

# **International Association of Seismology and Physics of the Earth's Interior (IASPEI)**

## **Quadrennial Report 2011-2014**

IASPEI promotes the study of problems relating to earthquakes, the propagation of seismic waves, and the internal structure, properties, and processes of the Earth.

Comprehensive minutes of the past Quadriennium and other information are posted on the IASPEI website, <http://www.iaspei.org/>.

### **IASPEI 2011 General Assembly at Melbourne (Australia)**

*Assembly.* IASPEI participated to the conference with more than 400 (395 officially registered as IASPEI) delegates, of which 78 supported financially with grants. The scientific program included 18 IASPEI and 13 Inter-Association symposia with IASPEI participation.

Two resolutions passed at the General Assembly in Melbourne encourage the creation of two more regional Commissions of IASPEI: the African Seismological Commission and the Latin American Seismological Commission to foster more cooperation within these two regions and the organization of regular IASPEI regional meetings.

*Statutes.* After several years of preparation and discussion, revised IASPEI Statutes have been unanimously approved in Melbourne during the IUGG General Assembly. Changes mainly reflect the changes in practice related to shorter scientific assemblies, the possibilities offered by modern internet era tools, and clarifications of language to avoid ambiguity.

### **IASPEI 2013 Scientific Assembly at Gothenburg (Sweden)**

The 37<sup>th</sup> IASPEI General Assembly was organized as a Joint Assembly of the three Associations IAHS, IAPSO and IASPEI in July 2013 in Gothenburg, Sweden. The 454 participants from 48 countries contributed to the success of the assembly by presenting 330 contributions and 200 posters within 36 symposia. 75 participants were supported with grants by IASPEI.

During the Opening Plenary, the first IASPEI medal was awarded to Robin Adams. In addition, two keynote lectures were presented by IASPEI President Domenico Giardini on GEM and by Roger Musson on the History of British Seismology. A third keynote lecture was given in the afternoon during the Joint Plenary by James Mori on drilling the plate boundary in the source region of the 2011 Tohoku-Oki earthquake.

On Friday, July 26, a round table discussion was held on "The role of scientists in the communication of risk: lessons from L'Aquila and international perspectives". Domenico Giardini presented an overview on the actual status of the L'Aquila case while Kenji Satake (Japan) and David Jackson (USA) explained how authoritative information to administrations and the public are organized in their countries in the case of an earthquake crisis. All three presentations were followed by a lively debate, for which the allocated time window in the assembly program proved to be too short.

The next IASPEI Scientific Assembly, after the General Assembly in connection with the IUGG 2015 one in Prague, Czech Republic, will be held in Kobe, Japan, in August 2017.

## **Asian Seismological Commission (ASC) meetings**

### *ASC2012, Ulaanbaatar, Mongolia*

The 9th General Assembly of ASC was held in Ulaanbaatar, Mongolia, from September 17 to 20, 2012, under the motto “International Scientific Cooperation for Prevention and Mitigation of Seismic Disaster”. About 300 scientists (115 foreign) from 20 countries participated to the conference and made 87 oral and 50 poster presentations. The excellent premises were kindly provided by the Mongolian Government. In particular, the opening session was held in the Mongolian Parliament. The Young Scientist Training Course which took place in the days before the conference, was sponsored by the Young Scientist grant of Deputy Prime Minister of Mongolia and IASPEI. Eight foreign and eleven Mongolian participants took part to the course.

