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## **Towards a Southeast Asian Network for a Geologic Information System (SANGIS)**

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**Abstract:** In recognition of the increasing importance of information technology in the earth sciences, the International Union of Geological Sciences (IUGS), together with professional and governmental organizations, have initiated steps to provide assistance for the development of the capability for data handling and exchange among countries on a regional scale. Along this line, some experience has been gained for countries in Africa through the Pan African Geologic Information System (PANGIS). In the wake of the success of PANGIS, the IUGS, through its Commission for the Management and Application of Earth Science Information (COGEOINFO) and other organizations have taken initial steps for the establishment of a Southeast Asian Network for a Geologic Information System (SANGIS).

The PANGIS program, which began some years ago, was planned and coordinated by IUGS through COGEOINFO and the French International Center for Training and Exchange in the Geosciences (CIFEG) with support from the United Nations Environmental, Scientific and Cultural Organization (UNESCO). The first activities involved the collection and compilation of bibliographic information associated with the earth sciences and the development of a systematic procedure that was accomplished by CIFEG.

The next phase of the program, involving experts from the geological surveys of Canada, France, United Kingdom, USA and the Belgian Royal Museum for Central Africa, was directed on the development of factual database systems covering field data and boreholes, mineral resources, geochemistry and geohydrology. This phase mainly focused on providing training and technology transfer to African information managers and geoscientists. Representatives from 37 nations received the six-month training associated with this phase of the program.

At the most recent UNESCO General Conference, the achievements of the PANGIS program were recognized by the African representatives and the General Conference accepted their motion for continued support during 1996–1997. At the same time, several Asian countries expressed their interest in this geoscience program and requested UNESCO to initiate a similar initiative in the Asian region during the next bi-annual exercise (1998–1999).

To begin implementing such a program for Southeast Asia, UNESCO and IUGS-COGEOINFO organized a workshop meeting at UNESCO headquarters in Paris in December 1997. Representatives from the geological surveys of Cambodia, Philippines and Vietnam, along with selected members of COGEOINFO, UNESCO, and management information experts affiliated with European and North American earth science agencies and international organizations attended to illustrate existing programs and experiences in earth science information. At this meeting, it was recognized that close coordination with ongoing programs and organizations involving the geological surveys of the region is important if the SANGIS program is to be successful. In this regard, the Coordinating Committee for Coastal and Offshore Geoscience Programs in East and Southeast Asia (CCOP) was briefed about SANGIS in its last meeting last March. Hopefully, the SANGIS program can be embraced by GEOSEA and close coordination among the geological surveys of Southeast Asian countries, IUGS-COGEOINFO and other concerned organizations and institutions will evolve through the Program.

## INTRODUCTION

Information technology, through its various applications, has become a valuable tool in the earth sciences. At the same time, this has facilitated the exchange of data and communications among earth scientists and agencies involved in earth science research. In recognition of the increasing importance of information technology for earth science, the International Union of Geological Sciences (IUGS) organized COGEODATA which dealt with earth science data and COGEODOC, which dealt with publications. Since their formation, the quality of technology and scope of its applications have increased by leaps and bounds. Among the most significant developments were the introduction of geographical information systems (GIS) and increasing concerns on impacts on the environment of development projects and natural processes. These brought to the fore both opportunities and demands for geoscience to play its full and fundamental part in addressing these issues. At the same time, governments do not always recognize the importance of geoscience inputs, or its availability.

In the face of such developments as described above, COGEODATA and COGEODOC were later merged into the Commission for the Management and Application of Geoscience Information or COGEOINFO. At the request of the Executive Committee of the IUGS, a special meeting was held in 1991 to provide a mandate for COGEOINFO and formulate a plan of action. IUGS felt that immediate steps need to be taken to stimulate and facilitate the use of geoscience information in conjunction with data of other kinds. The thinking was that the geoscience community must make every effort to provide the valuable information it collects and stores in a timely manner – to the public, government agencies, academic, research institutions and industry. Because geoscience transcends national boundaries, international action was deemed necessary to achieve compatibility for the requirements of data coordination, integration and speedy access. This is clearly an objective in which IUGS can play a vital role for society. In forming COGEOINFO, IUGS aims to enable and encourage the integration of multi-disciplinary problems, such as global change, environmental hazards and resources. In doing so, COGEOINFO has to work in close coordination with affiliated bodies and other international organizations.

The International Union of Geological Sciences (IUGS), together with professional and

governmental organizations, have initiated steps to provide assistance for the development of the capability for data handling and exchange among countries on a regional scale. Along this line, some experience has been gained for countries in Africa through the Pan African Geologic Information System (PANGIS). In the wake of the success of PANGIS, the IUGS, through its Commission for the Management and Application of Earth Science Information (COGEOINFO) and other organizations have taken initial steps for the establishment of a Southeast Asian Network for a Geologic Information System (SANGIS).

