objectivity and comprehensive scope can balance the European approach to these issues - such as environmental and civil protection, water and mineral extraction policy, geological infrastructure and waste disposal, natural hazards and their effects on land use in the regions and cities. Most importantly of all the GSOs can use their huge national information resources and expertise in information technology to provide access to the huge resources of public domain data and information in all these fields, an increasing volume of which it is standardising into parameters which can be used over the Internet to solve cross-border issues at a true pan-European scale.

EuroGeoSurveys emphasises to the EU institutions the great influence of Europe's natural 'geodiversity' on the distribution and behaviour of essential natural resources and how society needs to recognise that all these issues are controlled by the natural composition and movements of the Earth itself and the Solar System.

After four years of activity, EuroGeoSurveys has set up eleven different 'policy sector' networks of senior GSO experts drawn from as many member countries as possible. Each network tackles an area of the EU agenda which overlaps with ongoing national programmes and which needs greater input from applied earth science at the European level. The object is to use GSO know-how to deliver relevant, objective and cost-effective decision support through multidisciplinary work. The networks are:

- Information technology and communication of geodata
- International cooperation
- Research, innovation and technology foresight in geoscience
- Soils and land use planning
- Groundwater resources
- Mineral resources
- Natural geohazards
- Earth energy resources
  - Urban environment
- Coastal and marine environments
- Geological aspects of climate change

The networks aim to act as rapid response groups rather than as large, slow-moving standing committees. They send the EU topical, informed opinions on specific agenda issues, thus keeping operational costs down and enabling them to keep pace with the EU agenda.

Since 1997 the GSOs have been linked electronically across the Internet through a dedicated server set up during the EU Fourth Framework GEIXS project and plans are in hand to link the huge information resources of the national GSO libraries for public Internet access

Sustainable development: the EU perspective

Today 70% of European citizens believe that urgent action is needed to remedy degradation of the environment, although for many of them this means the more noticeable 'street-level' effects such as air pollution, noise and waste. Sustainable development is a key objective of the Treaty of the European Union. There are numerous definitions of sustainable development, most of which deal with natural resources removed from the environment such as the products of agriculture, forestry, fisheries, mines and oil or gas wells [2, 3, 4, 5, 6].

Sustainable development was recognised as a major world aim by the 1992 Rio Earth Summit and in 1993 the European Union responded by drafting its 5th Environmental Action Programme (EAP) 'Towards sustainability' to cover policy and action for the period 1993-2000. The 5th EAP set targets for action in various environmental issues and was given a Global Assessment during 1999,

the object being to launch a public consultation on priority issues to be addressed by the new 6th EAP to be drafted during 2000.

In October 1993 the EU set up the European Environmental Agency (EEA) in Copenhagen as an advisory body to "orchestrate, cross-check and put to strategic use information for the protection and improvement of Europe's environment". The EEA was also directed to publish an assessment of Europe's environment every three years to describe the present and the foreseeable state of the environment and in 1995 it issued the Dobris Assessment report which was intended to be a baseline reference for periodic updating, based on the best available data [7].

The Dobris report confirmed the poor quality of the European environment and listed 56 environmental problems, 19 of which have a geological cause or solution – including climate change, natural hazards, acidification, the management of fresh water, coastal zone management, waste management and urban environmental stress.

The Dobris report did not recognise the real relevance of geological processes to environment, natural resource and natural disaster issues and revealed the existence of many environmental knowledge gaps. However it was a useful catalogue of widespread, unwelcome environmental problems which drew political attention in a comfortable, affluent part of the world. The EEA recognised that a cross-sectoral, integrated approach to environmental problem-solving was necessary and also that it was difficult to define and assess environmental problems because of the obstacles to obtaining rapid access to comparable, compatible and verifiable data across Europe.

Sustainable development: a new view of Earth domains

To geoscientists, most of the published views of sustainability seem to concentrate on what can be described as the 'raw materials domain' of sustainable development. However two additional important domains must be included in any realistic analysis of sustainable development because they also impact on the raw material domain: the 'internal Earth domain' and the 'external Earth domain.'

The raw materials domain

This domain is essentially the immediate human living-space, most activity being carried out within the atmosphere or within 2 km below the Earth's surface. Although knowledge of the ground below 10 metres is very limited society can exercise some degree of choice and control of action. Each GSO helps to quantify and to inventory its own country's material flows and natural resource capital. Each GSO also monitors the natural (geogenic) interactions of these resources with the country's national human environment as well as the effects on the same environment of natural hazards and the industrial processes (anthropogenic) which are used to extract the resources. The GSOs distribute this information freely through national databases, imaging and digital products and – less

frequently than before - as hard copy map and report compilations published regularly in support of national policy or to customer specifications .

The internal Earth domain

This much larger scale domain is the internal physical infrastructure of the Earth and is particularly significant in a planet which has the only known moving crust in the Solar System. Here, humans have no choices or opportunities for direct intervention. The natural processes of the domain are driven by long term processes deep within the Earth that involve huge volumes of material, time scales of millions of years and distances of hundreds to thousands of kilometres. New crust is formed here and volcanoes erupt along the openings. Where crustal plates collide intense earthquakes and explosive volcanic eruptions occur along the contact zone (8). The natural energy required to drive such processes and events is well beyond that of the most powerful nuclear explosions.

The external Earth domain

This domain is defined by the Earth's position in the Solar System. Above the earth's atmosphere the domain is beyond human influence because it is characterised by long term solar system mechanisms which control gravitational fields and the Earth's rotation, thus controlling the long term natural variations in climate experienced through Earth history.

