

**ANNUAL REPORT FOR THE  
INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)  
WORKING GROUP ON  
GLOBAL GEOCHEMICAL BASELINES  
2005**

**1. TITLE OF CONSTITUENT BODY**

IUGS/IAGC Working Group on Global Geochemical Baselines.

**2. OVERALL OBJECTIVES**

To prepare a global geochemical database, and its representation in map form, to document the concentration and distribution of chemical elements and species in the Earth's near-surface environment. The database and accompanying maps can then be used to create a geochemical baseline against which future human-induced or natural changes to the chemistry of the land surface may be recognised and measured. In the short to medium term, this involves implementation of the recommendations given by Darnley *et al.* (1995), namely:

- collection and analysis of a series of multi-media geochemical samples - the Global Reference Network (GRN);
- design and publication of a Field Manual detailing sampling methods for collection of the GRN samples;
- design and production of an Analytical Manual detailing methods for analysing the GRN samples.

**3. FIT WITHIN IUGS SCIENCE POLICY**

Current IUGS scientific policy objectives relate to global earth science issues, such as identification of mineral resources, global change, geological hazards, environmental geology and sustainable development. The work of the Global Geochemical Baselines Working Group relates directly to all of these objectives through the establishment of a land-surface global geochemical reference network, providing multi-media, multi-element baseline data for a wide variety of environmental and resource applications. The project is also consistent with the strategic plan published by the IUGS Strategic Planning Committee (2000), and the International Year of Planet Earth (2005-2007) of 'Earth Sciences for Society'.

**4. ORGANISATION**

The project is led by a Steering Committee which co-ordinates the activities of five Technical Committees and contributions made by individual country representatives.

**Steering Committee**

*Honorary President*

Dr Arthur Darnley

Geological Survey of Canada

*Co-Leaders*

Prof Jane Plant

Imperial College, UK

Dr David Smith

US Geological Survey

*Scientific Secretary*

Mr Shaun Reeder

British Geological Survey

*Treasurer*

Mr Alecos Demetriades

IGME, Greece

**Analytical Committee**

*Chair*

Ms Gwendy Hall

Geological Survey of Canada

Co-ordinates the work plan for the analysis of GRN samples, the activities of the laboratories, and the supervision of analytical quality control data.

**Sampling Committee**

*Chair* Prof Reijo Salminen Geological Survey of Finland  
Supervises development and co-ordination of sampling protocols in the various climatic and geomorphic provinces throughout the world..

**Data Management Committee**

*Chair* Dr Timo Tarvainen Geological Survey of Finland  
Supervises sampling strategy, co-ordinates the sampling progress of the participating countries, manages the database of sample information and analytical results.

**Regional Co-ordination**

*Chair* Prof Reijo Salminen Geological Survey of Finland  
Co-ordinates project activities of groups of neighbouring countries and reports back to Steering Committee.

**Public Relations and Finance Committee**

*Chair* Mr Alecos Demetriades IGME, Greece  
Advertises and promotes the aims, objectives and achievements of the project world-wide, including by use of the World Wide Web, and takes responsibility for trying to secure funding for the project.

**5. EXTENT OF NATIONAL/REGIONAL/GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS**

The project does not have any other source of direct funding. However, within Europe, National Geological Surveys, and associated Institutes, have provided staff time and support to the project to complete the preparation of the European GRN as part of the FOREGS programme as an input to the IUGS/IAGC Global Geochemical Baselines project. A few other countries, including China, Russia, Colombia, India, Brazil, Canada, Mexico and the United States have provided funds through their National Geological Surveys or related institutes for pilot studies on establishing the GRN.

