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Final Evaluation Report
External Evaluation of the UNESCO-IUGS International Geological Correlation Programme (IGCP) for the Period 1997-2002

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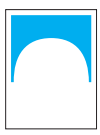

Foreword

This Final Report on the Evaluation of the IGCP Programme is based on the Draft Report, Deliverable 2 and the comments on the Draft Report made by the IGCP Secretariat, the Scientific Advisory Group (SAG) for the evaluation, the UNESCO Internal Oversight Service (IOS), Evaluation Unit, and Development Consulting AS (DECO). The Draft Report was discussed in a meeting between IOS, the SAG leader Prof. E. Derbyshire and the evaluation team at the Norwegian Institute for Air Research (NILU) on 12 January 2004.

The findings, conclusions and recommendations presented in this report are the overall responsibility of the evaluators.

Kjeller, 20 January 2004

Elin Dahlin and Göran Åberg

Acknowledgement

The evaluators want to thank all the people involved in the Evaluation for their constructive contribution and information.

Special thanks are due to Dr. Eder and Dr. Patzak in the IGCP Secretariat at the UNESCO Headquarters in Paris for providing us with all the necessary background material for the desk review, to the Scientific Advisory Group for providing us with useful background material and comments to the draft report, and to the UNESCO Regional Bureau for Science in Latin America and the Caribbean in Montevideo for their practical assistance in arranging all the meetings during the evaluation team's mission to Argentina and Uruguay.

The evaluators also wish to thank the UNESCO Internal Oversight Service for their support on evaluation procedures.

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Executive Summary

Background of the programme, purpose of the evaluation and methodology

The International Geological Correlation Programme (IGCP) is a joint endeavour of UNESCO (United Nations Educational, Scientific and Cultural Organisation) and IUGS (International Union of Geological Sciences). The IUGS serves as a scientific guide, while UNESCO handles operational and administrative matters. Around 40 percent of the IGCP project funds are managed by the UNESCO Regional Bureaux for Science (Jakarta, Cairo, Nairobi, and Montevideo). 101 Member States of UNESCO have established National IGCP Committees.

The main aim of the programme is to bring scientists from all over the world together and enhance interaction, particularly between developed and developing countries, through joint research work, meetings and workshops.

The current evaluation covers the period 1997 – 2002 with a total of 83 projects which have received seed funding. These projects have been selected after a peer review process by the IGCP Scientific Board, which meets once a year. The average total annual budget for the IGCP Programme has been USD 277.000, with a slight decrease over the evaluation period. The funding has been provided by the regular budget of UNESCO, IUGS, and the US National Academy of Science.

The IGCP Programme was last evaluated in 1997. The present evaluation aims to provide an independent assessment of the programme results over the evaluation period with a view of aligning it with the current UNESCO Medium Term Strategy (2002-2007). The empirical data that form the basis for the conclusions and recommendations are based on the following methodology: survey questionnaires to different stakeholder groups, interviews, document review and country visits.

Principal findings

The evaluation recognized several main programme achievements, including**:**

- The IGCP projects represent the practice of high quality geoscience with a notable publication record in peer-reviewed journals.
- IGCP projects are interdisciplinary involving several thousand professionals and students each year from around 150 countries.
- The projects have contributed to the development of several products, including databases, geological maps and textbooks.
- The evaluation has examined examples of practical use of the IGCP generated products, such as the Global Geochemical Baselines Database, first developed in the framework of IGCP in the 1980s and being updated with data from IGCP projects during the evaluation period. This database continues to be used by innumerable scientific and industrial “customers” around the world.
- The projects have contributed to capacity building for project participants and geoscience practitioners, especially in developing countries. Training courses have been provided in the framework of about 50 percent of the projects.

- Knowledge generated by IGCP projects in Africa has contributed to data banks in several countries. Geological, metallogenic and hydrogeological maps resulting from IGCP work have been used as a source of information for Geological Surveys and for industry, particularly in mineral resource exploration. Research and findings from IGCP projects are used in textbooks which are standard reading requirements in several African universities, and several postgraduate students (M.Sc. and Ph.D.) have been partly funded and completed their research and studies within the framework of IGCP.

In terms of organizational structure and management, the evaluation has identified the following strengths:

- The IGCP Secretariat is efficient despite its limited resources.
- The partnership between the IUGS and IGCP has been strong during the evaluation period. IUGS has mobilized support, funding and interest for the programme within the scientific community.
- The IGCP programme is cost-effective, having a catalytic effect generating 10-50 times the seed money provided by UNESCO at country and regional levels.
- The IGCP Scientific Board is composed of high calibre geoscientists from different specializations providing pro-bono services to the IGCP.

This evaluation recognized the following challenges for the programme**:**

- There is limited dissemination of results outside the scientific community, and the practical use of existing research findings are not easily evident with some notable exceptions. Several developing countries have expressed a desire for more user ready/practical research addressing societal needs.
- The IGCP Guidelines do not require project leaders to report on outputs and results of the projects other than scientific achievements. The project reports submitted by the project leaders emphasize scientific publications, but do not generally provide much information on other outputs and results; some project leaders include in lists of project publications items not strictly generated by the IGCP itself.
- Concerning the leadership of IGCP projects, 31% of the project leaders and 43% of the co-leaders are from developing countries or countries in transition. The remaining project leaders and co-leaders are from developed countries (defined as OECD countries).
- Until the year 2000, IGCP had a full time Secretary (P5) based in the UNESCO Natural Sciences Sector, Division of Earth Sciences. After a restructuring exercise in 2000, the position of Secretary of IGCP was combined with the function of Director of the Division of Earth Sciences. An Assistant IGCP Secretary (P2) was appointed at the same time; the appointee spends about 70 percent of her time on IGCP business, and the remaining 30 percent on providing support to other activities within the Division of Earth Sciences. The post of IGCP Clerk was abolished in 2000. Despite the efficient management of the programme, the capacity to provide adequate support for the projects under the programme has been limited by the present staffing levels.
- Disbursement of funds via the UNESCO Regional Bureaux for Science to project leaders has proved to be a cause of delay in the payment to project leaders, in certain cases by more than six months. The Regional Bureaux for Science are not fully

informed about IGCP projects and project activities within their region that are not managed by them.

- Representation on the Scientific Board is mainly from developed countries, with the 16 members coming from the following parts of the world: 7 Europe, 2 North America, 1 South America, 1 Africa, 1 Middle East, 4 Asia and the Pacific. At the time of writing (January 2004) there are two female members of the Board.
- The role and responsibility of the National Committees are not clear. Over the evaluation period around 2/3 of the National Committees did not submit annual reports.
- The review process for projects could benefit from external appraisers.

Conclusions

Overall, the relevance of the programme has been confirmed by the evaluation. The programme is cost-effective with seed funding provided by UNESCO, the US Academy for Sciences and the IUGS averaging USD 277.000 per year in the evaluation period. The positive outcomes have been clearly recognized in several regions. Geological databases and maps produced by IGCP are now in standard use. Also, IGCP has contributed to capacity-building of scientists, especially in developing countries. Yet, there is significant room for improvement in the dissemination and use of knowledge and products from the IGCP projects. In terms of financial sustainability this evaluation found that a reduction of the seed funding from UNESCO poses a threat to the continuation of the programme in that the catalytic effect will be lost, thus threatening the programme as a whole.

Recommendations

Recommendations for the IGCP Secretariat:

- Revise the objectives (ref. Item 1.1) to reflect the UNESCO Medium Term Strategy (2002 – 2007).
- The Secretariat should revise the current guidelines for project applications and reporting so as to ensure that direct and indirect results are an integrated part of a project report, such as capacity building, use of the products and relevant user groups. These guidelines should clearly state the operational objectives of the programme in line with the MTS of UNESCO. Following this improved monitoring of results, better record-keeping of the achievements of the programme in the IGCP Secretariat is needed.

- To facilitate working procedures and networking between all those involved in IGCP projects (Scientific Board, National Committees, Project leaders, co-project leaders and other participants, and UNESCO Regional Bureaux for Science) more information should be readily available on the web site. Greater advantage should be taken of the opportunities for interactive communication.

- The IGCP Secretariat in collaboration with the IUGS and the UNESCO Regional Bureaux for Science should develop a dissemination plan for the IGCP in order to facilitate the use of the knowledge and products generated by IGCP projects for different stakeholder groups.

- In the light of the above tasks to be added to the responsibilities of the IGCP Secretariat, the Natural Sciences Sector should undertake a review of the staffing resources required for the proper management of these tasks.

- The IUGS and the IGCP Secretariat should reconstruct the composition of the Scientific Board in order to obtain a better balance between the developing and developed countries, between the geographical regions and between women and men, while paying attention to the scientific needs of the IGCP Programme.

- The IGCP Secretariat and the IUGS should develop guidelines for the role, composition and operation of the National Committees. The guidelines should also focus on the need for good working relationships between the National Committees, the UNESCO National Commissions, and the Regional Bureaux for Science.

- The review process for project proposals could benefit from the use of external evaluators. The IGCP Secretariat should be responsible for finding two external evaluators (experts on the topic) for each proposal. The total number of projects undertaken each year should be less than at present but with each approved project receiving higher average funding than in the past.

Final Evaluation Report
External Evaluation of the UNESCO-IUGS International Geological Correlation Programme (IGCP) for the Period 1997-2002

1 Introduction

1.1 Description of the UNESCO - IUGS International Geological Correlation Programme (IGCP)

The International Geological Correlation Programme (IGCP)[*] is a joint endeavour of UNESCO (United Nations Educational, Scientific and Cultural Organisation) and IUGS (International Union of Geological Sciences). The IUGS serves as a scientific guide, while UNESCO handles operational and administrative matters. Following consultation planning, which commenced formally at a meeting in 1968, the IGCP programme was launched in 1972 to facilitate cooperation among geoscientists across frontiers and boundaries.

The main aim of the IGCP programme is to bring scientists from all over the world together and enhance interaction, particularly between developed and developing countries, through joint research work, meetings and workshops.

The main objectives of IGCP are the following (ref. website: http://www.unesco.org/science/earthsciences/igcp/background):

- Improvement in our understanding of the geoscientific factors controlling the global environment in order that human living conditions may be improved.
- Developing more effective ways to find and assess natural resources of energy and minerals.
- Increasing understanding of geological processes and concepts through correlative studies at many locations around the globe.
- Improving research standards, methods and techniques.

IGCP is an interdisciplinary programme. It covers the different fields in earth sciences and is linked with other UNESCO Scientific Programmes. It maintains active interfaces with disciplines such as water, ecological, marine, atmospheric and biological sciences. During the evaluation period 1997-2002 a total of 83 projects (Appendix 2) was funded, involving several thousands of scientists from about 150 countries.

During the evaluation period, the IGCP has been funded by contributions from UNESCO, IUGS and the US National Academy of Science.

[*] For abbreviations used in the report, see Appendix 1.

1.2 Changing context and objectives of the Programme

1.2.1 The strategic guidelines presented in the Medium Term Strategy for the evaluation period

The findings of this evaluation have been assessed against the two Medium Term Strategies, 1996-2001 (28 C/4) and 2002-2007 (31 C/4) and against the Approved Programme and Budgets for the periods 1996-1997 (28 C/5), 1998-1999 (29 C/5), 2000-2001 (30 C/5) and 2002-2003 (31 C/5).

The strategic guidelines for the IGCP Programme presented in the Medium Term Strategy (MTS) of UNESCO, the Approved Programme and the Budget for the evaluation period have all evolved.

In the MTS (28 C/4) covering the period 1996-2001; the focus was on closer collaboration and promotion of a greater synergy between natural sciences and social sciences - basic and applied (Art. 101). In art. 106 and 108 more cooperation between the environmental programmes covering major components of the earth system were requested. Relevant references in the MTS 1996-2001 (28 C/4) are;

"101] The Medium-Term Strategy for 1996-2001 seeks to foster closer collaboration and promote greater synergy between the natural sciences – basic and applied – and the social sciences in the search for appropriate solutions to some urgent development problems. The strategy seeks to reconcile two requirements: that of facilitating transdisciplinary approaches which could respond to the complexity of social issues and that of strengthening the various scientific disciplines. … "
"106] UNESCO's environmental programmes cover the major components of the earth system, with the exception of the atmosphere. During the 1996-2001 period, these programmes will co-operate more closely than in the past in addressing the interaction between the oceans, terrestrial ecosystems, freshwater systems and lithosphere, and the sustainable use of the resources they provide, taking into account socio-economic needs and constraints. Their social science components also need to be broadened or strengthened, as regards both their design and their implementation in Member States, in order to ensure consistency with the approach linking environment and development issues. …"
"109] In the earth sciences, UNESCO's strategy will be to pursue the fostering of cooperative research under the International Geological Correlation Programme, but also to promote the understanding of geological global processes as an essential input to the geosphere-biosphere global change system, the emergence of a 'global culture of prevention' through the assessment and mitigation of risks arising from natural hazards, and the accessibility of geological information to the engineering and scientific communities."