### *ASC2014, Makati City, The Philippines*

The 10<sup>th</sup> General Assembly of ASC, with theme “*Working together towards an earthquake-resilient Asia*”, was held at the Dusit Hotel, Makati City, Philippines from 18-20 November 2014 with 156 participants from 21 different countries. The Assembly was organized by the Philippine Institute of Volcanology and Seismology (PHIVOLCS) in cooperation with the Geological Society of the Philippines (GSP). The combined financial support from the Seismological Society of Japan (SSJ) and IASPEI enabled the conference to award full/partial support to 31 travel grantees from 11 countries. In addition to the formal opening ceremonies, a press briefing was also held on 18 November, with panelists Gary Gibson, Domenico Giardini, and Renato U. Solidum Jr. Eight invited talks were delivered in the plenary sessions and 133 papers were presented in the parallel sessions during the assembly. A 5-day Pre-Conference Training - “*Contributions of Seismology to Earthquake Risk Mitigation*” was held from 12-16 November”, and conducted by 2 invited trainers - Dr. Gary Gibson and Dr. Mark Quigley. Five special talks about monitoring, hazards and risk assessment and public awareness and preparedness in the Philippines were invited from PHIVOLCS. A total of 21 young scientists from various Asia and Oceania countries attended. The training was supported with funds from the Government of the Philippines. The ASC flag was officially turned over by Dr. Solidum to Brian Kennett of the Australian National University, representing Australia, the ASC 2016 host.

The next 2016 ASC conference will be in Australia.

## **European Seismological Commission (ESC) meetings**

### *ESC2012, Moscow, Russia*

The 33rd General Assembly of ESC was held in Moscow, Russia, from August 19 to 24, 2012, on the premises of the Russian Academy of Sciences. 548 people from 51 countries representing all five inhabited continents of our planet participated to the Assembly. The Assembly motto “*Seismology without Boundaries*” proved its value to the full.

In the framework of the ten topics into which the scientific program of the Assembly was built there were 39 scientific symposia with 845 scientific presentations – 490 oral and 355 poster presentations. Some symposia were organized in cooperation with the Seismological Society of America and with

the Asian Seismological Commission.

In the week following the ESC GA, the 9<sup>th</sup> International Young Seismologists Training Course “Modern Methods of Seismological Data Processing and Interpretation” was held in Obninsk. Ten lecturers presented a series of lectures to 19 female and 17 male participants from 15 countries. All of them were very satisfied with the course and received personal certificates of attendance.

#### *ESC2014, Istanbul, Turkey*

The 34<sup>th</sup> General Assembly of ESC was organized at the Istanbul Convention & Exhibition Centre (ICEC), in Istanbul, Turkey, from 24 to 29 August 2014, jointly with the 15<sup>th</sup> European Conference on Earthquake Engineering of the European Association of Earthquake Engineering (EAE), in the framework of the Second European Conference on Earthquake Engineering and Seismology (2ECEES). About 1000 participants from 76 different countries presented 1550 contributions. There were also 13 Keynote Lectures and 40 Theme Lectures. There are two new ESC Titular Member countries: Azerbaijan Republic, represented by Gurban Yetirmishli; and Georgia, with Observer status, represented by Tamaz Chelidze. The week before the General Assembly (20-23 August 2014) the 2nd Young Seismology and Engineers Training Course on ‘Ambient noise measurements’ took place at the Istanbul Technical University at Maçka. There were eight lecturers at the course with 25 participants from more than 10 countries.

The next 2016 ESC conference will be in Trieste, Italy.

#### **The Latin American and Caribbean Seismological Commission (LACSC) meetings**

Following the resolution passed at the General Assembly in Melbourne the Latin American and Caribbean Seismological Commission (LACSC) of IASPEI was formed at a meeting in Lima, Peru, on September 24, 2012, during the Seismology Symposium of the Geological Congress of Peru. M Assumpcao, IASPEI Exec member, attended the meeting and took an active role in the LACSC formation.

#### *LACSC2014, Bogota, Colombia*

LACSC held its first General Assembly in Bogota, Colombia, during July 23-25. More than 230 participants from 25 different countries presented 242 papers. Three simultaneous sessions had 149 oral presentations. 93 posters were displayed in the Exhibit Hall. The meeting fully accomplished the main LACSC goals: to establish in the Latin American community a framework for discussions, collaborations, and new acquaintances, besides motivating seismology students and young scientists. 65 students accounted for 27% of the papers. Very few no-shows were noticed in the oral sessions. Partial travel support from IUGG and IASPEI was given to 24 students and young scientists.