**6. INTERFACE WITH OTHER INTERNATIONAL PROJECTS**

This project is closely associated with the work of the Forum of European Geological Surveys (FOREGS) Geochemistry Working Group, which has recently been reformed under the auspices of the European Geological Surveys (EuroGeoSurveys). In addition, the INCO-COPERNICUS project, a laboratory standardisation project involving Western European and former Soviet Block countries, is associated with this project. The project also has links with the International Atomic Energy Agency (IAEA) and potential links with GTOS, the Global Terrestrial Observing System. The Working Group has also established closer links with the European Soil Bureau over the past few years, and is was actively involved in the European Commission's 'Soil Thematic Strategy Group' for the preparation of the EU's Soil Protection Document. The EuroGeoSurveys Secretary General is trying to link the project to other European Commission projects, such as the GMES Forum (Global Monitoring of Environment and Security), and INSPIRE (Infrastructure for Spatial Information in Europe). In North America, the project has established links with the tri-national soil geochemical survey involving the Geological Survey of Canada (GSC), the United States Geological Survey (USGS), and the Servicio Geológico Mexicano (SGM).

**7. CHIEF ACCOMPLISHMENTS IN 2005****Scientific Progress:**

There has been continued progress in a number of areas, most notably:

*Africa:* A field training course, which included lectures and two days of fieldwork, was held at the Geological Survey of Tanzania, Dodoma, on the 27 to 29 July, 2004. Representatives

from the east African countries who are planning to participate in the activities of IUGS/IAGC Task group on Global Geochemical Baselines were invited to attend. Three representatives from Kenya (Moi University), one from Seychelles, one from Nigeria, and seven from Tanzania (TGS) participated in the course.

*Australia:* A pilot study has been completed by the Cooperative Research Centre for Landscape Environments and Mineral Exploration (CRC LEME) and Geoscience Australia in the Riverina, a prime agricultural region in southern New South Wales and northern Victoria. A second pilot study has begun in the remote, flat, dry Gawler Craton of South Australia. These pilots are intended to establish and fine tune sampling and analytical protocols that can ultimately be applied at the national scale.

*India:* The Geochemical Baselines Programme in India continues to make progress. Sampling is nearing completion in the state of Andhra Pradesh and continues in the state of Tamilnadu.

*North America:* The USGS, GSC, and SGM are conducting pilot studies for a proposed soil geochemical survey of North America. In 2004, soil sampling was completed along two continental-scale transects. One transect extended from northern Manitoba in Canada to the US-Mexico border near El Paso, Texas and consisted of 105 sites. In 2005, sampling was extended into Mexico. The second transect, consisting of 160 sites, extended along the 38 parallel from the Pacific coast of the US just north of San Francisco, California to the Maryland shore on the Atlantic coast of the US. The Global Reference Network was used as a basis for selecting sites at approximately 40 km spacing along each transect. At each site up to four separate depths/horizons were collected as follows: 1) material from 0-5 cm depth, 2) O horizon, if present, 3) A horizon, and 4) C horizon. These samples have been analysed for more than 40 elements after a near-total four-acid extraction. In addition, bioaccessibility determinations on selected samples of A horizon and 0-5 cm material have been conducted using a deionised water extraction and an extraction by a simulated human gastric fluid. An additional sample of the 0-5 cm material was collected at each site for analysis of selected organic compounds and an additional sample of A horizon was collected for microbial characterisation by phospholipid fatty acid analysis, enzyme assays, BioLOG community profiling, and agricultural and human pathogen screening. The data generated by the near-total four-acid extraction has been published (Smith *et al.*, 2005; <http://pubs.usgs.gov/of/2005/1253/>). Additional data sets will be released as they become available.

*Cyprus:* Geochemical baseline mapping started on the 24th October 2005 in the part of Cyprus controlled by the Republic of Cyprus in collaboration with the Cyprus Geological Survey Department (GSD). Due to the high cost of collecting all sample media recommended by IGCP 259 (Darnley *et al.*, 1995; Salminen *et al.*, 1998, 2005) only floodplain sediments are being collected. Sampling will be completed during November 2005. The sampling is being carried out by A. Demetriades from the Hellenic Institute of Geology and Mineral Exploration (Working Group Treasurer and Public Relations chair), and the cost of sampling, estimated at about 6.000 CYP, will be born by GeoInvest Ltd, a Cypriot based company (<http://www.geoinvest-cy.com>), which agreed to be a sponsor, and to assist in the sampling, and provision of office facilities. GSD personnel are also trained in the sampling. It is hoped that such sponsorships from local companies will be found in other countries, as well as collaboration with national Geological Surveys like the GSD. The samples will be prepared and analysed at the GSD. Results will be published in 2006.