The MTS (31 C/4) covering the period 2002-2007 focuses on improving human security, particularly addressing the needs of the most vulnerable populations at global, regional, national and local levels. A key topic of this MTS is the relevance of scientific knowledge for solving the problems of societies. The following reference to the World Conference on Science in Budapest 1999 is quoted in the MTS: "the contribution of science cannot only be based upon terms of research and knowledge but must also be justified by its relevance and effectiveness in addressing the needs and aspirations of societies".

Other relevant references in the MTS 2002 – 2007 (31 C/5) are:

"(...) 83] UNESCO will address these challenges in an integrated framework, which responds to the new commitment to science for the twenty-first century, as defined by the results of the World Conference on Science, held in Budapest, Hungary, in 1999. The practical expression of this new contract is the recognition that the contribution of science cannot only be based upon terms of research and knowledge but must also be justified by its relevance and effectiveness in addressing the needs and aspirations of societies. The full participation of societies and all groups of societies in decision-making on scientific matters will be encouraged, as well as the need to contribute to the

definition of strategies that enable an effective use of research findings and innovations. Furthermore, the relationship between scientific research, education, technological innovation and their practical benefits is complex and involves today a large variety of actors."
"97] The International Geological Correlation Programme (IGCP) will contribute to enhancing knowledge on earth sciences with a view to applying it to the management of natural resources and to serving as a catalyst for international cooperation in support of sustainable development and environmental monitoring."
"102] In the earth sciences, there is a need for improved understanding of geological, geochemical, hydrogeological, mineralogical and geophysical parameters so as to bolster sustainable development through adequate monitoring. The modelling and forecasting of the impact of environmental and climate change calls for the introduction of new and more sophisticated technologies and related capacity-building as well as the collection of pertinent data. The use of satellite data will be enhanced and integrated into the management of earth sciences."
"115] (...) Expected outcomes:
- Enhanced human and institutional capacities at the national level and support for regional and international networking in the field of sciences for research and training;
- Enhancement of capabilities of national institutions in developing countries to assess and find solutions to environmental problems and to adapt to the exigencies of knowledge societies;"

1.2.2 The funding of the IGCP projects

The average funding for an IGCP project is $8.000 per year (min $ 4.200 per year and max $10.000 per year).

Table 1 shows the funding of the IGCP projects during the evaluation period.
The amount received from IUGS comes mainly from the US National Academy of Science.

Table 1: The outline financial situation of IGCP projects from 1997 to 2002.

Year	UNESCO	IUGS	Total	No. of projects			Average per project
				Overall	Funded	OET + nil	
Financial figures in US$1,000 units							
1997	204.0	55.0	259.0	53	45	8	5.8
1998	205.0	90.0	295.0	49	40	9	7.4
1999	190.0	90.0	288.0	43	40	3	7.2
2000	187.7	90.0	277.7	45	40	5	6.9
2001	184.4	95.0	279.4	41	37	4	7.5
2002	170.0	95.0	265.0	39	33	4	8.0

1.2.3 Structure and management of the IGCP Programme

1.2.3.1 The IGCP Secretariat

The IGCP Secretariat is part of the Division of Earth Sciences, Sector for Natural Sciences at the UNESCO Secretariat Headquarters in Paris. The human capacity in the IGCP Secretariat was reduced by the structural changes that took place within the Division in the year 2000, by combining of the position of Secretary of the IGCP with that of Director of the Division of Earth Sciences (Dr. Wolfgang Eder). Also in 2000 the Secretary of the IGCP changed, from Dr. Vladislav Babuška (who had held the position for seven years) to Dr. Margarete Patzak, Assistant Secretary (combined with a downgrade of the post from P-5 to P-2). One post (Clerk for the IGCP) was totally abolished after the retirement of Mrs Sally Cochrane.

1.2.3.2 The UNESCO Regional Bureaux for Science

There are four UNESCO Regional Bureaux for Science (RB), located in Jakarta, Nairobi, Cairo and Montevideo. At each of these bureaus there is a Regional Geologist who, among

her/his tasks, has the responsibility for following-up IGCP projects whose leadership is based within their region. It should be noted that the position of Regional Geologist at the Cairo Office has been vacant for about 2 years during the evaluation period.

These bureaus are required to write contracts and to provide the financial funding of these projects. Around 40 percent of the IGCP project funds are managed by the UNESCO Regional Bureaux for Science.

1.2.3.3 The IGCP Scientific Board

The IGCP is governed by a Scientific Board composed of sixteen geoscientists appointed jointly by the Director-General of UNESCO and the President of IUGS based on the nominations submitted by IUGS and IGCP National Committees. The appointments have to balance the following entities: scientific quality; geological field of specialization, international committee experience; world region - developing and developed worlds; gender and age. The Board members serve for a period of 4 years.

The Scientific Board meets once a year to assess annual reports of ongoing projects as well as to select new projects.

1.2.3.4 The IGCP National Committees

The evaluation team has not been able to obtain information of when and how the IGCP National Committees (NCs) were established. During the evaluation period 101 countries had NCs representatives registered, but only about 1/3 have submitted the annual reports to the IGCP Secretariat.

Most of the active NCs have several committee members (from 4-24), but in some countries the NCs count of only one person. The members of the NCs generally represent universities or research institutes (many of them are present or past project leaders) but some are representatives from Geological Surveys or from other groups related to applied geology.

1.2.3.5 The IUGS

The International Union of Geological Sciences (IUGS) was founded in 1961. The IUGS serves as an adviser and monitor of the IGCP Programme. IUGS promotes and encourages the study of geological problems, especially those of worldwide significance, and supports and facilitates international and interdisciplinary cooperation in the earth sciences. The IUGS has more than 110 National Committees and these Committees nominate candidates to the IGCP Board.

The Treasurer of IUGS and the IUGS secretariat are responsible for collecting and distributing the funding for the IGCP projects.

1.3 The purpose and objectives of the evaluation

The IGCP was last assessed in 1997. The results of this review were used in the redesign of the Programme's activities. The current evaluation aims, as stated in the Terms of Reference (TOR) (Appendix 3), to provide an independent assessment of the results obtained by the Programme over the period 1997 – 2002. The text relating to the IGCP evaluation from the official UNESCO document Approved Programme and Budget, 31 C/5 reads as follows:

"IGCP was the subject of an evaluation in 1997. Its results were used in the redesign of the Programme's activities. There is a need to plan for another evaluation six years after the first with a view to aligning the Programme with the next Medium-Term Strategy of UNESCO.
The evaluation will cover both the regular programme and extra budgetary financed activities and address the following issues:

- *relevance to Member States' needs and priorities;*
- *clarity and coherence of the Programme design and objectives, their attainability and adequacy of resources;*
- *major results with emphasis on multidisciplinary and intersectoral approaches to the design and implementation of the related activities;*
- *users and beneficiaries, linkage with the follow-up of the World Conference on Science, Budapest, 1999;*
- *added value, comparative advantage, partnership;*
- *impact on the promotion of basic and applied research in earth sciences at national, regional and international levels;*
- *impact on capacity-building, education and training;*
- *the advocacy role with regards to Member States' and impact on their policies and strategies;*
- *risk assessment."*

The evaluation has addressed all these issues. In terms of risk assessment, the evaluation has focused on financial viability given the pressing situation in this area.

1.3.1 The evaluation methods

The following methods have been used:

- **Document review;** this consisted of analysis of background information made available by the IGCP Secretariats well as examination of archives, such as annual reports, assessment reports, minutes of meetings etc. (Appendix 4).

- **Survey Questionnaires;** these were used in order to obtain information on Programme relevance, implementation and effectiveness (Appendix 5).
  The questionnaires were based on the draft questionnaires provided by the Scientific Advisory Group (SAG) for the evaluation. The questionnaires were elaborated further by the evaluation team in order to ensure their consistency with the key evaluation issues. The questionnaires were presented to the SAG for comments and they were accepted by the leader of the SAG group Prof. Derbyshire on 28 August 2003.

  The questionnaires were sent out from the IGCP Secretariat in Paris twice (on 1 September with a deadline of 22 September 2003, followed by one reminder and a new deadline of 10 October 2003).

  The questionnaires were sent to the following groups:

The Target Groups	Total number sent out	Total number of replies	%
IGCP Board	38	18	47

Members, Past and present			
IGCP National Committees	101	31	31
IGCP Project leaders and Co-leaders	83	36 + 2 from co-leaders	46
UNESCO Regional Bureaux or Science	4	3	75
Total	226	90	40

The following comments are offered on the response rate:

For IGCP Board members; for the past board members only 4 out of 22 replied. The remaining 14 replies came from the active board members, 2 of whom did not reply.
For the IGCP National Committees; the 31 replies came from the active NCs that usually deliver annual reports. The remaining 2/3 of the NCs are not very active.
For the IGCP Project leaders; most of the responses came from ongoing projects or projects that ended a short time ago.

The reason for the low percentage of replies for some of the groups might be the relatively short period allowed for a response, due to the fact that many geoscientists are engaged in fieldwork in the autumn season. It should be noted that the timeframe and budget for the evaluation did not allow further extension of the deadline.

There is also a possibility that some of the addresses used by the IGCP Secretariat were out of date.

Taken all this into consideration, the feedback on the questionnaires is 40%, which is not too bad, and answers received have contributed valuable information.

Key informant interviews: These were held with participants in the IGCP programme and with selected stakeholders. Field visits included time spent at the IGCP Secretariat at UNESCO Headquarters in Paris and in the UNESCO Regional Bureau for Science in Montevideo. Personal interviews were undertaken with the IUGS Secretariat and President, with the Director of the IHP and with several project leaders and project participants and relevant stakeholders. Two of the active Scientific Board members were also interviewed. For a list of people interviewed see Appendix 6.

Review of selected projects
During the evaluation period 83 past and present projects were funded. These projects display a great multidisciplinary approach, representing the participation of about 150 countries altogether. On average, any single project involves scientists with different geological backgrounds from about 30 countries. Out of these projects the evaluation team assessed the results from 7 projects which were chosen on the basis of the following criteria:
a. Geographical balance
b. Perceived success of the project
c. Activity level of the project
d. Continued projects (OET)

- A review of the following 7 selected projects was carried out:

    - **Project no. 357:** Organics and Mineral Deposits, 1993-1997
    - **Project no. 373:** Correlation, Anatomy and Magmatic-Hydrothermal Evolution of Ore-Bearing Felsic Igneous Systems in Eurasia, 1997-2001 (a follow- up project of 357)
    - **Project no. 379:** Karst Process and Carbon Cycle, 1995-1998
    - **Project no. 429:** Organics in Major Environmental Issues, 1998-2002
    - **Project no. 443:** Magnesite and Talc, 1999-2003
    - **Project no. 448:** World Correlation on Karst Ecosystem, 2000-2004 (this was a follow-up of project no 379)
    - **Project no. 454:** Medical Geology, 2000-2004

Country visit: The TOR required the evaluation team to visit one of the UNESCO Regional Bureaux for Science. The RB for Latin America and the Caribbean, in Montevideo, Uruguay, was selected, as this region has been very active in IGCP projects for a long time. It was also easy and cost effective to combine the visit to the RB office with a visit to Argentina which has an active NC. In addition, the evaluation team was able visit selected UNESCO Representatives, project leaders and stakeholders in Argentina.

The purpose of the two-country visits was to obtain as full a description as possible of how and why IGCP's activities have reached the countries and the region, which organizations and partners have taken part, and how the projects have been implemented. The project activities looked at in detail were followed up with interviews of people who took part; data on outcomes and impacts was gathered. The specific evaluation issues addressed during the mission are presented in Appendix 7. The persons interviewed are presented in Appendix 6.

1.3.2 The Evaluation Team

An evaluation team co-ordinated by the Norwegian Institute for Air Research (NILU), which signed a contract with UNESCO dated 30 June 2003, conducted the evaluation. The evaluation team consisted of two members: Dr Elin Dahlin, Norwegian Institute for Air Research (NILU) and Prof Göran Åberg, Institute for Energy Technology (IFE). The evaluation team was assisted by Dr Anders Wirak, Development Consulting AS (DECO), who commented on the Evaluation Plan and served as a discussion partner during the evaluation process.

A Scientific Advisory Group (SAG) was appointed by the IGCP Secretariat and noted in the TOR. The SAG has the following members:

- Prof Edward Derbyshire (as leader), Research Professor in Quaternary Science, University of London, United Kingdom
- Prof Suzanne Kay, Department of Earth and Atmospheric Sciences, Cornell University, United States of America
- Prof Henri Kampunzu, Professor of Igneous Petrology, Geological Mapping, Metamorphic Petrology, and Applied Geology, University of Botswana
- Dr Ian Speden, Institute of Geological and Nuclear Sciences, and former Director of the Geological Survey of New Zealand
- Prof Francisco Hervé, University of Chile, Santiago, Chile, and Servicio Nacional de Geología y Minería, Santiago. (Corresponding Member)

The SAG has provided input to the TOR, assisted in the development of the questionnaires, as well as providing extensive support and comments during the review of drafts of the report.

