
GLOBAL SEISMIC HAZARD ASSESSMENT PROGRAM (GSHAP)

Progress Report n.3 – February 1994

THE IASPEI 27TH GENERAL ASSEMBLY



On January 10-22, 1994, the 27th General Assembly of the International Association of Seismology and Physics of the Earth's Interior (IASPEI) was held in Wellington, New Zealand. The IASPEI Assembly marked a key moment for GSHAP, as IASPEI has been one of the main promoters of GSHAP since its start and has taken an active role in devising the GSHAP specifications and in the preparatory and implementation phase of the program.

IASPEI is the prime scientific association dealing with seismic hazard assessment, although several aspects more related to geological and geodynamic analysis are covered directly by IUGS and ILP. While ILP activates specific, time-limited programs like GSHAP, IASPEI maintains a structure of Commissions and Working Groups that meet routinely every two years to evaluate the developments in each field and promote cooperation. Several IASPEI Commissions have a relevant interest in GSHAP: the Commission on Practice, the Commission on Earthquake Hazard and Prediction, the Sub-Commission on Earthquake Hazard, the Sub-Commission on Strong Motions, the Committee for Developing Countries, the Commission for the IDNDR, the European Seismological Commission.

The IASPEI General Assembly provided the first official occasion for the Commission structure to evaluate the GSHAP status. A one-day open meeting was held on January 13, to open the discussion on GSHAP to the whole IASPEI community. The Chairmen of the relevant IASPEI Commissions attended the open meeting and, conversely, the GSHAP Coordinator and Secretary took part in the working meetings of the IASPEI Commissions. In addition, presentations on GSHAP guidelines and implementation were also given in the regular sessions and workshop.

Finally, the GSHAP Steering Committee held its 3rd meeting in Wellington in occasion of the IASPEI Assembly.

The Wellington meeting served the purpose to focus the IASPEI attention on GSHAP, to review the program's progress, to plan joint activities with IASPEI. This Progress Report covers the Wellington assembly, the 3rd meeting of the GSHAP Steering Committee, the decisions taken under each relevant IASPEI Commission, the revised regional structure and activities, and the

detailed plans for 1994 and 1995. Many items are presented as addenda or modification of more complete descriptions included in the Progress Reports n.2 - December 1993.

IASPEI Resolution

The IASPEI Assembly has approved general resolutions on seismic hazard (resolution n. 2) and seismic risk (resolution n. 4), and one specific resolution on GSHAP:

IASPEI Resolution n. 3: Global Seismic Hazard Assessment Program

Considering the establishment of the International Decade of Natural Disaster Reduction (IDNDR) by the United Nations (UN), the adoption of the Global Seismic Hazard Assessment Program (GSHAP) by the International Council of Scientific Unions (ICSU), the endorsement of GSHAP as a demonstration project by the Scientific and Technical Committee of the UN Decade, and *recognizing* the increased need to cooperate in the field of global seismic hazard assessment and the experience and expertise IASPEI has accumulated in this field through its Commissions, Subcommissions and Working Groups, IASPEI *endorses* the GSHAP initiative, *supports* the establishment of international test areas under the supervision of Regional Centers, *urges* assistance to GSHAP in the establishment of standards and guide-lines applicable within the time frame of the Decade.

IASPEI Commission on Practice

As GSHAP pursues the establishment of improved seismological standards, and among these the compilation of a homogeneous instrumental global catalogue for this century, the Commission on Practice, under chair S. Sipkin, has resolved to follow the adoption of new standards for earthquake location and quantification and to evaluate the efforts of the GSHAP Special Projects. The IUGG Assembly in 1995 will provide the chance for the Commission on Practice to judge the convergence of the efforts of ISC, NEIC and GSHAP toward homogeneous procedures.

IASPEI Sub-Commission on Strong Motion

The Sub-Commission and its chairman, LiLi Xie, expressed the will to join the efforts of the GSHAP Special Project on Strong Ground Motions to establish improved relations for use in different tectonic settings around the world.

IASPEI Commission on Earthquake Hazard and Prediction

IASPEI Sub-Commission on Earthquake Hazard

These met under the chairmanship of G. Sobolev and agreed to join efforts with GSHAP in running the test area in the Caucasus. While the operation of the test area will remain responsibility of GSHAP, this test will offer to IASPEI scientists the occasion to focus for the next two years on specific targets to be achieved in a limited time framework; among the goals are the comparison of different approaches and computation algorithms, the evaluation of the relative importance of different geological and geophysical data. The Caucasus was selected for its seismo-tectonic interest and high seismic hazard, the availability of excellent geological and seismological databases and the crucial multi-national framework, where the IASPEI contribution could prove essential.