*Europe:* Within Europe, significant progress was made on the FOREGS Geochemical Atlas of Europe with the publication of Part 1: Background Information, Methodology and Maps, in both printed and electronic forms in June 2005. It is available from <http://www.gsf.fi/publ/foregsatlas/>. Good progress is also being made on the interpretation of the geochemical data, and Part 2 of the Geochemical Atlas of Europe will be available in both printed and electronic forms by June 2006. The minutes of the FOREGS Working

Groups' recent Business Meetings, held in Ljubljana, Slovenia (9-14 October 2005) are appended.

Progress was made on harmonising activities of the FOREGS Working Group with the European programme INSPIRE (Infrastructure for Spatial Information in Europe). The intention would be to identify five different Working Groups with specific responsibilities: - WG1 INSPIRE; - WG2 spatial harmonisation of the Pan-European River and Catchment Database and the FOREGS data; - WG3 harmonisation of soil monitoring data with JRC IES (the European Soil Bureau, ESB), with a focus on heavy metals; - WG4 hyperspectral analysis of the FOREGS and national sample archives; - WG5 laboratory standardisation for heavy metal analysis, and interpretation of pollution in soils, sediments and water.

**Public Relations and Finance Committee:** The new structure for the Committee agreed at the 2002 Annual Business Meeting (Chair: Alecos Demetriades; Deputy Chair: Andrew Grosz, three committee members, and affiliated members from each participating country) has not yet been activated, because it is important to firstly organise a section in the IUGS Website for the Global Geochemical Baselines project. This work should be finalised during 2006. To begin with, a hotlink should be established between the IUGS website and <http://www.gsf.fi/publ/foregsatlas/>. The intention is for this web page to represent a forum for information exchange and promotional activities with products from the FOREGS and other pilot projects. There is an ongoing discussion of the procedure to be followed for the transfer of FOREGS/EuroGeoSurveys data to the IUGS Website, especially legal aspects since the data must be publicly released by the Directors' themselves. A decision is expected either at the pending EuroGeoSurveys' Contact Points meetings in December 2005 or February 2006.

The Committee continued its activities for the promotion of the global programme, including the raising of funds through discussions with marketing and public relations consultants, and with senior staff from international mining companies. Other discussions with marketing experts are being planned for 2006 on the issue of the FOREGS/EuroGeoSurveys Geochemical Atlas of Europe, which is considered to be the spearhead of the promotional activities, together with the results of the Chinese Environmental Geochemical Monitoring Network project (EGMON). It is stressed that significant funding (in the order of £75K to £100K) is required just to start making progress with the marketing and fund-raising initiatives. The suggestion of the first marketing consultant to raise the public image of the fund raising campaign by having a celebrity figurehead or patron will be pursued when the results of the FOREGS/EuroGeoSurveys and EGMON projects are made public in 2006.

Financing the global project with EU funds, as part of the EU Commission's Global Monitoring of Environment and Security Forum, is still a possible solution. A presentation of the FOREGS/EuroGeoSurveys Geochemical Atlas of Europe to European Commission officers and other interested parties is being planned in February 2006. The EU Commission Officers will be informed on the significance of the global project and the situation for direct EU funding will be further explored, based on information from the previous Director of DG Environment (June 2003) on the possibility of funding projects of European or global concern from 2005-6.

Discussions with the Greek Orthodox Churches of Western Europe over potential financial assistance, which started in 2002, will be pursued further; discussions with other Greek and international companies will be pursued in 2006 upon publication of the FOREGS and EGMON results, and the installation of the project's new IUGS website. Personal contact with all potential sponsors is essential, hence the necessity for IUGS to provide the required seed money for the fund raising campaign.