The next LACSC Regional Assembly will be held in Costa Rica in 2016.

#### **The African Seismological Commission (AfSC) meetings.**

The African Seismological Commission (AfSC) was launched on the 22 January 2014 during an Africa-Array workshop held at WITS University in Johannesburg, South Africa. The meeting was

well attended and an attendance register was circulated in order to build a contact database of all interested parties. There were representatives from 21 African countries at the meeting: Algeria, Ethiopia, Madagascar, Ghana, Malawi, Zimbabwe, Zambia, Angola, Egypt, Senegal, Morocco, Libya, Nigeria, Cameroon, DR Congo, Tanzania, Mozambique, South Africa, Cape Verde Republic, Botswana and Rwanda. The meeting was opened by the IASPEI President, Domenico Giardini, and Secretary General/Treasurer, Peter Suhadolc. Due to the small number of IUGG members within Africa, the adopted statutes are valid temporarily and will be reassessed in 2018.

### **Other major initiatives with IASPEI Participation**

#### *Symposium on the Effects of Surface Geology on Seismic Motion*

The 4th International IASPEI/IAEE Symposium on the Effects of Surface Geology on Seismic Motion (ESG4) was held at the University of California Santa Barbara from August 23 - 26, 2011, and organized by Ralph Archuleta. It included six plenary sessions.

#### *IASPEI-IAG-IAGA Monitoring crustal deformation and the ionosphere by GPS in the Caribbean project*

In the frame of the IUGG Grants Program, the project *Monitoring crustal deformation and the ionosphere by GPS in the Caribbean* was given a grant for the term 2012-2014. This project is further sponsored by IASPEI, IAG, and IAGA. The main objective of this initiative is to invite the Caribbean countries to participate actively in geodetic and geophysical projects going on in the Central and South American region, in order to enable the use the acquired data for practice and science in their countries, and to promote geosciences. This includes capacity building activities providing the basis for profound education and sustainable development as well as the establishment of international and interdisciplinary contacts to participate in research projects at regional and global scales. According to this, a capacity building called *School on Reference Systems, Crustal Deformation and Ionosphere Monitoring* was carried out in Panama City, from October 21 to 23, 2013. 145 participants from 28 countries attended the School. An extension of the Project duration was approved by IUGG.

#### *Global Earthquake Model (GEM)*

The GEM program, initiated by the OECD in 2009 and managed by the Secretariat located in Pavia (Italy), completed its first 5-year implementation phase in 2013, and is moving now to more engineering aspects of seismic hazard and risk in its second phase, initiated in 2014. The open-access OpenQuake software for hazard and risk assessment has been released and is available online to the scientific community. Five GEM Global Components have been completed in 2013-2014 with the participation of IASPEI experts and producing new global standards of high interest for the whole IASPEI community: the *ISC-GEM Global Instrumental Earthquake Catalogue*, with more than 20,000 events covering 110 years of seismic history in a highly homogenous way (IASPEI organized the Scientific Advisory Board), the *Global Geodetic Strain Rate model*, the global database of active faults and seismic sources (*Faulted Earth*), the *Global Earthquake History* database and the compilation of *Global Ground-Motion Prediction Equations*. GEM will complete a global hazard model by end 2015, including also the results of regional projects such as SHARE (Europe), EMME

(Middle-East) and EMCA (Central Asia). The IAEE-IASPEI Joint Working Group on the International Alliance of Seismology and Earthquake Engineering Professional Associations activities were related to one of its missions: the GEM project, a global risk assessment initiative. Domenico Giardini, IASPEI President and GEM Foundation Governingfounding member, Board member, attended several Board meetings on behalf of IASPEI.