2 Findings

2.1 Main results from the IGCP programme

2.1.1 Scientific value

During the evaluation period a total of 83 IGCP projects were pursued, divisible into the following scientific fields of research:

- Stratigraphy, palaeontology, sedimentology, fossil fuels
- Quaternary, environmental and engineering geosciences
- Mineral deposits, petrology, geochemistry
- Geophysics, tectonics, structural geology

These fields were characterised as providing an appropriate coverage by 2/3 of the Board Members who answered the questionnaire. Several of the remaining 1/3 suggested the inclusion of hydrogeology, a suggestion that had been anticipated by UNESCO and IUGS in their resolve to add a fifth working group to the Scientific Board concerned with hydrogeology/palaeohydrology (see 2.1.1.2). In addition, some replies suggested inclusion of the following topics: marine and urban geology, natural hazards, and palaeoclimate and geobiotechnology.

The questionnaires answered by the project leaders show that 31 out of 36 projects have published their results in peer-reviewed journals, an indication of the high quality of the research undertaken by these projects.

All IGCP projects have an interdisciplinary approach, as one of the assessment criteria is specifically concerned with evidence of planned involvement of scientists from different disciplines as a condition of acceptance of any project proposal. Examples of the interdisciplinary approach are shown in the evaluation of the results from the 7 selected IGCP projects (see item 2.1.2). Concerning the leadership of IGCP projects, 31% of the project leaders and 43% of the co-leaders are from developing countries or countries in transition. The remaining project leaders and co-leaders are from developed countries (defined as OECD countries).

The objectives of the IGCP are to achieve a balance between basic and applied science. Within the period 1997-2001 covered by the MTS 28 C/4, the projects that started in the mid 1990s were more related to basic science but, from around the year 2000, most of the projects show a closer concern for applied science.

About 80 % of the respondents found the existing balance between basic and applied science correct, but several of the representatives from the developing countries asked for research which was more related to the societal needs in their countries. In the questionnaires, and during the interviews, there were some suggestions that the objectives might be modified so as it focus more on environmental problems and global geoscience processes through interdisciplinary studies such as e.g. hydrogeology, geobiotechnology, urban and marine geology.

2.1.1.1 Major results from selected IGCP projects

The results from 7 projects, chosen on the basis of the criteria presented in item 1.3.1, show the following major results:

Project no. 357, Organics and Mineral Deposits, 1993-1997
This project was considered innovative and very interactive with notable emphasis on the role of organics in the genesis of sedimentary and diagenetic ore deposits; it was rated as excellent throughout its five year operation. More than 150 scientists from 31 countries participated in a number of field excursions, project meetings and working group meetings. In 1997 the active countries were Argentina, Australia, Bulgaria, Canada, Cuba, China, Czech Republic, Ecuador, Estonia, Finland, France, Germany, Hungary, India, Japan, Nigeria, Pakistan, Poland, South Africa, Russian Federation, Slovakia, Spain, Switzerland, Tunisia, UK and USA.

The project had many points of direct and also indirect practical consequences for the exploration of several classes of ore deposits. The project was also of direct significance in the assessment of nuclear waste disposal sites because natural uranium deposits, such as those at Okla in Gabon, are the best models available by which it is possible to assess groundwater dispersal of radioactive isotopes.

The above project was continued by the same project leader in:

Project no. 429, Organics in Major Environmental Issues, 1998-2002
The focus of this follow-up project to no. 357 was on the role of organics in the environment, their identification and characterization. In particular, it emphasized the role of organics in radioactive waste disposal, remediation of toxic heavy minerals in polluted soils, strategies to deal with coal mining dumping sites, and input of atmospheric contaminants in industrial regions and resultant public health risks.

Over 30 countries were involved in the project with about one third being developing countries. Those active in 2002 were Albania, Argentina, Australia, Austria, Bulgaria, Brazil, Burkina Faso, Canada, China, Czech Republic, Estonia, Finland, France, Germany, Hungary, Israel, Italy, India, Japan, Jordan, Nigeria, Poland, South Africa, Russian Federation, Slovakia, Slovenia, Spain, Switzerland, UK and USA.

Apart from a massive publication of results and international meetings, there were also training courses giving the project a high societal relevance. The final assessment report stated that part of the project report was a thorough reflection on the modern literature on the topic. However, checks performed also revealed that the authors of some papers presented as results of this IGCP project did not know of the existence of the IGCP programme.

Project no. 373, Correlation, Anatomy and Magmatic-Hydrothermal Evolution of Ore-Bearing Felsic Igneous Systems in Eurasia, 1997-2001
This project was a very active one and was looked upon as an example of how the IGCP programme facilitates cooperation between scientists from developed and developing countries and leads to societal benefits. Among the scientific achievements are those associated with investigations of ore-related, sub volcanic rare metallic granites that provide evidence for the nature of magmatic-hydrothermal processes and related ore formation. The project contributed materially to basic geosciences, but operationally the subject area is dominated by the industrialized countries.

During the project period over 300 papers were published mainly in peer reviewed scientific journals together with monographs and a number of maps, which will aid international mining companies in their exploration campaigns. The project was also very active with special sessions at international conferences.

About 300 scientists within 65 teams from 45 countries were involved in the project. Those were Albania, Australia, Austria, Bulgaria, Brazil, Cameroon, Canada, China, Czech Republic, Finland, France, Georgia, Germany, Hungary, Iran, Italy, India, Japan, Kazakhstan, Kyrgyzstan, Rep. of Korea, Morocco, Macedonia, Mexico, Mongolia, New Zealand, Poland, Portugal, Romania, South Africa, Russian Federation, Slovakia, Slovenia, Spain, Switzerland, Tajikistan, Thailand, Turkey, UK, USA, Ukraine, Uzbekistan, Viet Nam and Yugoslavia.

Project no. 379, Karst Process and Carbon Cycle, 1995-1998
This is another project that was well organised and conformed to the standards set by IGCP. The project has produced significant scientific results such as the discovery that carbonate dissolution is more important during interglacial periods, that photosynthesis is important in CO_2 degassing, and that new dates indicate that Nanjing and Peking men may date back beyond 500 000 years before the present. Societal benefits have emanated from studies of karst water quality and deep karst water. The fact that a substantial number of the nations involved come from the developing world is worth noting.

Many papers and books have been published, and a strong presence was maintained in major conferences. Moreover, project 379 collaborated closely with other IGCP and international projects. The participating countries were: Argentina, Australia, Austria, Bulgaria, Brazil, Belgium, Canada, China, Croatia, Czech Republic, Cuba, France, Germany, Iran, Italy, India, Indonesia, Ireland, Israel, Japan, Lithuania, Malaysia, Mauritania, Norway, Philippines, Poland, Romania, Russian Federation, Singapore, South Africa, Slovakia, Slovenia, Spain, Switzerland, Turkey, UK, USA, Ukraine, Viet Nam and Yugoslavia.

The above project was continued by the same project leader in:

Project no. 448, World Correlation on Karst Ecosystem, 2000-2004
This following-up project aimed at analysing a range of karst sites in several different environments in order to characterize geochemical environments and subterranean ecosystem

types as a basis for the assessment of the human impact on these systems, as well as to use these data to suggest rehabilitation strategies. It has clear societal relevance including environmental protection strategies and some health aspects. The project also had a clearly multi-disciplinary requirement and framework.

There is a question mark whether there was active research on some of the sites described in the project report, or whether it simply is a compilation of data from those areas. The extent to which work was done by some ”active” country participants might also be questioned. On the positive side, many developing countries were involved, there was good cooperation with other projects, and a relatively high level of meeting activity was sustained. Participating countries were: Albania, Argentina, Australia, Austria, Bulgaria, Brazil, Belgium, Canada, China, Croatia, Czech Republic, France, Germany, Greece, Hungary, Iran, Italy, Indonesia, Ireland, Israel, Japan, Lithuania, Malaysia, Norway, Morocco, New Zealand, Poland, Romania, Russian Federation, South Africa, South Korea, Slovakia, Slovenia, Spain, Switzerland, Turkey, UK, USA, Ukraine, Viet Nam and Yugoslavia.

Project no. 443, Magnesite and Talc, 1999-2003
The aim of this project was to improve knowledge of the genesis and behaviour of magnesite and talc in geological processes. The other purpose was to investigate the risk factors of these minerals as abiotic components of the environment and other impacts of exploitation and metallurgical processing. A scientifically sound project from basic as well as applied aspects and the proposal corresponded to a well-balanced multidisciplinary project. There was also a good mixture of young and experienced scientists as well as participants from developed and developing countries. The participating countries were: Argentina, Australia, Austria, Brazil, Canada, China, Chile, Croatia, Cuba, Egypt, Finland, Germany, Greece, India, Italy, Japan, South Korea, Namibia, Pakistan, Russia, Slovakia, Turkey, USA, Ukraine and Yugoslavia.

Despite these elements of success, however, the assessment report on this project suggests that it did not seem to work towards the realization of the IGCP’s principal objectives. Moreover, the reported descriptions of the geology of magnesite and talc deposits of Austria, Brazil, and Slovakia might easily have been obtained from the published literature. There were no publications in international journals, meeting activity was very low, and the key participants came from only two countries. Since critical recommendations did not lead to any improvement the project was terminated by the Scientific Board at the end of 2003.

Project no. 454, Medical Geology, 2000-2004
This project has adopted a truly interdisciplinary approach that combines the geochemistry of toxic elements in soils and rocks with the scientific medical analysis of their effects on the environment, plants and, in particular, humans. There is broad involvement of many scientists from developing countries and a great emphasis on education and training. It is considered one of the most relevant IGCP projects within the framework of the new policy of Geosciences in the Service of Society. The project operates on a global scale involving participants from 57 countries, is multidisciplinary and disseminates geological, medical and environmental knowledge to grass root communities.

The activities of the project are extensive, involving experts and communities all over the world, with developing countries being key participants. The project newsletter is distributed to almost 500 people and can be downloaded from the project’s own website. It is also estimated that information about the project may reach 35 000 medical practioners worldwide. The project is well in line with the UNESCO Medium-Term Strategy 2002-2007 (31 C/4,

p.27:85) in its statement that “the contribution of science cannot only be based upon terms of research and knowledge but must also be justified by its relevance and effectiveness in addressing the needs and aspirations of societies”.

The participating countries in 2001 were: Australia, Angola, Austria, Bulgaria, Brazil, Cameroon, Canada, China, Denmark, Finland, Germany, Iraq, India, Japan, Kazakhstan, Kenya, Lithuania, Malawi, Mexico, Netherlands, Niger, Nigeria, Norway, Pakistan, Peru, Poland, Romania, Russian Federation, Scotland, Uganda, South Africa, Slovakia, Sri Lanka, Spain, Sweden, Tanzania, UK, USA, Ukraine, Yugoslavia, Zambia and Zimbabwe.

Study of assessment reports shows that significant scientific results are a major outcome. This issue is also brought back to the project leaders in the assessment reports as a recommendation for further funding and positive evaluation by the Scientific Board.

As an example, in project no. 357 (1994-1997, being the forerunner of no. 429) it is stated in the final assessment report 1998, that the project; ”maintained an outstanding scientific level throughout its five year duration. – It is a model for IGCP projects focused in special topics and is an example of how broad international collaboration can be achieved while keeping a superlative production in the number and quality of scientific publications”.

Implementation of projects and their impact and use in developing countries puts greater demands on practical use, in addition to scientific value which is emphasized by the IGCP. A recommendation for further work and development of the role of IGCP is thus to make IGCP and the projects more relevant to the need for practical application, as emphasized in the UNESCO Medium-Term Strategy 2002-2007 (31 C/4, p.27:85).

2.1.1.2 Collaboration with other science programmes

Both the UNESCO Medium –Term strategy Plans for 1996-2001 (28 C/4) and 2002-2007 (31 C/4), as well as the Programme and Budget Plans for all the periods from 1997- 2002 (ref: C5 27, 28, 29 and 30) focus on the intersectoral approach such as co-operation between the individual science programmes within the Natural Sciences Sector of UNESCO.

Since 1993, an intersectoral approach has been adopted by the IGCP, following the establishment of contacts between the five scientific programmes of UNESCO - IGCP, IHP, IOC, MAB and MOST. At the UNESCO General Conference November 1999 a Joint Statement by the five Chairpersons of IGCP, IHP, IOC, MAB and MOST was introduced.

The principal role of the Steering Group of the Chairpersons of the five scientific programmes is to stimulate collaboration and guide synergy within and between the five intergovernmental and international scientific programmes (as approved in paragraph 02202, 31 C/5).
The members of the Steering Group have had five meetings (up to October 2003) and have expressed on all occasions their willingness to provide a platform for the further development of crosscutting actions within UNESCO, centred upon sustainable development. They have pointed out that the five programmes could tap a range of sites and unmatched networks of scientists for sustainable development work. Collaborative activity was discussed in 2000 and active involvement and collaboration with MAB, IHP and IOC on the Volga-Caspian Basin project started in 2001.

During the evaluation period IGCP has several times been invited to collaborate within IHP projects on topics such as databases on fossil ground water, arid/semi arid zones and water

resources, hydrogeological maps, aquifer resource management and application of remote sensing in arid regions. An agreement on collaboration between IHP and IGCP was reached in 2001. The question of including hydrogeology as a new field of research within the IGCP concept was discussed at the last Scientific Board meeting (February 2003) and it is now firmly agreed that a working group on hydrogeology will be created with effect from February 2004. IUGS has consistently supported a stronger working relationship between IGCP and IHP and fully endorses the establishment of this new working group on hydrogeology.