After the Cyprus experience, the Public Relations and Finance Committee will be looking for local companies, such as the Cypriot GeoInvest Ltd to finance the sampling, and if

possible the analysis, and to collaborate with the national Geological Surveys. Also, for international companies, like DuPont, which have investment interest in certain countries.

The Hellenic Institute of Geology and Mineral Exploration has purchased 100 copies of the FOREGS Geochemical Atlas of Europe for promotional purposes. It has already donated 50 copies to University libraries, Ministries, Institutional libraries, Chamber libraries, etc. Also, different international working groups have been informed about the publication of Part 1 and the website address from which the atlas can be viewed and downloaded.

## 8. CHIEF PROBLEMS ENCOUNTERED IN 2005

The main problem still facing the project is the lack of funding that is required to achieve the aims and objectives of the project at the global scale. Although the geochemical baseline project in Europe continues to make significant progress, through funding by the participating European Geological Surveys, it is still considered unlikely that the global programme will go ahead without significant funding from all possible sources, including IUGS. Funds are required for training, transportation, additional analytical services and quality control.

Mr Alecos Demetriades of IGME, Greece, and Dr Andrew Grosz of USGS, in their roles as chair and deputy chair of the Public Relations and Finance Committee, have specific responsibilities for carrying out marketing initiatives in an effort to secure funding. In order to carry out these initiatives more successfully, assistance is requested from the IUGS committee in the form of:

- (i) seed money for promotional purposes,
- (ii) supply of addresses of all Geological Surveys in the World for the purposes of promoting the global project in these countries, and the development of contact points, and
- (iii) designing an Internet section dedicated to the project within the IUGS Website in collaboration with the IUGS Web Master. In this section, it is proposed that all project material will be stored and all Geological Surveys will have hot links to this page. It is stressed that this is a very important promotional activity, not only for providing information to scientists and the public in general, creating an exchange platform with contact points all over the world, but also for fund raising.

## 9. CHIEF PRODUCTS IN 2005

### *FOREGS Geochemical Atlas of Europe*

The first volume of the 'FOREGS Geochemical Atlas of Europe', which includes all introductory and background texts as well as a complete set of maps of European geochemical data, was published in June 2006 in both printed and electronic forms. The electronic version is available from <http://www.gsf.fi/publ/foregsatlas/>.

### *Papers*

Batista M J, Martins L, Salminen R, Bidovec M, Pirc S, De Vivo B, De Vos W, Mrnkova J, Gilucis A, Gregorauskiene V, Halamic J, Heitzmann P, Lima A, Jordan G, Klaver G, Klein P, Lis J, Locutura J, Marsina K, Mazreku A, O'Connor P J, Olsson S Å., Ottesen R T, Petersell V, Plant J A, Reeder S, Salpeteur I, Sandström H, Siewers U, Steenfelt A and Tarvainen T. In press. Geochemical Atlas of Europe - FOREGS Geochemical Baseline Mapping: The Portuguese experience. To be published in the Portuguese Geologists Association journal.

Cannon W F, Woodruff L G, Garrett R G, Kilblurn J, Smith D B and Horton J D. 2005. Chemical variation in A- and C-horizon soil along two North American continental

transects [abstr.]: Geological Society of America Abstracts with Programs, Vol. 37, No. 7, p. 354-355.

Demetriades A, Batista M J, Bidovec M, De Vivo B, De Vos W, Duris M, Gilucis A, Gregorauskiene V, Halamic J, Heitzmann P, Lima A, Jordan G, Klaver G, Klein P, Lis J, Locutura J, Marsina K, Mazreku A, O'Connor P J, Olsson S Å, Ottesen R T, Petersell V, Pirc S, Plant J A, Reeder S, Salminen R, Salpeteur I, Sandström H, Siewers U, Steenfelt A and Tarvainen T. 2005. FOREGS Geochemical Atlas of Europe. INTERFACE, Newsletter of the Association of Environmental Geochemistry and Health.