## THE PANGIS EXPERIENCE

For some years, a number of professional and governmental organizations have been assisting African geoscientists through a program named PANGIS — the Pan African Geologic Information System. The first activities focused on the collection and compilation of bibliographic information associated with the earth sciences, and the development of a systematic procedure was accomplished by the French International Center for Training and Exchange in the Geosciences (CIFEG). The PANGIS program was planned and coordinated by CIFEG and the International Union of Geological Sciences (IUGS) through COGEOINFO, and with support from the United Nations Environmental, Scientific, and Cultural Organization (UNESCO).

After several years of effort successfully training representatives from nearly every African nation regarding the use of bibliographic procedures in the earth sciences, the African Nations, through the African Geological Surveys Association (AGSA) requested that an effort to develop a program to train geoscientists in factual databases be developed. UNESCO and IUGS agreed to coordinate efforts associated with the development and training aspects of geoscience data bases. COGEOINFO coordinated the effort which involved CIFEG, UNESCO, members of COGEOINFO, AGSA, representatives from several African nations and experts from the Geological Surveys of Canada, France, United Kingdom and United States, as well as the Belgian Royal Museum for Central Africa (MRAC). Experts developed factual database systems covering field data and boreholes, mineral resources, geochemistry, and geohydrology.

Given the special African situation, this program mainly focused on providing basic training and technology transfer to African Information Managers and Geoscientists. Purpose-made

database engines were designed in this program, allowing for the storage of factual earth science data. Recently this program has been managed by the Royal Museum for Central Africa with headquarters at Belgium. Representatives of 37 nations have received the six month training associated with this program.

### **SANGIS WORKSHOP, 1997**

At the most recent UNESCO General Conference the achievements of the PANGIS program were recognized by the African representatives, and the General Conference accepted their motion for continued support during 1996–1997. At the same time, several Asian countries expressed their interest in this geoscience program and requested UNESCO to initiate a similar initiative in the Asian region during the next bi-annual exercise (1998–1999).

To begin implementing such a program for Southeast Asia, UNESCO and IUGS-COGEINFO organized a workshop meeting at UNESCO headquarters in Paris in December 1997. This workshop was designed to focus specifically on the geoscience information management needs in the Southeast Asian region, and on those issues that UNESCO and COGEINFO can specifically address. Representatives from the geological surveys of Cambodia, Philippines and Vietnam, along with representatives of COGEINFO, UNESCO, and management information experts from CIFEG (France), MRAC (Belgium), RGD-TNO (The Netherlands), British Geological Survey, Denmark Geological Survey and CSM (US) attended to illustrate existing programs and experiences in earth science information.

At this meeting, potential needs that were identified were: 1) Institutional capacity-building for individual national geological surveys; 2) Enhancement of regional communication and collaboration among the countries of Southeast Asia. Activities that may be conducted in pursuing a SANGIS program would include the following:

- Promote international standards for bibliographic data and metadata.
- Transfer experience and expertise in geoinformation systems, especially the role of spatial analysis and decision-making provided by Geographical Information Systems (GIS).
- Promote awareness of the importance of legal systems that support the rights of ownership, use and distribution of geoscience information.
- Coordinate SANGIS programs with other ongoing regional activities.

In response to some of the problems articulated during the workshop, the meeting endorsed the proposal to identify critical training needs and considered taking short-term actions on the following requests of participants:

- Introduce international bibliographical database standards and techniques to ongoing programs of the Philippine Mines and Geosciences Bureau.
- Assist the Department of Geology and Mines of Cambodia with their restoration of historical geoscience records.
- Create an index of recent and ongoing bilateral and multilateral agreements within Southeast Asia in the field of Earth Sciences.

### **REALIZING A SANGIS PROGRAM**

To give substance to the SANGIS program, medium-term and long-term actions have been proposed. Medium term actions include the following:

- Organize regional meetings.
- Promote access to, and exchange of, geoinformation within the region.
- Introduce geoinformation management for spatial analysis and decision-making in GIS, whereby in-country training activities would be conducted in response to identified training needs.

With respect to the promotion of geoinformation exchange within the region, the Program would support improved access to the Internet and the World-Wide-Web and establish a high-profile SANGIS home page on the WWW.

Long-term actions would involve the enlargement of network activity to include issues related to the construction and maintenance of large factual databases. These activities should be directed towards:

- Design and implementation of such databases.
- Spatial analysis and decision making using GIS.
- Legal and administrative issues, especially those concerning data distribution and ownership.

Regional meetings, of course, are necessary in order to achieve consensus on the content of the SANGIS Program. While this has yet to be organized, close coordination with ongoing programs and organizations involving the geological surveys of the region is considered important if the SANGIS program is to be successful. In this regard, the Coordinating Committee for Coastal and Offshore Geoscience Programs in East and Southeast Asia (CCOP) was briefed about SANGIS in its last

meeting last March. Hopefully, the SANGIS Southeast Asian countries, IUGS-COGEOINFO and program can be embraced by GEOSEA and close other concerned organizations and institutions will coordination among the geological surveys of evolve through the Program.

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