2.1.2 Results in the scientific community

IGCP has been characterised as one of UNESCO's major instruments for comparative research, elaboration and dissemination of data in the earth sciences. It is important to state that this programme is run in close cooperation with the IUGS who support the activities within the programme. The IGCP projects have involved about 20 000 scientists per year, and the programme has contributed to capacity-building especially in the science sector related to global geodynamic processes and ecosystems, biogeography, geomedicine, and natural hazards, as well as the assessment of natural resources. Special emphasis has been placed on enhancing scientific, technical and human capacities in developing countries.

About half of the participants in the IGCP projects are from developing countries; their involvement in IGCP projects enables them to build up a network with scientists in developed countries with whom they can exchange knowledge on all geo-related topics.

Training courses have been provided by half of the projects and several of the projects have arranged more than one training course. There is a common agreement on the need to increase the training element within projects for the developing countries. Publications from the various projects have been used in education at University level.

Project participants have brought together scientific research activities in a way that has greatly enhanced dialogue between the developed and the developing countries. This has provided a valuable opportunity to achieve and foster stimulating interaction between colleagues around the world.

Despite these outputs, the projects are unevenly distributed around the major world regions, as is project leadership. There are many more projects active in European and particularly in the North American countries than, for example, in African and Arabic countries.

The deliberately international approach of the IGCP programme gives added value to the partnership providing scientific findings and research, and encourages the transfer and sharing of knowledge within the international scientific community. The results of this evaluation show that all the project leaders and partners who have been contacted do consider that their participation in an IGCP project has given added value and increased communication on an international level.

2.1.2.1 Evaluation of the capacity building component based on IGCP projects in African countries

In the MTS 2002-2007, 31 C/4 p. 6-7, it is specifically stated that Africa and the Least Developed Countries (LDCs) shall be targeted in all programme activities. During the

evaluation period there were 4 projects with African project leadership (projects no.: 348, 363, 419, 470) and 5 projects with African co-leaders (projects no.: 363, 418, 431, 440, 450). For the title of these projects see Appendix 2.

Improvement of knowledge in African countries:
IGCP forms the core of international geological activities in Africa, both in Universities and Research Centres, and in the Geological Surveys of several countries. The impact of IGCP is multi-form since the IGCP projects provide the framework used by most African countries to correlate the data across borders. Knowledge generated by IGCP projects in Africa has been used mainly in the following areas:

1. Exploration for mineral resources is one of the major areas of action for IGCP in Africa. Several IGCP projects and related meetings in Africa include an applied component with focus on mineral exploration. Geologists from industry represent a substantial number of the participants attending IGCP meetings in Africa since these meetings provide opportunities to learn about new geological developments, accumulate new data and then convert them into exploration models.
2. The medical geology component of environmental health has been a booming area since the creation of an IGCP project (454) on this theme, with sub-projects focused on various topics such as drinking water, mining pollution, etc.
3. A large amount of data generated by the IGCP projects has been used as a major contribution to the data banks of African countries of use in the production of geological, metallogenic and hydrogeological maps of Africa. This work is coordinated by the Commission of the Geological Maps of the World (e.g. Metallogenic map of Africa published by the Council of Geosciences, South Africa on behalf of all Geological Surveys of Africa; the Tectonic Map of Africa currently under preparation, etc.). Furthermore, the IGCP data were extensively used during the production of the Map of Gondwana supercontinent and currently, IGCP data are being used along with all previous data for the preparation of the Map of the Rodinia supercontinent.
4. Each IGCP project related to Africa is generally concluded by production of a book or a Special Issue of an international journal. Moreover, IGCP projects are currently leading the preparation of Special Issues of the Journal of African Earth Sciences (Elsevier) to be used for the compilation of a book on the Geological Evolution of Africa, a volume likely to become the reference textbook on the geology of Africa for several decades to come. All IGCP projects currently active or recently concluded with Africa as the main or subsidiary area of interest are involved in this project. The results of IGCP work are, through these publications and in leading international journals, the main source of documentation in Universities, research centres, Geological Surveys and even in industry, particularly in mineral resources exploration.

International Cooperation and Capacity Building
The IGCP projects probably represent the best platform used by African geologists for capacity building in Earth Sciences in Africa, given that the IGCP projects facilitates contact between scientists from Africa and those from developed countries working on the subject of interest for their African partners. Each IGCP project completed in Africa results in several Ph.D. and/or M.Sc. degree students being sponsored by the project's members from developed countries. In the case of IGCP project 418, for example, more than 4 M.Sc. degrees were completed by young African geologists, two of whom went on to register for a Ph.D. programme to be completed in 2004 (after the conclusion of the project). These postgraduate students were sponsored by the institutions involved in IGCP project 418.

The majority of African geoscientists who completed their postgraduate training through the IGCP are now staff members in their national universities (and so are themselves now training younger geologists in their respective countries), or working in Geological Surveys, within research centres, and in the mining industry, mainly in the exploration units. In the case of Geological Surveys, this includes the preparation and the production of various geological, metallogenic, hydrological, geotechnical, and environmental/natural hazards maps, as well as underground water assessment, development of databases, and policies in the areas of mineral resources and related environmental issues, etc. A small percentage are involved in management and politics, e.g. Minister's advisers or President's advisers. For example, one of the current DRC President's advisers in geosciences was involved in, and completed his Ph.D. within the framework of the IGCP.

Influencing Policies

The involvement of geologists from Geological Surveys is a key tool in influencing policies. Most policies relate to the mining industry, but broader issues (e.g. environmental) are drafted by staff members in Geological Surveys. Their involvement in IGCP Projects has stimulated and broadened their understanding of the major issues and challenges of the earth sciences in their modern setting, and a number of Geological Surveys in African countries have recently created Divisions related to environmental issues. The prime stimulus of this process has been the IGCP's progressive move over the past decade towards greater emphasis upon environmental issues. Similarly, geochemical mapping for environmental purposes is increasing in African countries and is a direct outcome of the stimulus provided by the Global Geochemical Baselines project supported by IGCP and IUGS during the past decade. Botswana, for example, has embarked on such a programme, spending several millions of USD on the Environmental Geochemical Mapping project each year. South Africa has followed suit. In turn, the results from these studies are shaping environmental policies in African countries. During the past decade there has been a substantial increase in the number of African countries having an Environmental Law and/or a Mining Law.

2.1.2.2 Participation of young scientist and women in the IGCP Programme

Considering the follow-up of the World Conference on Science (WCS) with respect to the item "Science for Knowledge and Science for Development", the IGCP has taken a very positive initiative in its introduction of the IGCP Young Scientist Project, which aims to foster international cooperation between prospective young scientists from developing countries and developed countries early in their careers.

This initiative will also encourage young scientists to become project leaders, although it must be said that information concerning this Young Scientist Programme is not sufficiently widely available, especially in the universities. So far, the announcement of this initiative has appeared only on the IGCP home web page; this presupposes that all potentially interested young people will already know about the IGCP and its web page, a situation that is clearly not the case. Most of the questionnaire respondents emphasize that IGCP must put more effort into publicizing the existence of this Programme, and that this should be the task of all involved in the Programme.

Responses to the questionnaire survey suggest that the number of young scientists under 40 participating in 24 IGCP projects is 386 young scientists (43%) from developing countries and about 517 (57%) from developed countries.

The opportunity for young scientists from Africa and the LDCs to participate fully in IGCP projects is certainly limited by deficient funding.

Given the question raised at the WSC about an imbalance between the participation of men and women in all science-related activities, this evaluation has focused on this matter both in questionnaires and in interviews. From the answers received from 26 projects, there appears to be involvement by 221 women (38%) from developing countries compared to 355 (62%) from developed countries.

2.1.3 Outreach to policy-makers, managers and other relevant stakeholders

The intention of the IGCP programme during the evaluation period has been to work together with other UNESCO intergovernmental programmes on water (IHP), oceans (IOC), biodiversity and ecosystems (MAB), coastal zones (CSI) and urbanisation problems (MOST) in order to provide policy-relevant knowledge required to solve priority problems within fields such as urban geology, pollution of groundwater, water and land management in mining areas, karst-ecosystems, floods and landslides.
As an example, the 2001 Tokyo Declaration "Geoscientists tame landslides" was released during the UNESCO-IGCP Symposium on Landslide Risk Mitigation and Protection of Cultural and Natural Heritage. At the same time, a new International Consortium on Landslides for the worldwide promotion of landslide research was initiated as a result of work in the preceding three years by IGCP project no. 425. A Memorandum of Understanding was agreed upon, which established the foundation for cooperation in research on landslide risk mitigation and protection of the cultural and natural heritage as a key contribution to environmental protection and sustainable development in the first quarter of the twenty-first century.

Information to relevant stakeholders about the IGCP-programme is available through the IGCP Secretariat website, the IUGS website and through the yearly Geological Correlation reports and the National Committee websites. The IGCP Secretariat produced a small information leaflet some years ago; unfortunately, this is now out of date, but plans are in hand for production of a replacement in 2004.

Results from the projects are presented on project websites, in articles in the journal “EPISODES” but mostly in scientific publications. Articles in high-quality scientific journals are difficult to read for non-specialists in the field and have therefore a limited audience. Discussing high-level geological problems and using a special terminology is not a form of communication suitable for direct contact with policy-makers and relevant stakeholders. The statement by the SB that ”The publication record is excellent and the *visibility* of the results is notable (Project no 429, assessment report 2001)” is therefore questionable, at least with respect to visibility at the non-specialist level.

From the Questionnaires completed by the IGCP project leaders, the results show that broader dissemination of results is very limited outside the scientific community. It is also well recognized that subscriptions to many international scientific journals are costly, many being beyond the budgets of most developing countries. During the field study in South America visits were made to a few geological libraries in order to review their contents of relevant modern textbooks and scientific journals. The result was not encouraging.

Given that the IGCP network brings together thousands of scientists from all over the world, it plays a useful role in disseminating its results among developing countries through IGCP-funded meetings and training workshops. However the follow-up activities of IGCP workshops vary according to topic and the regional circumstances. The stimulus provided to young scientists in Africa and South America, for example, has led many participants to undertake postgraduate degree training and to enter those professions needing earth scientists (universities, geological surveys, exploration and industrial companies etc.). This has had a measurable effect in Africa, South America and elsewhere, although the IGCP project leaders have rather taken this success for granted; they should be required to state clearly the specific follow-up outcomes of their workshops in their final reports at the end of their 5 year programmes.

Results from the questionnaires show that information and dissemination about the IGCP programme to ministries, governmental organisations, and the general public is almost non-existent. Many of the responses also mentioned a lack of information about the IGCP at relevant geological conferences. National and international events and conferences are considered to be relevant arenas for dissemination of the objectives of the IGCP programme; they have proved themselves to be very successful arenas for interaction and dissemination of knowledge and should be used much more fully in the dissemination of the results of IGCP projects.

Questionnaires, interviews and desk studies all point to the need for the IGCP to enhance its visibility. Suggestions as to how this might best be achieved included production of flyers, posters and brochures (targeted not only at scientists), and more information about project results on the IGCP website.

2.1.4 Overall relevance of the IGCP programme for different users and beneficiaries

The main users and beneficiaries of the results from the IGCP programme are the following groups:

1. Fellow professionals
2. People in education, mostly at university level
3. Governmental organizations (mostly Geological Surveys) and related private organizations (for example mining companies)

Out of the 36 answers from the project leaders, only 6 stated that their results are being used by the general public. These projects also reported that they had written publicity documents and/or they had made news releases; the remainder of the projects have concentrated much more on publishing their results at conferences and/or in peer-reviewed journals.

The following two IGCP projects are examples of how the results have been used worldwide following finalisation of the projects:

- In 1983, in response to the requests of UNESCO Member States to initiate programmes on advanced technologies in earth science research, two programmes were launched by UNESCO and the IUGS. One of the programmes was "Geological Applications of Remote Sensing" (GARS) which was a follow-up to IGCP project no.143 "Remote Sensing for Mineral Exploration" (1976-1982). This programme is still active and the third GARS project was launched in 1995 in the Philippines, as a

contribution to the International Decade for Natural Disaster Reduction (IDNDR, 1990-2000). The third GARS project focuses on volcanic monitoring, in particular on the study of mudflows (lahars), using optical and thermal sensor data, Synthetic Aperture Radar (SAR) data and Geographic Information System.

- The IGCP project "Global Geochemical Baselines" (no. 360) has developed a database "Global Reference Network" for collecting results from geochemical sampling around the world. Standardised methods for geochemical sampling have been developed and agreed upon by representatives of more than 100 countries. This database is still running and is currently coordinated by IUGS and IAGC.

One initiative taken by the IGCP Secretariat and which was related to the general public was the proposal put forward to UNESCO's Executive Board at its 156th session in May 1999, about the development of a UNESCO Geoparks Programme. The Executive Board responded by asking for a feasibility study.

At their 28th Board meeting in 2000, the SB rejected a request that IGCP funds be split in order to establish a Geoparks Programme, on the grounds that the IGCP's "seed money" status did not allow it to stretch its resources to such a degree that the IGCP as a whole would be threatened. Nevertheless, the idea of Geoparks has proved attractive and, largely due to funding provided by national bodies for generation of Geoparks within their own national borders, geoparks are increasing in number, including several in African countries.