Salminen R. 2005. Focus on: Continental-Wide Geochemical Mapping in Europe. *Explore*, 127, 8-15.

Smith D B, Cannon W F, Woodruff L G, Garrett R G, Klassen R, Kilburn J E, Horton J D, King H D, Goldhaber M B and Morrison J M. 2005. Major- and trace-element concentrations in soils from two continental-scale transects of the United States and Canada: U.S. Geological Survey Open-File Report 2005-1253. Web only publication: <http://pubs.usgs.gov/of/2005/1253/>

Smith D B, Goldhaber M B, Cannon W F, Woodruff L G, Garrett R G, Eilers R G and Prieto J C S. 2005. A proposed soil geochemical survey of North America [abstr.]: Abstract Book, 21<sup>st</sup> Annual International Conference on Soils, Sediments, and Water; Amherst, MA; Oct. 17-20, 2005, p. 164.

Woodruff L G, Cannon W F, Kilburn J E, Smith D B, Garrett R G, Klassen R, Eilers R G and Horton J D. 2005. Landscape geochemistry on a continental scale [abstr.]: Abstract Book, 21<sup>st</sup> Annual International Conference on Soils, Sediments, and Water; Amherst, MA; Oct. 17-20, 2005, p. 165.

#### *Other Presentations, Posters, Abstracts and Dissemination of Promotional Material*

FOREGS project results for Total Organic Carbon content in soil were included in a European Commission Soil Thematic Strategy Technical Working Group report on Organic Matter: "*Status and distribution of soil organic matter in Europe*". It can be downloaded from the EU Commission's web site:- <http://forum.europa.eu.int/Public/irc/env/Home/main> and select "Soil Policy".

Various lectures relevant to the WG's activities were given by Prof Plant, including: a distinguished lecture to the RSC on Inorganic Chemicals in the Environment, March 2005, RSC London; a plenary at SETAC, Santiago, Chile, Oct 2005, on metals in the environment; a lecture on environment and risk at the Royal Society of Chemistry, London in November 2005; and a series of popular lectures in Iceland and the Netherlands on geochemistry and health.

A bilingual poster was presented at HELECO'2005 in Athens, Greece, February 2005. A PowerPoint presentation of geochemical distribution maps was also displayed at the kiosk of the Institute of Geology and Mineral Exploration.

An IUGS/FOREGS poster was presented, together with other promotional material, on the occasion of meetings of NuPulse project in Budapest, Hungary (January 2005), and Athens, Greece (July 2005), and at a public presentation of the NuPulse project at Ioannina, Greece (September 2005).

The bilingual FOREGS poster of the European Geochemical Baselines Atlas compiled in 2004 as an input to the IUGS "Global Geochemical Baselines" project, is in the process of being updated and will be circulated to all Geological Survey representatives for display at national and international conferences, symposia and workshops.

## **10. SUMMARY OF EXPENDITURES IN 2005**

The Working Group has received 1500 USD from IUGS in 2005. This amount is very small for the planned promotional activities, and even for assistance to developing country participants. It was, therefore, decided to keep it for future small promotional activities, and in the hope that IUGS will approve the requested amount.

The cost of the FOREGS programme over the past year is estimated to be in excess of US \$0.1M. These funds were provided from the Geological Institutes of the participating countries within Europe. The cost of pilot studies in the US and Canada for the proposed soil geochemical survey of North America is estimated to have been approximately US \$0.5M. There has also been considerable expenditure within India, China and Brazil.

## **11. WORK PLAN FOR NEXT YEAR**

The FOREGS/EuroGeoSurveys programme will be completed in the first half of 2006 with the publication of the second volume of the 'Geochemical Atlas of Europe', which will include extended interpretation of the geochemical data published the first volume. The geochemical database will be completely populated with all geochemical data and, according to the decision of the FOREGS Directors, it will be released during 2006.