An evaluation of the joint activities in the Caucasus is expected in 18 months, in occasion of the next IUGG General Assembly in Boulder, Colorado (July, 1995).

IASPEI will support the participation of IASPEI scientists and official groups in the GSHAP activities, and in particular the activities of the Commission and Sub-Commission on Earthquake Hazard in the selected GSHAP-IASPEI test area in the Caucasus. The first official activity will be a planning working meeting in Istanbul in late May 1994, with the participation of the directors of the national agencies of the countries of the Caucasus region and of GSHAP and IASPEI representatives and experts.

European Seismological Commission

The European-Mediterranean area is certainly among the most complex in the GSHAP implementation, as it is fragmented in a mosaic of test areas under the operation of few GSHAP Regional Centres and independent projects. The ESC has shown a keen interest in the success and homogenization of the existing and proposed efforts in seismic hazard assessment in the whole European-Mediterranean territory and will take a leading role in the activities and meeting planned for 1994. At the forthcoming ESC General Assembly (Athens, September 1994), a special session will be devoted to GSHAP and to the integration of all the regional hazard programs.

IASPEI Committee for Developing Countries

The group led by R. Adams was notified of the GSHAP activities in 1993 and of plans for 1994, with particular reference to the organization of regional meetings and the planned transfer of technology to developing countries, and stressed the importance of these efforts for the global seismological community.

IASPEI Commission for the IDNDR

The IASPEI/IDNDR group, under the guidance of B. Bolt, re-affirmed the role of GSHAP as a key contribution of the seismological community to the Decade.

3RD MEETING OF GSHAP STEERING COMMITTEE

The Steering Committee met in Wellington to evaluate progress since its 2nd meeting in Ixtapa (Mexico, April 1993), the plans for 1994-1995 and the coordination with IASPEI.

Among the topics under discussion were also the role of IUGG and IUGS, the membership of the Steering Committee, the revision of the regional structure for 1994, the definition of a more definite program schedule, the coordination with the engineering community, the status and schedule of the special projects.

This Progress Report is not intended to provide the Minutes for the Steering Committee meeting; however, all the items presented here have been approved by the Steering Committee.

Future meetings of the Steering Committee will be in Athens in occasion of the ESC General Assembly (September 1994) and in Boulder in occasion of the IUGG XXI General Assembly (July 1995). In addition, a GSHAP mid-term evaluation meeting will be organized in Italy in late 1995.

REVISED GSHAP REGIONAL STRUCTURE

Taking into account the activities of 1993 and the plans for 1994, the Steering Committee approved a new map summarizing the regional structure and the program status for 1994 (Appendix). The following changes are noted:

Region 10: Oceania

As Region 9 (East Asia-Oceania) was too vast to be managed under the responsibility of one single center, and as agencies in Oceania have expressed the desire to become more involved in GSHAP activities, the Region 10 was designed to include Oceania under the coordination of the Australian Geological Survey Organization in Canberra; Regional Coordinator will be D. Denham of AGSO. Region 10 has not designated a single test area; rather, starting from the availability of existing databases and national efforts, it will initiate activities covering the whole area, with particular interest to the active margin between the Australian and Pacific plates.

The border between Region 9 (East Asia) and Region 10 (Oceania) is loosely designed across Indonesia, where cooperation of AGSO and PHIVOLCS is envisaged.

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Test Areas

With operations initiated in most test areas planned in 1992, the geographical coverage of some areas have been redefined: the China-Burma-India area, the Caucasus, the African Rift (see Appendix). A new test area has been created in the Middle East, including the Western border of the Arabian plate and the countries along the Dead Sea fault system; this area is run under the Eastern Mediterranean Region seismic hazard program of USGS/UNESCO and GSHAP will take part in the regional seismic hazard assessment.

OVERVIEW OF REGIONAL ACTIVITIES

As a complement to the summary of regional activities presented in the Progress Report n. 2 - December 1993, to which the reader is referred, we highlight here the key regional activities as planned in Wellington in 1994.