Since that time, the Division of Earth Sciences has taken an initiative to build up and International Network of National Geological Parks (Geoparks) and several members of the SB have agreed to contribute to this network in a personal capacity. The IGCP secretariat has suggested the launching or coordination of activities devoted to 'Education in and Popularization of Earth Sciences' under which national 'Geoparks' with geoscience and natural history museums could provide outreach to students, out-of-school youth, and adults, in order to increase public respect and understanding for the value of geological landscapes. Appropriate output from present and future IGCP projects will be used in support of this initiative.

2.1.5 Cost effectiveness

The IGCP programme celebrated its 30th anniversary in 2002 and the results from the last six years covering the evaluation period show that the Programme remains efficient and cost effective. Considering the low level of funding it receives from UNESCO, which provides only "seed money" for the 83 projects that have been running in the evaluation period, the funding provided has been a great investment because of the impressive funding that recognition as an IGCP project has released from national sources. IGCP is thus very cost-effective with projects usually attracting between 10 and 50 times the value of the "seed money" provided.

The funding procedure for the IGCP projects is as follows. If the project proposals are approved by the SB, the contracts are prepared by UNESCO. After signature by the project leaders, the Treasurer of IUGS is asked to initiate the payment mechanism. He has to collect the funding from UNESCO, from the United States Academy of Sciences through ICSU and from IUGS itself. As IUGS is a rather small and non-bureaucratic entity it happens frequently that funds to project leaders are transferred before the money from the partners has been

credited to the IUGS account. That procedure is partly based on written agreements and signed contracts, but partly also on a "gentleman's agreement" basis, followed by signed contracts. Then the scientific reports and the financial statements are collected jointly at UNESCO and IUGS, checked and forwarded for review to the SB. Summarised reports and financial statements are prepared and forwarded to UNESCO, the IUGS Bureau and Executive Committee, to ICSU and to the United States Academy of Science in order to obtain the financial support for the following year.

Some comments on the funding procedures were received during the evaluation.
Based on a new system of decentralization, the Regional Bureaux have the funding responsibility for transferring funding to IGCP project leaders within their region. There are several cases that clearly illustrate that this system has not functioned very well.

If the funding reaches the project leaders late, it is very difficult for them to plan their activities such as workshops, meetings, training courses and fieldwork. For some participants, especially in the developing countries, the allocated money represents their only source of sufficient funds to attend meetings.

2.2 Organizational structure, managerial support and coordination mechanism

2.2.1 Governing structure

2.2.1.1 The IGCP Secretariat

The results from the questionnaires, interviews and the observations gathered during the visit to the IGCP Secretariat in Paris indicate that the IGCP Secretariat was well structured during the evaluation period. This is mainly due to the efficiency of the personnel. However, they are often overworked because the number of personnel is so small. The Assistant Secretary (P2) spends about 70 percent of her time on the IGCP, the remaining 30 percent being devoted to supporting other activities within the Division of Earth Sciences. Despite the efficient management of the programme, the capacity to support the projects under the IGCP programme has been limited under the present set up.

The administration of IGCP needs a full time Secretary position, as was the case before the structural changes took place in 2000. This is necessary in order to give proper attention to the wide range of tasks involved in the running of the IGCP, such as increased dissemination of the Programme results and improvements to the IGCP website, to name but two.

2.2.1.2 The UNESCO Regional Bureaux for Science

There is a need for more communication between the RBs and the IGCP Secretariat, the SB and the NC. The RBs should be more engaged in the dissemination of the IGCP concept. If the RBs should continue to bear the responsibility for following up IGCP projects in their region it is very important that the RBs have a responsible person working within them. The position of the RB in Cairo has been vacant for some time and this has been a problem for those IGCP projects related to this Office.

One of the tasks for the RBs could be to establish links between the project leaders and the governmental and public sector. As examples, there may be organised transdisiplinary

conferences within the region of the Regional Bureaux at which results of current projects in the region are presented. Such conferences have already been arranged by the RB in Jakarta.

2.2.1.3 The composition of the IGCP Scientific Board

Comments were made in replies to some of the questionnaires about the composition of the IGCP Scientific Board. The participation of the Member States in the Scientific Board is not considered representative. It is quite heavily weighted towards the developed countries and especially Europe. The small number of female representatives was also raised by several respondents. Today the Scientific Board has 16 members representing the following parts of the world:

- Europe: 7
- North America: 2
- South America: 1
- Asia: 2
- Australia: 1
- Africa: 1
- Middle East: 1
- India: 1

The composition of the Scientific Board between 1997 and 2002, the time period for this evaluation, showed a dominance of scientists from the University and Institute areas, with few delegates directly representing applied geology in the form of industry and geological surveys. There were two exceptions to this. In 1997 WG 3 had a participant from the Geological Survey of India and in 2002 another participant from the Geological Survey of India served in WG 2.

It is possible that this fact may have had some bearing upon some decisions taken by the Board from time to time, and thus upon the course taken by the IGCP, although it is impossible to assess either the nature or the extent of any such effects in the absence of measurable evidence. As a precautionary measure, however, it would be prudent for the Secretariat, in conjunction with the Scientific Board, at all times to look for ways of engaging the involvement of one or two members of the non-educational earth science sector in the running and guidance of the IGCP, as opportunity and expert availability arise.

2.2.1.4 The role of the IGCP National Committees

Active IGCP National Committees give support (sometimes also funding) to project leaders and participants and they are encouraging new research proposals. About half of the NCs are inactive and the IGCP Secretariat should develop some guidelines for the evaluation and duration of the NCs. For example if a NC has not submitted any yearly reports about the national activity for 3 years, it should be suggested that another committee be appointed. The composition of the NCs should reflect a more interdisciplinary approach and also contain end-users of relevant projects in each country.

The guidelines for the NCs should focus on a more active role for the NCs in the dissemination of the IGCP programme in their country. They should also work for better funding possibilities for the project participants in their country. In order to maintain the existing budget, or possibly try to enlarge it, initiatives should be taken with the aim of disseminating information on the aims, role, achievements and value to society of the IGCP to

politicians, decision-makers, national research councils and representatives of private industry.

The UNESCO National Commissions are often not aware of the IGCP and the NCs representatives in their country.

2.2.2 Procedure for calls for proposals and project selection

The procedures for the yearly announcements of the call for proposals are based on the following:

The IGCP Programme is carried out through individual projects, which fall under any of the following disciplines:

- Stratigraphy, palaeontology, sedimentology, fossil fuels
- Quaternary, environmental and engineering geosciences
- Mineral deposits, petrology, volcanology, geochemistry
- Tectonics, geophysics, structural geology

The duration of an IGCP project is five years. The total number of projects implemented per year depends on the available financial resources and the results of scientific peer review of submitted project proposals.

The criteria for the selection of project proposals are:

- Its relevance to the major objectives of the programme.
- It should meet a worldwide, continental or regional need.
- It should involve preferably various branches of earth sciences and their applications and requires interdisciplinary cooperation.
- It requires coordinated international action between specialists from different countries.
- It should have not only long-term benefits but also yield, whenever possible, tangible short-term practical results for the participating countries.

The evaluation of the proposals is being made by the SB in plenary session, with initial recommendations made by the four specialist working groups.

Some comments have been received concerning the evaluation procedures. The IGCP Secretariat should therefore be responsible for finding 2 external evaluators (experts on the actual topic) for each proposal. The working groups of the SB should then, taking account of the external assessors' reports, formulate their recommendations on which project proposals are worthy of IGCP support and funding. The number of projects should be less than at

present, but each category of project should receive higher funding than in the past, a proposal favoured by a majority of those responding to the questionnaire survey.

2.2.3 Financial viability

2.2.3.1 The funding situation for the coming years

The IUGS Secretary General Dr. Werner Janoschek has drawn attention to the fact that there might be a major problem worldwide because the Earth Sciences appear to be declining in awareness by the general public. This has had a direct influence on the budget of the Earth Science Division, and has meant that money for the IGCP has diminished. In Dr. Janoschek's opinion, one of the reasons for this might be that geoscientists understandably pursue their professional scientific activities without being aware of the need to find means of addressing the public at large, with a view to alerting politicians, decision-makers, and representatives of funding agencies to the nature and societal contributions of Earth Science in a language they can readily understand (Ref. Minutes from the IGCP Board meeting, February 2003.)

Another problem for the future funding of the IGCP concerns directly the US National Science Academy contribution to the IGCP, which is forwarded upon request by IUGS via ICSU. The United States rejoined UNESCO in October 2003. While this was a great political success for UNESCO, it might bring about dramatic changes in their science budget. As of 2004, the United States will pay their contribution to UNESCO – according to its regulations – but will probably stop its direct contributions to UNESCO-related scientific programmes, one of which is the IGCP.

If future funding of the IGCP dries up, there is a risk that the activities will not continue. The catalytic effect of the IGCP funds is a major factor because, once official recognition and "seed money" is accorded to a project by UNESCO-IUGS, government officials and various institutions in the host country are usually willing to support various project activities such as meetings, workshops and training courses. Without the umbrella and the seed funding from UNESCO-IUGS, it is unlikely that these activities could continue.

3 Conclusions

Positive findings

Overall, the relevance of the IGCP programme has been confirmed by the evaluation. The total of 83 projects from the evaluation period 1997-2002 represent the practice of high quality geoscience with a notable publication record in peer-reviewed journals. The projects are interdisciplinary, involving several thousand professionals and students each year from around 150 countries.

The programme is cost-effective with seed funding provided by UNESCO, the US Academy for Sciences, and IGUS averaging USD 277.000 per year in the evaluation period. The positive outcomes have been clearly recognized in several regions.

The outcome from the projects has consisted of development of several products, including databases, geological maps and textbooks. The evaluation has examined examples of the practical usefulness of IGCP-generated products, such as the Global Geochemical Baselines Database, first developed in the framework of IGCP in the 1980s and still being updated with data from IGCP projects during the evaluation period. This database continues to be used by innumerable scientific and industrial "customers" around the world.

The projects have contributed to capacity building for project participants and geoscience practitioners, especially in developing countries. Training courses have been provided in the framework of about 50 percent of the projects.

Knowledge generated by IGCP projects in Africa has contributed to the geological data banks in several countries. Geological, metallogenic and hydrogeological maps resulting from IGCP work have been used as sources of information for Geological Surveys and for industry, particularly in mineral resource exploration. Research and findings from IGCP projects are used in textbooks which are standard in several African universities, and several postgraduate students (M.Sc. and Ph.D.) have been partly funded and have completed their research and studies within the framework of IGCP.

In terms of organizational structure and management, the evaluation has identified the following strengths:

The IGCP Secretariat is efficient despite its limited resources. The partnership between the IUGS and IGCP has been strong during the evaluation period. IUGS has mobilized support, funding and interest for the programme within the scientific community.

The IGCP Scientific Board is composed of high calibre geoscientists from different specializations providing pro-bono services to the IGCP.

Areas for improvement

The evaluation of the results from the projects shows that IGCP has managed to fulfil the requirements of the UNESCO Mid-term strategies for the evaluation period 1997-2002 to a limited extent only. In the opinion of the assessors, this appears to be due to a too strict focus on basic research, which gives an unbalance, related to research bearing upon societal needs.

Dissemination of results outside the scientific community is rather limited, and the practical use of existing research findings are not immediately evident, although there are some notable exceptions. Several developing countries have expressed the desire for more user-ready/practical research addressing societal needs.

There is no requirement in the guidelines for project leaders to report on outputs and results of the projects other than scientific achievements. The project reports submitted by the project leaders emphasize scientific publications, but generally lack information on other outputs and results; in some cases publications not directly derived from an IGCP project is cited as part of the project's output.

Concerning the leadership of IGCP projects, 31% of the project leaders and 43% of the co-leaders are from developing countries or countries in transition. The remaining project leaders and co-leaders are from developed countries (defined as OECD countries).

Until 2000, IGCP had a full time Secretary (P5) based in the UNESCO Natural Sciences Sector, Division of Earth Sciences. After a restructuring exercise in 2000, the position of Secretary of the IGCP was combined with the function of Director of the Division of Earth Sciences. An Assistant IGCP Secretary (P2) was appointed at the same time, spending about 70 percent of her time on IGCP, the remaining 30 percent being devoted to assisting other activities within the Division of Earth Sciences. The post of IGCP Clerk was abolished in 2000. Despite the efficient management of the programme, the capacity to provide appropriate and sufficient support to the projects under the programme has been limited within the present set up.

Disbursement of funds via the UNESCO Regional Bureaux for Science to project leaders has proved to be cause of delays in payment to project leaders, in certain cases by more than six months. At present, the Regional Bureaux for Science are not fully informed about IGCP projects; neither are they informed about those project activities undertaken within their region but not managed by them.

A majority of the current membership of the Scientific Board comes from developed countries. The 16 members come from the following countries: 7 Europe, 2 North America, 1 South America, 1 Africa, 1 Middle East, 4 Asia and the Pacific. At the time of writing (January 2004) there are two female members on the Board.