The FOREGS Geochemical Mapping Field Manual (Salminen *et al.*, 1998) will be revised in 2006 to include new details on sampling in karstic terrains prepared by A Demetriades, S Pirc, M Bidovec and F Sustersic, and other key terrains, such as tropical, desert and arctic.

Countries outside Europe will be encouraged to observe the work done by the FOREGS Geochemistry Working Group, and to try to formulate similar working relationships and sampling programmes. An effort will be made to assist the eleven member countries of the Coordinating Committee for Geoscience Programmes in East and Southeast Asia (CCOP) in obtaining funding to hold a training seminar to initiate a geochemical baselines project.

The Public Relations and Finance Committee will continue in its plan of marketing initiatives in an effort to secure external funding. However, seed money is required from the IUGS to proceed with the fund raising campaign.

## **12. COMMUNICATION PLANS**

The IUGS/IAGC/FOREGS Working Group plans to participate in national and international symposia, conferences and workshops for the promotion of the project, including the "Soil Geochemical Patterns at International, National, and Regional Scales" symposium to be convened at the 18<sup>th</sup> World Congress of Soil Science in Philadelphia, PA (USA), July 2006.

Communication will also be achieved through continued output of oral presentations, posters and promotional materials.

A contact has already been made with the METRO newspaper, which is distributed in many European capitals, to publish a press release, if possible, on the same date throughout the whole of Europe to coincide with the publication of Part 2 of the Geochemical Atlas of Europe.

## **13. SUMMARY BUDGET FOR NEXT YEAR AND POTENTIAL FUNDING SOURCES OUTSIDE IUGS**

The European countries that are committed to interpretation of the FOREGS data and preparation of the "Geochemical Atlas of Europe" are likely to continue to fund this work from internal sources. The combined cost of these efforts is likely to be about US\$ 0.1M. Continued work on soil geochemical pilot studies in Canada, US, and Mexico will cost about US\$ 0.5M.

Without securing substantial financial contributions from external sources, it will be very difficult for the IUGS project to achieve its global objectives. It is hoped that the progress made with the European Atlas will be useful in marketing and helping to secure funds over the next year. The Public Relations and Finance Committee will be taking a proactive role in trying to secure funds for the global project from a wide variety of potential sources.

As indicated earlier, an Expression of Interest was submitted to the IUGS/IAGC in response to its 2003 call, but no information was received as to whether it was approved or not.

Any other support from IUGS/IAGC towards the advancement of this project in developing countries would be most welcome. In particular, the Public Relations and Finance Committee is requesting seed money for travel and promotional purposes in the order of **Twenty thousand** US dollars (20,000 USD). We understand the financial problems of IUGS, but we strongly believe that this is an important project, which must be given the priority it deserves.

#### 14. CHIEF ACCOMPLISHMENTS 1998-2005

- 1998 Publication of Salminen R, *et al.* (1998) *FOREGS Geochemical Mapping Field Manual*. Geological Survey of Finland Guide Number 47.
- 1998 Release of the IUGS/IAGC Global Geochemical Baselines website, hosted by the British Geological Survey at [www.bgs.ac.uk/IUGS](http://www.bgs.ac.uk/IUGS).
- 1998 Annual Meeting was held in Naples, Italy (1-3 October 1998) in conjunction with the FOREGS Geochemistry Working Group Annual Meeting.
- 1998 European GRN sampling programme commenced.
- 1999 Completion of pilot study for geochemical mapping carried out in Colombia.
- 1999 The Committee for Coastal and Offshore Geoscience Programmes (CCOP) agreed to act as a Regional Co-ordinator for their member countries (China, Japan, Vietnam, Indonesia, Cambodia, Thailand, Malasia, Papua New Guinea, Philippines, and Korea) in SE Asia.
- 2000 Symposium on geochemical baseline activities was organised as part of the 31st International Geological Congress in Rio de Janeiro.
- 2000 First draft of promotional papers to possible sponsors prepared and sponsorship campaign commenced.
- 2000 Annual Business Meeting of the IUGS/IAGC and FOREGS Working Groups held in Athens, Greece (14 to 17 November).
- 2001 Sampling and the majority of analysis completed in FOREGS countries. Preliminary maps of geochemical data for Europe prepared and preliminary interpretation begun.
- 2001 Meeting held with CCOP member countries during the Seminar on Regional Geochemical Exploration, Beijing, China to discuss their participation in the global project.
- 2002 Annual Business Meeting of the IUGS/IAGC and FOREGS Working Groups held in Svincice, Czech Republic (22 to 25 April 2002).
- 2002 Sampling and analysis completed in Southern India. Pilot studies partially completed within Colombia and Brazil. A major new campaign under the auspices of the Coordinating Committee for Geoscience Programmes in East and Southeast Asia is currently in the planning stages.
- 2003 Annual Business Meeting of the FOREGS Working Group held in Dublin, Ireland (18 to 21 March 2003).
- 2003 Quality control of the analytical results of the FOREGS project completed.
- 2003 FOREGS poster, as the European contribution to IUGS/IAGC Working Group on Global Geochemical Baselines, and a two page flyer prepared for promotional purposes.
- 2003 Annual Business Meeting of the IUGS/IAGC and FOREGS Working Groups held in Edinburgh, Scotland (9 September 2003).