1-2. Americas UNAM, Mexico City (G. Suarez), CERESIS (A. Giesecke)

As the PAIGH/IDRC program in Central and South America will be concluded in 1994, the aim is to find ways to continue with the established regional framework and integrate the results obtained in Central America, Mexico, Antilles and South America. An effort is under way to negotiate with PAIGH and IDRC for the continuation of their effort under the same program structure. The Regional Seismological Assembly in South America (Brasilia, August 1994) will be the turning point where the results obtained in the PAIGH/IDRC program will be presented and future activities will be planned.

3-4. Europe-Mediterranean GFZ, Potsdam (G. Grunthal), CNCPRST, Rabat (D. Ben Sari)

Two major breakthroughs in the area are the initiation of the Eastern Mediterranean Region Seismic Hazard program, under the USGS/UNESCO coordination, and the naming of the CNCPRST of Rabat as the Center for Seismic Hazard Assessment of the Open Partial Agreement on Natural Disasters of the European Council, expected to be formalized in March 1994. In the context of the EMR program, the GSHAP will jointly run a test area in the countries along the Dead Sea and Red Sea fault system; the first working meeting is planned for late May in Istanbul. The OPA will provide substantial economic support to Rabat to conduct regional activities which for now will cover the Western Mediterranean; the first working meeting is scheduled in Granada in May 1994. Additional test areas are active in the Adriatic plate and in Northern Europe. The ESC General Assembly in Athens (September 1994) will provide the forum to review and integrate these efforts.

5. Continental Africa University of Nairobi (I. Nyambok)

A working tie is now established with the ongoing regional effort in seismic data compilation run by the University of Bergen, with partial support from Sweden; a first joint working meeting is being scheduled in September in a location of the African Rift, still to be decided; GSHAP will co-sponsor this activity. During 1994, we will also seek to increase the role of scientists from South Africa and UK in the GSHAP implementation in the area.

6. Middle East IIIES, Tehran (M. Ghafory Ashtiany)

In addition to the participation to the test areas in the Caucasus and EMR, the compilation of the regional databases is proceeding. The Second International Conference on Seismology and Earthquake Engineering has been scheduled for May 1995 and will include a full session on GSHAP.

7. Northern Eurasia

JIPE, Moscow (V. Strakhov)

The efforts to finance the activities in the CSI will continue during 1994, the main source of hope for the moment being the CEC and the ISF. The Caucasus area will be jointly operated by the Tehran and Moscow Regional Centres, the Istanbul Training Centre and the IASPEI Commission of Earthquake Hazard, with the sponsorship in 1994 by GSHAP, IASPEI and the local agencies.

8. Central-Southern Asia

SSB, Beijing (P. Zhang)

A major GSHAP regional meeting is planned for late June in Beijing, with the commitment of SSB to extend the already advanced bilateral cooperation existing with Russia to the whole Central-Southern Asia. By late June significant progress is expected in the India-Burma-China test area. IASPEI has approved the creation of the Asian Seismological Commission, which is expected to assume a leading role in coordinating regional activities in seismic hazard assessment.

9. East Asia

PHIVOLCS, Manila (R. Punongbayan)

There is good hope that the Natural Hazard Mapping program proposed by the Geological Survey of Japan will start its operation in the early half of 1994. The activities of the newly formed Asian Seismological Commission will be most relevant for this area, as it would be the commitment of scientists and organizations from Japan.

10. Oceania

AGSO, Canberra (D. Denham)

As detailed above, national activities will be integrated under the regional coordination of AGSO.

The Regional Coordinators have been asked to submit by the summer of 1994 a detailed Project Document covering the test area or the whole region of competence, describing the existing knowledge and available databases and a detailed working plan and timetable (budget, schedule, personnel), to be collected in a special volume, possibly to be published as a special issue of *Annali di Geofisica*. The purpose is to evaluate the present status and future plans in each region, allowing a meaningful comparative evaluation and integration of the regional activities.

SPECIAL PROJECTS

GSHAP has initiated three Special Projects of global interest:

1. Global Instrumental Earthquake Catalogue
2. Strong Ground Motion Relations
3. Hazard Computation Software

Several activities are under development within these projects and it is not possible to provide here a detailed status; a dedicated Progress Report will be distributed in the near future.

COORDINATION WITH THE ENGINEERING COMMUNITY

Progress is being made in linking the GSHAP with the risk mitigation activities conducted by the engineering community in the framework of the Decade, and in particular with the International Association of Earthquake Engineers and its World Seismic Safety Initiative.

As part of the promotion of the GSHAP, from now on the GSHAP documentation will be distributed to the IAEE national representatives, to the IAEE officials and to the key engineers involved in the WSSI.