Neither the role nor the responsibilities of the National Committees are clear. Over the evaluation period around 2/3 of the National Committees failed to submit annual reports.

The review process for projects could benefit from external appraisers.

Lack of funds impacts negatively on a project's ability to increase African contributions to the IGCP, especially in terms of involving young geoscientists.

The future of the Programme

The funding situation for the IGCP in the immediate future is strongly tied to the outcome of the return of the United States to UNESCO and decisions yet to be made by the US National Academy of Science, which has been one of the major contributors to the IGCP Programme. In order to maintain the existing budget, or possibly even to try to enlarge it, initiatives must be taken that will improve dissemination of the aims, role, achievements and societal value of the IGCP in such a way that the awareness of the general public, politicians, decision-makers, national research councils and representatives of private industry will be considerably enhanced.

4 Recommendations

Recommendations for the IGCP Secretariat:

- Revise the objectives (ref. Item 1.1) to reflect the UNESCO Medium Term Strategy (2002 – 2007).

- The Secretariat, in consultation with the Scientific Board, should revise the current guidelines for project applications and reporting so as to ensure that direct and indirect results are an integral part of a project report, such as capacity building, use of the products and relevant user groups. These guidelines should clearly state the

operational objectives of the programme in line with the MTS of UNESCO. Following this improved monitoring of results, better record keeping of the achievements of the programme in the IGCP Secretariat is needed.

- To facilitate working procedures and networking between all those involved in IGCP projects (Scientific Board, National Committees, Project leaders, co-project leaders and other participants, and UNESCO Regional Bureaux for Science) more information should be readily available on the web site. Full advantage should be taken of the opportunities for interactive communication.

- The IGCP Secretariat, in collaboration with the IUGS and the UNESCO Regional Bureaux for Science, should develop a dissemination plan for the IGCP in order to facilitate fuller use of the knowledge and products generated by IGCP projects for different stakeholder groups.

- In the light of the above tasks to be added to the responsibilities of the IGCP Secretariat, the Natural Sciences Sector should undertake a review of the staffing resources needed to manage all these tasks in a proper and timely way.

- The IUGS and the IGCP Secretariat should reconstruct the composition of the Scientific Board in order to obtain a better balance between the developing and developed countries, between the geographical regions and between women and men, while paying attention to the scientific needs of the IGCP programme.

- The IGCP Secretariat and the IUGS should develop guidelines for the role, composition and operation of the IGCP National Committees. The guidelines should also focus on the need for good working relationships between the National Committees, the UNESCO National Commissions, and the Regional Bureaux for Science.

- The review process for project proposals could benefit from the use of external evaluators. The IGCP Secretariat should be responsible for finding two external evaluators (experts on the topic) for each proposal. The total number of projects undertaken each year should be less than at present but with each approved project receiving higher average funding than in the past.

Appendix 1

Abbreviations

Abbreviations:

CSI	Coastal Regions and Small Islands (UNESCO programme)
DECO	Development Consulting AS
GARS	Geological Application of Remote Sensing
IAGC	International Association of Geophysical Contractors
ICSU	International Council for Science
IGCP	International Geological Correlation Programme (now the International Geoscience Programme)
IHP	International Hydrological Programme (UNESCO programme)
IUGS	International Union of Geological Science
IOC	Intergovernmental Oceanographic Commission
IOS	UNESCO Internal Oversight Service
LDCs	Least Developed Countries
MAB	Man and the Biosphere (UNESCO programme)
MOST	Management of Social Transformations (UNESCO programme)
MTS	Medium Term Strategy
NCs	IGCP National Committees
NILU	Norwegian Institute for Air Research
OET	IGCP project “On Extended Term”
RB	UNESCO Regional Bureaux for Science
SAG	Scientific Advisory Group
SB	IGCP Scientific Board
TOR	Term of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WCS	World Conference on Science

Appendix 2

List of IGCP projects for the period 1997-2002

LIST OF IGCP PROJECTS – 1997-2002

335 **Biotic Recovery from Mass Extinctions**
D.H. Ervin, E.G. Kauffman (United States)
1993-1997

341 **Southern Hemisphere Paleo- and Neoclimates**
W. Volkheimer (Argentina), P.P. Smolka (Germany)
1993-1997

345 **Andean Lithospheric Evolution**
R. Pankhurst (United Kingdom), M.C. Gardeweg (Chile)
1993-1997

346 **Neogeodynamica Baltica**
R.G. Garetsky, E.A. Levkov (Belarus), G. Schwab (Germany)
1994-1997

347 **Correlation of Ganges-Brahmaputra Sediments**
Md. Hussain Monsur (Bangladesh) 1995-1999, O.E.T. in 2000

348 **The Mozambique and Related Belts**
S. Muhongo (Tanzania), S. Berhe (United Kingdom)
1993-1997

349 **Desert Margins and Paleomonsoons since 135 kyrs. BP**
A.K. Singhvi (India), An Zhisheng (China)
1993-1997

350 **Cretaceous Environmental Change in E & S Asia**
H. Okada (Japan)
1993-1997

351 **Early Paleozoic Evolution in NW Gondwana**
B.A. Baldis, F.G. Aceñolaza (Argentina)
1993-1997

354 **Economic Superaccumulations of Metals in Lithosphere**
Pei Rongfu (China), P. Laznicka (Canada), J. Kutina (United States), D.V. Rundquist (Russia),
I.Plimer (Australia), T. Nakajima (Japan)
1995-1999, O.E.T. in 2000

356 **Carpatho-Balkan Plate Tectonics and Metallogeny**
E. Véto-Akos (Hungary), J. Lexa (Slovakia), S.N. Vlad (Romania)
1993-1997

357 Organics and Mineral Deposits
J. Pasava (Czech Republic)
1993-1997

359 Correlation of Tethyan, Circum-Pacific and Marginal Gondwanan Permo-Triassic
Yin Hongfu (China), J.M. Dickens (Australia), A. Baud (Switzerland), Yang Zunyi (China)
1993-1997

360 Global Geochemical Baselines
A.G. Darnley (Canada), J.A. Plant (United Kingdom), A.J. Björklund (Finland)
1993-1997

361 East Asia Activated Zones
R. Barsbold, O. Gerel (Mongolia)
1993-1997

362 Tethyan and Boreal Cretaceous
J. Michalik (Slovakia), H. Leereveld (Netherlands)
1993-1997

363 Lower Proterozoic of the Sub-Equatorial Africa
S. Master (S. Africa), M. Kanika (Zaire)
1994-1998

364 Caribbean Volcanic Arcs and Ophiolites
G. Draper (United States)
1994-1998

366 Ecological Aspects of the Cambrian Radiation
A. Zhuralev, R. Riding (United Kingdom)
1994-1997

367 Late Quaternary Coastal Records of Rapid Change
D.B. Scott (Canada)
1994-1998

368 Proterozoic Events in East Gondwana Deposits
M. Yoshida (Japan), M. Santosh (India), C.R. Dissnayake (Sri Lanka)
1995-1999, O.E.T. in 2000

369 Peritethyan Rift Basins
W. Cavazza (Italy), A.H.F. Robertson (United Kingdom), P.A. Ziegler (Switzerland)
1994-1998

371 North Atlantic Precambrian (COPENA)

R.P. Gorbatschev (Sweden), C.F. Gower (Canada)
1994-1998

373 Correlation, Anatomy and Magmatic-Hydrothermal Evolution of Ore-Bearing Felsic Igneous Systems in Eurasia
R. Seltmann (Germany), R. Grauch (United States), A.A. Kremenetsky (Russia)
1997-2001 (O.E.T. in 2002)

374 Palaeoclimatology and Palaeo-oceanography from Laminated Sediments
A.E.S. Kemp (United Kingdom)
1994-1998 (O.E.T.)

376 Laurentian-Gondwanan Connections
V.A. Ramos (Argentina), J.D. Keppie (Mexico), F. Hervé (Chile)
1994-1998 (O.E.T.)

378 Circumalpine Quaternary Correlations
C. Schlüchter (Switzerland), N.J. Vivic (Slovenia)
1994-1997 (O.E.T.)

379 Karst Process and Carbon Cycle
Yuan Daoxian (China)
1995-1999, O.E.T.

380 Biosedimentology of Microbial Buildups
C. Monty (France)
1995-1999, O.E.T.

381 South Atlantic Mesozoic Correlation
E.A.M. Koutsoukos (Brazil), P. Bengtson (Germany)
1995-1999, O.E.T. in 2000

382 Seismotectonics and Seismic Hazard Assessment of the Mediterranean Basin
D. Giardini (Italy), K. Makropoulos (Greece), J. Mezcua (Spain) and S. Riad (Egypt)
1996-2000

383 Palaeostress, Neotectonics, Geodynamics and Natural Hazards in West Pacific/Asia
R.H. Findlay (Papua New Guinea)
1996-2000

384 Impact and Extraterrestrial Spherules
C.H. Detre (Hungary), A. Bevan (Australia), B.P. Glass (United States), K. Jakabská (Slovakia),

Z. Ouyang (People's Republic of China), E. Papp (Australia), A. Raukas (Estonia), G. Udubasa (Romania)
1996-2000 (O.E.T.)

386 Response of the Ocean/Atmosphere System to Past Global Changes
H.H.J. Geldsetzer (Canada), D.M. Banerjee (India), L.R. Kump (United States), Z. Sawlowicz (Poland), H. Strauss (Germany)
1996-2000, O.E.T.

389 Geoenvironmental Evaluation of Coastal Belts in Arab Countries
Z.M. Zaghloul, Ferial El-Bedewy (Egypt)
1995-1999, O.E.T.

391 Sand Accumulations and Groundwater in the Sahara
Farouk El-Baz (United States), Ibrahim Himida (Egypt)
1995-1999

393 Neritic Middle-Upper Eocene
E. Caus (Spain)
1996-2000, O.E.T. in 2001

396 Continental Shelves in the Quaternary
W. W.-S. Yim (Hong Kong), P.J. Davies (Australia)
1996-2000

400 Geodynamics of Continental Rifting
D. Delvaux (Belgium), A. Khan (United Kingdom)
1996-2000

404 Terrestrial Carbon in the Past 125 Ka
H. Faure (France), A. Velichko (Russia)
1996-2000

405 Anthropogenic Impact on Weathering Processes
P. Sulovsky, J. Zeman (Czech Republic)
1996-2000, O.E.T. in 2001

406 Circum-Arctic Palaeozoic Vertebrates
M.V.H. Wilson (Canada), T. Märss (Estonia), P. Männik (Estonia)
1996-2000, O.E.T. in 2001

408 Rocks and Minerals at Great Depth and on the Surface
F.P. Mitrofanov (Russia), D.M. Guberman (Russia), H.-J. Kümpel (Germany)
1998-2002

410 The Great Ordovician Biodiversification Event
B.D. Webby (Australia), F. Paris (France), M.L. Droser (United States)
1997-2001 (O.E.T. in 2002)

411 **Geodynamics of Gondwanaland-derived Terranes in E & S Asia**
S. Hada (Japan), I. Metcalfe (Australia), J.H. Kim (Korea), Tran Van Tri (Vietnam), Jin Xiouchi (China)
1998-2002

413 **Understanding Future Dryland Changes from Past Dynamics**
D. Thomas (United Kingdom), A.K. Singhvi (India)
1998-2002

414 **Seismic Ground Motion in Large Urban Areas**
G.F. Panza (Italy)
1997-2001

415 **Glaciation and Reorganization of Asia's Drainage**
J.T. Teller (Canada), R. Vaikmae (Estonia)
1997-2001

418 **Kibraran Events in Southwestern Africa**
R.M. Key (United Kingdom), R. B. Mapeo (Botswana)
1997-2001 (O.E.T. in 2002)

419 **Foreland Basins of the Neoproterozoic Belts in Central-to-Southern Africa and South America**
M. Wendorff (Botswana), P.L. Binda (Canada)
1998-2002

420 **Phanerozoic Crustal Growth**
Bor-ming Jahn (France), N.L. Dobertsov (Russia)
1998-2002

421 **North Gondwanan Mid-Palaeozoic Biodynamics**
R. Feist (France), J.A. Talent (Australia)
1997-2001 (O.E.T. in 2002)

425 **Landslide Hazard Assessment and Cultural Heritage**
K. Sassa (Japan), P. Canuti (Italy), P. Carreno (Peru)
1998-2002

426 **Granite Systems and Proterozoic Lithospheric Processes**
J. S. Bettencourt (Brazil) O. T. Rämö (Finland), W. R. Van Schmus (United States)
1998-2002

427 **Ore-Forming Processes in Dynamic Magmatic Systems**
C.M. Lesher, S.-J. Barnes (Canada), H.M. Prichard (United Kingdom)
1998-2002

428 **Climate and Boreholes**
V. Cermák (Czech Republic), H. N. Pollack (United States), C. Clauser (Germany)
1998-2002

429 **Organics in Major Environmental Issues**
J. Pašava (Czech Republic), J. Jeník (Czech Republic)
1998-2002

430 **Mantle Dynamics and Natural Hazards**
M.F.J. Flower (United States), V.I. Mocanu (Romania), R.M. Russo (United States), Nguyen Trong Yem (Viet Nam), Ma Zongjin (China)
2000-2004 (on hold)