Society and the internal and external domains

Few developed modern societies have adapted their way of life and economic activity to the longer-term constraints of the internal Earth domain, the source of the main types of natural hazards such as volcanic eruptions, natural radioactivity, earthquakes and associated events such as landslides. Despite these high human and economic costs, few national administrations assign high political priority to using geoscientific knowledge to set up prediction, monitoring, planning and emergency systems that can help to limit the impacts of such natural hazards. Some countries have started to factor economic risk forecasts of natural hazard impacts into insurance practice and national or corporate forward plans. In the United States of America, recent estimates indicate that the weekly cost of natural disaster reparation is US$1 billion [9]. These costs are important, given the steadily rising number of Europeans who live in vulnerable environments such as city, mountain and coastal areas.

In the external Earth domain**,** variations in the planet's rotation movements produce measurable short term climatic variation. Geoindicator measurements prove that occasional climatic cooling or warming periods occurred long before humans developed any large centres of population or industry: one of them 55 million years ago - 48 million years before the appearance of the first human beings! Forward projection of the geological record from the last 450 000 years indicates that a fifth glacial period of about 10 000 years duration will begin in 20 000 years time. Most geoscientists agree that the gas production by artificial, human sources remains within natural

variation and is unlikely to override the climatic changes caused by the powerful solar system mechanisms (10).

How the Geological Surveys apply their work to environmental problems

The knowledge and expertise of the national GSOs make major contributions to understanding all of the three domains. Most people still do not recognize how major geoscientific issues impact on society and part of the blame here rests with geoscientists who - as a group – prefer to talk to their own kind and have not yet convinced non-specialists that human beings can adjust to environmental events. The long term of both observations and natural processes makes events such as volcanic eruptions and earthquakes seem unpredictable, giving them low political priority in the face of shorter term issues driven by financial markets, elections, unemployment cycles and harvests. However, as in medicine, long term preventive and precautionary measures are safer and more cost-effective than expensive emergencies and the GSOs are assembling much of the background geoscience information needed for land use planning in order to limit environmental damage. It may be too late to convince adults of these concepts but the teaching of good basic geoenvironmental principles in primary and secondary schools could produce future generations of decision makers who are better able to balance sustainable development issues. Many of the GSOs promote information campaigns for schools and the public which have proved to be popular.

EuroGeoSurveys members have been successful in winning projects although this is not the association's main activity. In 1999 16 GSOs completed the EU-funded GEIXS project which standardised the electronic catalogues and indexes (metadata) of their public domain information resources within a Europe-wide GIS system, the new International Geological Map of Europe (IGME-2) and a large multilingual thesaurus. GEIXS also set up a Europe-wide Internet system for exchanging this geoscientific metadata and providing public access to it for governments, researchers and the private sector through a dedicated Web server at http://www.eurogeosurveys.org. During 1999 GEIXS activities and standards were extended to eight Central and Eastern European GSOs. The site currently attracts thousands of enquiries each month, demonstrating the high European demand for quality geoscience information.

The GEIXS concept is being developed as the EuroGeoSurveys Internet gateway and will provide the essential information infrastructure of three further EU-funded projects won by members: on European seafloor sediment databasing (EUMARSIN: 1998-2000); on remote sensing to discriminate environmental pollution due to mineral extraction (MINEO: 2000-2002); and on classification of geological sites suitable for the disposal of waste carbon dioxide from fossil fuel combustion (GESTCO: 2000-2002). Other geoenvironmental projects submitted in 2000 are still under evaluation.

Conclusions

Improved cooperation since 1995 between the national GSOs has enabled them to contribute an informed vision to the EU environmental policy agenda and to set up important pan-European geoenvironmental information systems for public use. The Directors of EuroGeoSurveys are confident that this long term cooperation between professionals will bring GSO activity into a more prominent and more societally relevant position and make the total European environment a safer, more sustainable and better-understood one to live in. However this will require work of a

much more multidisciplinary nature than ever before, in which geoscientists will work closely with life scientists, economists, social scientists and engineers [11].

References

[1] Annells R N (1996) EuroGeoSurveys : the national geological surveys combine to map a way forward for the total environment of the European Union. Episodes, Vol 19, No 3, pp. 61-65

[2] Brundtland G H (1987) Our common future. World Commission on Environment and Development. (Oxford: Oxford University Press)

[3] IUCN, UNEP and WWF (1991) Caring for the earth: a strategy for sustainable living.

[4] European Commission (1993) 'Towards sustainability.' The Fifth Environmental Action Programme.

[5] Natural Resources and Environment Foresight Panel (1995) Vision statement and key recommendations report. (London: Office of Science and Technology/Department of Trade and Industry)

[6] Adriaanse A and others (1997) Resource flows :the material basis of industrial economies. (New York: World Resources Institute)

[7] Stanners D, Bourdeau, P eds (1995) Europe's Environment: the Dobris assessment. European Environment Agency, Copenhagen

[8] Plant J A, Haslam H W, Steenfel, A, Varet J and Annells, R N (2000 in preparation). Sustainability of the Earth's surface environment: a European geoscience perspective. British Geological Survey Report, (Keyworth, Nottingham: British Geological Survey)

[9] Pont R G (2000) Understanding natural hazards – what everyone should know. 1st International Professional Geology Conference (Alicante, Spain, July 2000). European Geologist, Vol.10 126-128

[10] Larsen E (1997) The climate of the past – a key to understanding future climate development. Geol Surv Norway (NGU), Annual Report 1997, 12-14

[11] Mulder E F J de and Annells R N (2000). Geosciences for Europe´s environment in the 21st century. 31st International Geological Congress (Rio de Janeiro). (Extended abstract).