In addition, we are exploring the feasibility to hold joint sessions and discussion on finding common approaches to seismic hazard assessment in occasion of the next regional meetings of the IAEE: the 10th Conference of the European Earthquake Engineers, to be held in Vienna in August 1994, and the Pacific Conference on Earthquake Engineering, which will be organized in Melbourne on November 1995, by the Australian Earthquake Engineering Society, and by the New Zealand National Society of Earthquake Engineers.

COORDINATION WITH THE WMO/STEND PROGRAM

Upon request by the World Meteorological Organization, GSHAP has evaluated the feasibility of joining the WMO demonstration program for the Decade for the establishment of a System for Technology Exchange for Natural Disasters (STEND). The network of GSHAP Regional Centers could provide a valuable link with seismology and solid Earth geophysics, particularly in developing countries, and complement STEND with useful operational technology for the collection and analysis of seismological data and for seismic hazard assessment; in turn STEND would be able to disseminate the technology available at the Regional Centers through its network.

Following also the deliberation of IASPEI, the GSHAP Steering Committee has decided in principle to adhere to the WMO initiative and to decide on specific initiatives at a later stage upon verification of the technical innovations of the STEND system. GSHAP could provide STEND with specific modules on the different elements of seismic hazard assessment, derived from the GSHAP Technical Guidelines, for inclusion in the STEND database and distribution. D. Mayer-Rosa of Switzerland has been designed as the representative of both GSHAP and IASPEI in the WMO-STEND committee.

REVISED GSHAP TIME FRAMEWORK

Taking into account the activities and meetings scheduled for the next years, the Steering Committee has agreed on the time schedule for the GSHAP program; the key dates of the program in

the next four years will be as follows:

- 1993-1995: the first operational phase is under way, targeting test areas in all continents;
- late 1995: a mid-term evaluation meeting will be held in Italy;
- 1995-1997: the second phase will expand the GSHAP action at regional and national level;
- 1997: the GSHAP will close in occasion of the 29th IASPEI General Assembly in Thessaloniki, Greece.

Further indications on the overall schedule for the Decade may result from the Yokohama mid-Decade World Conference on Natural Hazards.

1994

In addition to the remarks on regional activities contained in this report and in the 1993 Progress Report, we recall here some of the principal meetings where GSHAP activities are planned:

- the European Research Conference on Seismic Hazard will be held in Granada, Spain, on 14-19 May 1994, sponsored by the ESF; on that occasion a working meeting covering the Western Mediterranean will be held;
- the mid-Decade World Conference on Natural Disaster Reduction, scheduled in Yokohama on May 23-27, 1994, will bring together political leaders and decision makers from all countries; it is widely hoped that, following the Yokohama Conference, the Decade will start off with renewed impetus; the GSHAP will be presented in a poster session on the Decade demonstration programs;
- a training course in seismic hazard assessment will be held by the GSHAP Training Center in Istanbul; the test areas of Caucasus and EMR will be the topic of ad-hoc working meetings;
- a GSHAP regional meeting will be organized in late June by SSB in Beijing, to discuss coordination in seismic hazard assessment in Central-Southern Asia and the operation of the India-Burma-China test area;
- the Regional Seismological Assembly in South America (Brasilia, August 22-26 1994) will include one session on "Seismicity studies and evaluation of earthquake hazard and risk" and a GSHAP technical meeting;
- the 10th Conference of the European Earthquake Engineers will be held in Vienna in August 1994; we are exploring the feasibility of holding a joint session;
- the 1994 ESC General Assembly in Athens (September 1994) will dedicate one session to GSHAP to review and integrate the initiatives in seismic hazard assessment active in the European-Mediterranean region.

1995

GSHAP activities in occasion of several important meetings of 1995 have already been decided:

- the Second International Conference on Seismology and Earthquake Engineering will be convened by IIEES in Tehran on May 15-17, 1995, and will include a full session on GSHAP;
 - the IUGG XXI General Assembly in Boulder (Colorado, July 2-14, 1995) will hold sessions on natural disasters and Decade programs; a GSHAP technical meeting will also be held;
 - a mid-term GSHAP evaluation meeting is planned for late 1995 in Italy;
 - the Pacific Conference on Earthquake Engineering will be organized in Melbourne on November 20-23, 1995, by the Australian Earthquake Engineering Society and by the New Zealand National Society of Earthquake Engineers; GSHAP has been invited.
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Report prepared on February 4, 1994, by Domenico Giardini, GSHAP Coordinator

GSHAP Regional Structure 1994