431 **African Pollen Database**
A.M. Lezine (France), A. Sowunmi (Nigeria)
1998-2002

432 **Contourites, Bottom Currents and Palaeocirculation**
D.A.V. Stow (United Kingdom), I.N. McCave (United Kingdom), J.-L. Faugeres (France)
1998-2001

433 **Caribbean Plate Tectonics**
M.A. Iturralde-Vinent (Cuba), E.G. Lidiak (United States)
2000-2004

434 **Land-Ocean Interactions during the Cretaceous in Asia**
H. Hirano (Japan)
1999-2003

436 **Pacific Gondwana Margin**
R.J. Pankhurst, (United Kingdom), J.D. Bradshaw (New Zealand), L. Spalletti (Argentina)
1999-2003

437 **Coastal Environmental Change during Sea-Level Highstands**
C.V. Murray-Wallace (Australia)
1999-2003

440 **Rodinia Assembly and Breakup**
S. Bogdanova (Sweden), H. Kampunzu (Botswana)
1999-2003

442 **Raw Materials of Neolithic Artefacts**
D. Hovorka (Slovak Republic), G. Trnka (Austria)
1999-2002 (on hold)

443 **Magnesite and Talc-Geological and Environmental Correlations**
M. Radvanec (Slovak Republic), W. Prochaska (Austria), A.C. Gondim (Brazil), Cai Kequin (China)
2000-2004

447 **Proterozoic Molar-tooth Carbonates**
X. Meng (China), D.G.F. Long (Canada), R. Bourrouilh (France)
2001-2005

448 **World Correlation on Karst Ecosystems**
Yuan Daoxian (China), C. Groves (United States), G, Messana (Italy)
2000-2004

449 **Global Correlation of Late Cenozoic Fluvial Deposits**
D. Bridgland (United Kingdom)
2000-2004

450 **Proterozoic Sediment-Hosted Base Metal Deposits of Western Gondwana**
S.S. Iyer (Canada), A.F. Kamona (Namibia), A. Misi (Brazil), J. Cailteux (DR Congo)
2000-2004

453 **Modern and Ancient Orogens**
J.B. Murphy (Canada), J.D. Keppie (Mexico)
2000-2004

454 **Medical Geology**
O. Selinus (Sweden), P. Bobrowsky (Canada)
2000-2004

455 **Basement Volcanoes Interplay and Human Activities**
A. Tibaldi (Italy), M. Garcia (Spain), A.M. Lagmay (Philippines), V.V. Ponomareva (Russia)
2001-2005

457 **Seismic Hazard and Risk Assessment in North Africa**
D. Benouar (Algeria), G. Panza (Italy), A. El-Sayed Attia (Egypt), T. Benaissa (Morocco), M. Chadi (Tunisia), S. Abdennur (Libya)
2001-2005

458 **Triassic/Jurassic Boundary Events**
J. Pálfy (Hungary), S.P. Hesselbo (United Kingdom), C. McRoberts (United States)
2001-2005

459 **Terrestrial Carbon Cycle**
J.-L. Probst (France), L. François (Belgium), P.J. Depetris (Argentina), J. Mortatti (Brazil)
2001-2005

463 **Upper Cretaceous Oceanic red beds**
C. Wang (China), M. Sarti (Italy), R.W. Scott (United States), L.F. Jansa (Canada)
2002-2006

464 **Continental Shelves During the Last Glacial Cycle: Knowledge and Applications**

F.L. Chiocci (Italy), A.R. Chivas (Australia)
2001-2005

467 **Triassic time**
M. J. Orchard (Canada)
2002-2006

470 **The 600 Ma Pan-African belt of Central Africa**
F. Toteu (Cameroon)
2002-2006

471 **Evolution of Western Gondwana during the Late Palaeozoic**
C.O. Limarino (Argentina), L.A. Buatois (Argentina)
2002-2006

473 **GIS Metallogeny of Central Asia**
R. Seltmann (United Kingdom), 5 young scientists
2002-2006

Appendix 3

Terms of Reference

External Evaluation of the International Geological Correlation Programme (IGCP)

Terms of Reference

1. Background

The International Geological Correlation Programme (IGCP) has been stimulating comparative studies in the Earth Sciences since 1972 and has made research results available to a huge number of scientists around the world. The IGCP serves as a platform for the promotion of interdisciplinary dialogue, networking and cooperation between scientists in developed and developing nations; it also constitutes a means of solving fundamental problems relevant to the sustainable development of human societies. This is achieved through a series of focused capacity-building activities, including international and regional conferences, workshops and field investigations. The broad aim is to improve the management of the solid Earth by supporting activities related to fundamental and applied geosciences, with due attention being given to interactions between the geosphere, hydrosphere and biosphere. Particular efforts are made to include scientists from the developing countries, women and young scientists. The IGCP strengthens institutional and individual capacities on multidisciplinary themes related to hydrogeology, ancient ecosystems, desertification, climate change, coastal zones, environmental catastrophes and geological heritage, for example. It also improves public awareness and provides a basis for review of international and national geo-environmental policies, showing long-term impact on national and regional environmental management plans.

The IGCP is the 'flagship' international geoscience programme within the United Nations system, being jointly managed by UNESCO and the International Union of Geological Sciences (IUGS). As such, the IGCP is a singularly successful example of highly productive collaboration between governmental and non-governmental instiutions. Projects approved and monitored by the IGCP are of regional and global scope concerning problems with significance beyond the scope of any single discipline or country. One great strength of the Programme lies in the "grass roots" origins of its projects, in their limited life-span (five years) and in the IGCP's ability (through the international character of the Programme under UNESCO) to add legitimacy and social relevance to research projects in a way that enables them to attract widespread, and frequently substantial, international support. Most projects use the status conferred upon them by UNESCO's recognition to enhance their average 'seed money' (long-term {15-year} average of about US$6,500 per annum) from other, often national, sources by a factor ranging between 10 and 50 (in certain countries up to 200). Another strength of the Programme is the strict quality control of its projects, which are subject to rigorous peer review on an annual basis. This process is in the hands of the IGCP Scientific Board, consisting of 16 outstanding international geoscientists whose duties also include supervision and implementation of the Programme as a whole.

For more detailed background information on the Programme, its legislative authority, organizational structure, and programme finances and project funding, see Annex 1

2. Purpose and objectives of evaluation

The IGCP was last assessed in 1997. The results of this review were used in the redesign of the Programme's activities. A major consideration in the forthcoming 2003 assessment is to ensure broad alignment of the Programme with the 2002-2007 Medium-Term Strategy of UNESCO. The text relating to the IGCP evaluation from the official UNESCO document Approved Programme and Budget, 31 C/5 reads as follows:

"IGCP was the subject of an evaluation in 1997. Its results were used in the redesign of the Programme's activities. There is a need to plan for another evaluation six years after the first with a view to aligning the Programme with the next Medium-Term Strategy of UNESCO.
The evaluation will cover both the regular programme and extrabudgetary financed activities and address the following issues:

- *relevance to Member States' needs and priorities;*
- *clarity and coherence of the Programme design and objectives, their attainability and adequacy of resources;*
- *major results with emphasis on multidisciplinary and intersectoral approaches to the design and implementation of the related activities;*
- *users and beneficiaries, linkage with the follow-up of the World Conference on Science, Budapest, 1999;*
- *added value, comparative advantage, partnership;*
- *impact on the promotion of basic and applied research in earth sciences at national, regional and international levels;*
- *impact on capacity-building, education and training;*
- *the advocacy role with regard to Member States' and impact on their policies and strategies;*
- *risk assessment."*

This 2003 evaluation will be carried out in accordance with the decision of the General Conference and the endorsement of the IGCP Scientific Board. The objective of the evaluation is to examine the mode of operation of the IGCP, including the efficiency with which its plan is implemented, the effectiveness of the governing mechanism, the internal and external sources of any impediments to the smooth running of the Programme, as well as to provide an independent assessment of the results obtained by the Programme over the period **1997 – 2002**. This evaluation is expected to provide a full and frank assessment of the IGCP's performance in the execution of its aims, and to assess the degree to which it has responded to the demands of the stakeholders (as Member States of UNESCO), plus numerous other partners, including scientific and professional NGOs.

3. Scope and evaluation issues

The evaluation will determine the extent to which IGCP has been able to fulfil its objectives, and to what extent the approach and strategies adopted remain appropriate *vis-à-vis* the priorities and plans of the Science Sector of UNESCO as a whole. The scope of the evaluation shall include relevance of the IGCP to UNESCO, results and impact of the IGCP, operations and management, and sustainability.

Relevance of IGCP

The following main evaluation questions should be addressed:

1) How closely do the Programme's activities and objectives address acknowledged geoscientific problems? (e.g. implementing comparative studies, establishing and sustaining interdisciplinary platforms and dialogues, networking and cooperation, solving fundamental geoscientific problems, ensuring relevance to sustainable development, encouragement of both fundamental and applied geosciences, strengthening institutional and individual capacities especially in developing countries, facilitating multidisciplinary work, and contributing scientific background for the review of the policies and management plans of Member States.).
2) How broad is IGCP's thematic coverage? To what extent did this change during the period under review?
3) What is the relative value and weighting of the IGCP with respect to UNESCO's priorities for its Science Sector and for the Organization as a whole. To what extent does the IGCP contribute to an area of comparative advantage for UNESCO?

Results and Impact of IGCP

The following main evaluation issues and questions should be addressed:

1) What are main results achieved? The results should be distributed and analysed for the period 1997-2002.
2) What are the results as regards the inclusion of scientists from developing countries, women and young scientists?
3) In the context of UNESCO's catalytic role, identify and determine to which extent and how the IGCP has influenced countries in contributing to IGCP activities, in using IGCP-generated knowledge and in formulating geoscientific and geo-environmental management and educational strategies that support sustainable development, particularly in developing countries. What are the long-term impact on national and regional environmental management plans, especially as regards developing countries?
4) What is the degree of impact of the IGCP on countries and regions around the world, based on the following indicators?
    a. The impact of the IGCP on the geosciences as a body of knowledge.
    b. The beneficiaries of the IGCP and the level of benefit.
    c. The social, economic, technical, environmental, and other effects of the IGCP on individuals, communities, and institutions.

Operations and Management

With respect to the efficiency and effectiveness of the operations of the IGCP, the evaluation will address the organizational structure, managerial support and coordination mechanisms used by the IGCP in the implementation of the Programme, including administrative and management arrangements designed to provide it with support and services. The evaluation will identify constraints and obstructions encountered in the process of project development and implementation that posed practical problems for the Programme and its constituent projects. Specifically, the evaluation will address the following questions:

1) Is IGCP's geographical coverage, as indicated by (a) the nationalities of its participating scientists and (b) the world regions investigated, well distributed across countries according to needs, or are there imbalances that should be addressed?
2) How broad is the dissemination of earth science information as indicated by the distribution and accessibility of IGCP publications, training materials and web site?

3) With respect to the effectiveness of governance and associated coordination, to what extent do the organizational structure, managerial support and coordination mechanisms used by UNESCO support or hamper the implementation of projects and/or programmes (including the UNESCO/IUGS Secretariat, the IGCP Scientific Board, and the IGCP National Committees/UNESCO National Commissions)? Is the planning and management of the Programme designed to meet the objectives?
4) What role(s) are currently played by UNESCO field offices in the implementation of the programme? In what respects do the field offices help or hinder the operations of individual IGCP projects?
5) Assess the extent to which the IGCP has been able to forge effective partnerships and collaborative projects with other bodies, in line with UNESCO' strategy on partnerships and collaboration. How do partnerships affect the *modus operandi* of IGCP projects?
6) Would there be an advantage in transforming the 'international' IGCP into an 'intergovernmental' enterprise? What advantages and disadvantages would accrue from (a) making such a change and (b) retaining the present structure, mechanisms and ethos of the Programme?
7) Are the designed targets being achieved at an acceptable cost? The evaluation should also assess the adequacy of resources available to the IGCP for the attainment of its aims. How efficiently has planning and implementation of the Programme been carried out, given your findings with respect to any Organizational impediments and the availability and adequacy of resources?

Sustainability of the Programme

The following main evaluation questions should be addressed:

1) Do the beneficiaries accept the Programme, are they willing to continue, and are the project leaders' host institutions developing the capacity and motivation to administer it?
2) Can the Programme become self-sustaining financially and, if so, under what conditions?
3) Is the Programme likely to continue in the event of termination of direct funding by the U.S.A.?
4) What is the funding potential in addition to the current funding?

Evaluators should bear in mind the following when formulating recommendations:

- Recommendations should be practical, operational and measurable;
- Recommendations should be outcome-oriented and relevant to decision making foras, the overall policy of the Programme as well as UNESCO's mandate;
- Recommendations of the evaluation should focus on Implementation modalities/mechanisms (including decentralization and Headquarters/Field Office interaction).

4. Evaluation Team

The evaluation will be carried out by an external expert with the following qualifications: (i) experience in conducting complex evaluations, preferably impact evaluations; (ii) experience in alternative evaluation methodologies; (iii) experience with scientific programmes, preferably geoscience programmes; (iv) capacity to conduct the evaluation within the framework of the Terms of Reference and the outlined timeframe.