- 2004 IUGS/IAGC/FOREGS Working Groups' workshop (DW016) at the 32<sup>nd</sup> International Geological Conference, Florence, Italy, 20-28 August 2004, held on 22 August 2004.
- 2005 Production of Part 1 of the FOREGS Geochemical Atlas of Europe, including background and introductory texts and geochemical maps for a wide range of sample media and chemical elements.

## 15. ANTICIPATED OBJECTIVES AND WORK PLAN 2006-2010

The work plan for the next year, detailed in section 11 of this report, will culminate in the production of Part 2 of the FOREGS/EuroGeoSurveys Geochemical Atlas of Europe, scheduled for release in both printed and electronic forms at the end of June 2006.

The FOREGS Geochemical Mapping Field Manual will be extensively revised to cover all terrain types. Similarly, a FOREGS Analytical Manual will be released with details of all the analytical procedures used in the analysis of European samples, including quality control procedures, etc.

A popular, well illustrated, version of the FOREGS atlas will be prepared in 2006. It will be aimed at decision makers, but also the general public and educational institutions.

To aid in the training of field sampling teams, an illustrated version of the Field Manual showing, in picture form, all stages of sampling will be produced as a PowerPoint presentation to be distributed on CD-rom or downloaded from the Working Group's website.

Ongoing efforts will be made to increase the extent of the participation in the global GRN project for countries outside of Europe.

## 19. REFERENCES

Darnley A G *et al.* 1995. *A Global Geochemical Database for Environmental and Resource Management: Recommendations for International Geochemical Mapping*. Final Report of IGCP Project 259. Earth Sciences 19, UNESCO, Paris.

International Union of Geological Sciences Strategic Planning Committee. 2000. *International Earth Science in the 21<sup>st</sup> Century. Science and Organisational Strategy for the International Union of Geological Sciences*. Trondheim, Norway, International Union of Geological Sciences, 49p.

Salminen R *et al.* 1998. FOREGS Geochemical Mapping. Field Manual. Geologian tutkimuskeskus - Geological Survey of Finland, Opas - Guide 47. Also available at <http://www.gsf.fi/foregs/geochem/fieldman.pdf>.

Salminen R *et al.* 2005. FOREGS Geochemical Atlas of Europe. Geological Survey of Finland. Also available at <http://www.gsf.fi/publ/foregsatlas/>.

NAME: Mr Shaun Reeder  
POSITION: Scientific Secretary  
DATE: 22 November 2005

ADDRESS: British Geological Survey  
Keyworth, Nottingham, United Kingdom, NG12 5GG  
TELEPHONE: +44 (0)115 936 3523  
FACSIMILE: +44 (0)115 936 3261  
E-MAIL: [s.reeder@bgs.ac.uk](mailto:s.reeder@bgs.ac.uk)