A team of independent external senior scientists, with an in-depth collective knowledge of geological sciences, project management, international scientific and technical cooperation, including the IGCP, will form the ***Scientific Advisory Group***. In close cooperation with the IGCP Secretariat, this team will provide to a large extent the information and technical data upon which the external assessors will base their evaluation. The Scientific Advisory Group will safeguard the relevance and adequacy of the data forming the basis of the analysis and conclusions draws by the external evaluator.

The external expert will take over-all responsibility for the evaluation. The evaluator will collect and target data sources according to the Terms of Reference. Based on these data and the data provided by the Scientific Advisory Group, the external evaluator will conduct an analysis and develop recommendations within the framework of the Terms of Reference.

The Scientific Advisory Group will include:

Edward Derbyshire (as leader), Research Professor in Quaternary Science, University of London, United Kingdom

Susan Kay, Professor of Geology, Cornell University, United States of America

Henri Kampunzu, Professor of Igneous Petrology, Geological Mapping, Metamorphic Petrology, and Applied Geology, University of Botswana

Ian Speden, Institute of Geological and Nuclear Sciences, and former Director of the Geological Survey of New Zealand

The external evaluator and the leader of the Scientific Advisory Group will be in proactive (e-mail) contact throughout the evaluation. They will approach data gathering in a systematic way so as not to duplicate effort and overload partners and other players involved in the programme.

5. Evaluation methods

The external evaluator should, in consultation with the Scientific Advisory Group, develop the necessary evaluation tools to address the evaluation issues specified in the Terms of Reference. The methods to be used to address the evaluation issues should be specified in the evaluation plan prepared by the external evaluator. Evaluation methods may include:

- Document review (desk study), including review of all relevant documents, evaluations and literature;
- Interviews and discussions with staff at Headquarters;
- Field visits (to location(s) and field office(s) yet to be defined);
- Questionnaires addressed to IGCP project leaders, National Committees, IGCP Board Members, and others considered appropriate;
- Observation and other participatory techniques may be used as considered appropriate;
- Participation of partners and stakeholders;
- Benchmarking (reference norms and standards).

6. Implementation arrangements

The Scientific Advisory Group and the Secretary of IGCP will provide the external evaluator with background document for the document review (first phase of the evaluation). The

external evaluator should be self sufficient as regards logistics, but will be provided office space when interviewing staff at UNESCO Headquarters as part of the evaluation.

Timeframe:

a)	Deadline for submission of evaluation proposals/interest	19 May 2003
b)	Deadline for selection of external evaluator	6 June
c)	Document-based analysis by evaluator	June - End July
d)	Submission of Evaluation Plan by evaluator	30 July
e)	Execution of the evaluation	1 August.-1 November
f)	Submission of draft final report	15 November
g)	Review of draft by Scientific Advisory Group and stakeholders	20 December
h)	Submission of final report	20 January 2004

Deliverables by the external evaluator

(a) Evaluation Plan
(b) A draft final report with findings, lessons learned and recommendations
(b) A final report with findings, lessons learned and recommendations

Appendix 4

List of key documents consulted

List of key documents consulted:

UNESCO, Medium Term Strategy:

- 1996 – 2001, 28 C/4
- 2002 – 2007, 31 C/4

United Nations Educational, Scientific and Cultural Organization

- Approved Programme and Budget for 1996- 1997, 28 C/5
- Approved Programme and Budget for 1998-1999, 29 C/5
- Approved Programme and Budget for 2000-2001, 30 C/5
- Approved Programme and Budget for 2002-2003, 31 C/5
- Draft Programme and Budget for 2004-2005, 32 C/5

UNESCO, Harnessing science to society, analytical report

- World Conference on Science, Paris December 2002

Minutes from IGCP Board Meetings for the period 1997-2003

Annual Reports available from the National Committees for the evaluation period 1997-2002

Geological Correlation (IGCP) Geoscience in the service of society

- No. 25, Paris, June 1997
- No. 26, Paris, June 1998
- No. 27, Paris, June 1999
- No. 28, Paris, June 2000
- No. 29, Paris, October 2001
- No. 30, Paris, July 2002

Project reports presented in the Geological Correlation and Assessment reports from the IGCP Scientific Board for the projects:

- Project no.348, Proterozoic Sediment-hosted Base Metal Deposits of Western Gondwana
- Project no. 357, Organics and Mineral Deposits, 1993-1997
- Project no.373, Correlation, Anatomy and Magmatic-Hydrothermal Evolution of Ore-Bearing Felsic igneous Systems in Eurasia, 1997-2001
- Project no. 379, Karst Process and Carbon Cycle
- Project no. 418, Kibaran Events in South –Western Africa
- Project no. 425 Landslide Hazard Assessment and Cultural Heritage
- Project no. 429, Organics in Major Environmental Issues, 1998-2002
- Project no. 443, Magnesite and Talc, 1999-2003
- Project no. 448, World Correlation on Karst Ecosystem, 2000-2004
- Project no. 454, Medical Geology, 2000

Project no. 450, Proterozoic Sediment-hosted Base Metal Deposits of Western Gondwana

Information from the Internet:

Background information:

About UNESCO: - http://portal.unesco.org

About IGCP: http://www.unesco.org/science/earthsciences/igcp/index.htm

About the UNESCO Division of Earth Sciences
http://www.unesco.org/science/earthsciences/

About IUGS: http://www.iugs.org/

About IUGS Journal EPISODES:
http://www.episodes.org/backissues.htm

About CSI
http://www.unesco.org/csi/

About IHP: http://www.unesco.org/water/ihp/index.shtml

About MOST:
http://www.unesco.org/most/flyer.htm

About MAB
http://www.unesco.org/mab/index.htm

About IOC
http://ioc.unesco.org/iocweb/index.php

Information about different IGCP projects presented on the Internet:

Project no. 360, Global Geochemical Baselines:
http://www.bgs.ac.uk/iugs/Iugsph3.htm

Project no. 379, Karst Processes and the Carbon Cycle
http://www.karst.edu.cn/igcp/igcp379/index.htm

Project no. 425, Landslide Hazard Assessment and Cultural Heritage
http://landslide.dpri.kyoto-u.ac.jp/igcp/Tokyo_Symp.E.html

Project no. 429, Organics in Major Environmental Issues
http://www.min.tu-clausthal.de/www/sga/news6/art6.html

Project no. 440, Rodinia Assembly and Break up
http://www.tsrc.uwa.edu.au/440project

Project no. 448, World Correlation on Karst Ecosystems
http://www.karst.edu.cn/igcp/igcp448/index.htm

Project no. 450, Proterozoic Sediment-Hosted Base Metal Deposits of Western Gondwana
http://www.ucalgary.ca/~iyer/igcp450/unesco/catalog.htm

Project no. 454, Medical Geology
http://home.swipnet.se/medicalgeology/

Project no. 470, The 600 Ma Pan-African Belt of Central Africa
http://www.unesco.org/science/earthsciences/igcp/approved_2002.htm

Appendix 5

Survey Questionnares

- Questionnaire for IGCP National Committees
- Questionnaire for past and present Project Leaders/Co-Leaders
- Questionnaire for past and present members of the IGCP Scientific Board
- Questionnaire for Officers at UNESCO Regional Bureau for Science

Appendix 6

List of persons interviewed

List of persons interviewed

Name	Role within IGCP	Organisation, Country
Eder, Wolfgang	Director Division of Earth Sciences, IGCP Secretary	UNESCO, Division of Earth Sciences, France
Patzak, Margarete	Assistant Secretary, IGCP Secretariat	UNESCO, Division for Earth Sciences, France
Mulder de, Eduardo	President of IUGS	NITG TNO Technical University, The Netherlands
Refsdal, Hanne	IUGS Secretariat	Geological Survey of Norway, Norway
Haldorsen, Sylvi	IGCP Board Member (2002-2005)	Agricultural University of Norway, Norway
Ramos, Victor A.	IGCP Board Member (2000-2003) Project leader, no 376.	Universidad de Buenos Aires, Argentina
Edward Derbyshire	Leader of the Scientific Advisory Group for the IGCP Evaluation and former IGCP Board Member (1996-2001 and IGCP Chair person 1997-2001)	University of London, UK
Kampunzu, Henri A. B.	Member of the Scientific Advisory Group and IGCP Board Member (1997-1999); Co-project leader, no 440	University of Botswana, Botswana
Rapela, Carlos W.	Former IGCP Board Member (1996-1999); Co- leader IGCP project 249 and 345	Universidad Nacional de La Plata, Argentina
Ellis, Jorge	National Programme Officer	UNESCO Office in Montevideo, Regional Science Bureau for Latin America and the Caribbean, Uruguay
Arduino, Giuseppe	Programme Specialist	UNESCO Office Jakarta, Regional Science Bureau for Asia and the Pacific, Indonesia
Missotten, Robert	Programme Specialist	UNESCO, Division of Earth Sciences, France
Malling, Søren	Programme Specialist	UNESCO, Division of Earth Sciences, France
Szöllösi-Nagy, Andras	Deputy ADG/SC Director of Division	UNESCO, Division of Water Sciences, France
Guibert-Tejada, J. Alberto	Deputy Secretary, International Hydrological Programme,	UNESCO, Division of Water Sciences, France
Gonzalez, Ariel W.	Permanent Delegation of Argentina to UNESCO	UNESCO, France

Burton, Juliana	Argentinian National Commission for UNESCO	Ministry of Education, Argentina
Cingolani, Carlos	President of the IGCP Argentinean National Committee	Universidad Nacional de La Plata, Argentina
Aguirre-Ureta, M. Beatriz	Member of the Argentinean IGCP National Committee,	Universidad de Buenos Aires, Argentina
Limarino, Carlos Oscar	Project leader IGCP project 471	Universidad de Buenos Aires Argentina
Buatois, Luis	Co leader IGCP 471	Universidad de Buenos Aires, Argentina
Lopez de Luchi, Monica	Project participant IGCP project 436	Universidad de Buenos Aires, Argentina
Tomezzoli N., Renata	Project participant IGCP project 436	Universidad de Buenos Aires, Argentina
Riccardi, Alberto	Member of the IUGS Commission, Project leader, IGCP project 322	Universidad Nacional de La Plata, Argentina
Mendia, Jose E.	Director	Argentinian Geological Survey, SEGEMAR Argentina
Page, Roberto	Director	Argentinian Geological Survey – SEGEMAR Argentina
Jacovkis, Pablo M.	Dean	Facultad de Ciencias Exactas y Naturales, Argentina
Prolo, Maria Florencia		Argentinian Geological Survey – SEGEMAR Argentina
Spalletti, Luis	Project co-leader IGCP project 436	Universidad Nacional de La Plata, Argentina
Marìn, Silvana	Uruguayan National Commission for UNESCO	Ministry of Education, Uruguay
Daudy, Vilma	IUGS representative, Asesore Seguiridad Minera y Medio Ambiente	Uruguayan Geological Survey / Direcciòn Nacional de Geologìca y Minerìa DINAMIGE, Uruguay
Schauricht, Felipe Puig	National Director	Uruguayan Geological Survey / Direcciòn Nacional de Geologìca y Minerìa DINAMIGE, Uruguay
Bossi, Jorge	Participant in IGCP project 315 and 478	Departamento de Geologìa – Facultad de Agronomìa, Uruguay
Sprechmann, Peter	Participant in IGCP- project 478	Instituto de Geologìa – Facultad de Ciencias, Uruguay

Appendix 7

Evaluation issues addressed during field visit to Uruguay and Argentina

Specific evaluation issues addressed during the visit to the UNESCO Regional Bureau for Science for Latin America and the Caribbean, in Montevideo, Uruguay

1 Is IGCP meeting the needs of the countries in Latin America and the Caribbean in its domain? If not, what needs are not met, and which activities are not considered fully relevant?

2 Clarity and coherence of the IGCP programme design and objectives, their attainability and adequacy of resources. What role does UNESCO RB in Montevideo currently play in the implementation of the programme?

3 Has the potential of the RB implementing IGCP been fully utilized? If not, why not? Has the involvement of RB brought IGCP closer to country needs?

4 Major results with emphasis on multidisciplinary and intersectoral approaches to design and implementation of the related activities. In what respects does the RB help the operations of individual IGCP projects?

5 Does IGCP in Latin America contribute to an area of comparative advantage for UNESCO?

6 Does IGCP in Latin America contribute to one of UNESCO's 5 functions stated in the Medium-Term Strategy 31C/4 ?

7 What are the provisions and systems in place for monitoring and evaluation of results in the Regional Bureau? Does the programme and the way it is implemented in Latin America reflect results-based programming and management?

8 Users and beneficiaries in line with with the follow-up on the World Conference on Science, Budapest, 1999. Collecting data from project leaders and partners on gender and inclusion of young scientists (under 40).

9 What is the added value and comparative advantage of being a member of an IGCP project?

10 Do IGCP projects have an impact on the promotion of basic and applied research in earth sciences at national level in the countries in the Laltin American and Caribbean Region?

11 What impact does the IGCP have upon projects on capacity building, education and training in the Latin American and Caribbean Region?

12 What is the geeneral funding situation for IGCP projects in Latin America and the Caribbean?