### **Other IASPEI-supported meetings**

IASPEI has sponsored (on its own or via an IUGG grant) the following workshops/symposiums:

- *Session S4.6 of Seismotectonics and Seismic Hazards in Africa*, a session at the CAG23, 7 - 14 January, 2011, Johannesburg, South Africa, was sponsored by IASPEI. IASPEI support went to a student from the Ethiopia Geophysical Observatory.
- *International Symposium on "Advances in Earthquake Science-2011"* held at the Institute of Seismological Research, Raisan, Gandhinagar, India, on January 22-24, 2011, with 169 attendees of whom 15 supported by IASPEI/IUGG funds. Organized by the Institute of Seismological Research, Department of Science & Technology, Government of Gujarat.
- *12th International Workshop on Modeling of Mantle Convection and Lithospheric Dynamics*, held in Groß Dölln (Germany) on August 20-25, 2011 with around 120 attendees. It was organized by GFZ under the auspices of the Commission on Earth structure and Geodynamics.
- *International Symposium on Geophysical Imaging with Localized Waves*, held at Sanya, Hainan Island, China on August 2011. It was organized by Ru-shan Wu under the auspices of the Task Group on Seismic Scattering and Heterogeneity, IASPEI Commission on Seismological Observation and Interpretation.
- *International Course on "Theory and Practice on the waveform inversion to compute the seismic moment tensor, Point- and complex-source modeling using program ISOLA"*. Held on September 2-10, 2011 in Costa Rica and organized by Ronnie Quintero (National University and Seismological and Volcanological Observatory of Costa Rica). 21 participants from Latin America attended the workshop, three of them sponsored with IASPEI funds.
- *The Magmatic Rifting and Active Volcanism Conference* was held in Addis Ababa, Ethiopia, 11-13 January 2012. More than 200 scientists from across the planet gathered to discuss their latest findings on the causes and impact of magmatic rifting and active volcanism in a variety of tectonic settings.
- *ECGS 2012: Earthquake source physics on various scales*. This workshop was organized by the European Center for Geodynamics and Seismology and held during three days, from 3 October 2012 until 5 October 2012, at the Alvisse Parc Hotel in Luxembourg City.
- *Latin American Seismology Symposium*. Held in Peru, it was the venue where the Latin American and Caribbean Seismological Commission (LACSC) was formed.
- *The 13<sup>th</sup> International Workshop on Modelling of Mantle and Lithosphere Dynamics*, held in Norway at Klækken Hotel in the vicinity of Oslo. 95 scientists attended the workshop, among which 32 graduate students and 17 postdoctoral researchers, from Europe, North America and Japan. Thirteen keynote speakers gave overviews and discussed latest developments in subduction dynamics, plume dynamics, numerical techniques, surface and deep processes and dynamics of planetary interiors.

- IRIS Seismological Workshop *Managing Waveform Data and Related Metadata for Seismic Networks*, Kuwait, January 14-18, 2013. More information can be found at [http://www.iris.edu/workshops/2013/kuwait\\_metadata/](http://www.iris.edu/workshops/2013/kuwait_metadata/).
- The International Workshop *Training course in full waveform inversion for moment tensors and multiple source models* was held at Brasilia University in December, 2013, organized by the Seismological Observatory. 20 Latin American geoscientists from eight different countries attended the course.
- *Mega earthquakes and tsunamis in subduction-zones: forecasting approaches and implications for hazard assessment*, Rhodes, Greece, 6-8 October 2014.
- Special Symposium – *Four paradigms in predicting extremes: Legacy of Vladimir I. Keilis-Borok*, Merida, Yucatan, Mexico, 2-4 June 2014.

### **Scientific Programmes, Projects, Publications**

The IDEA (International Digital Earthquake Archives) project of the Committee for Preservation of WWSSN and Historical Seismograms (also called simply *Seismoarchives: Seismogram Archives of Significant Earthquakes of the World*), under the guidance of Willie Lee, has achieved significant progress in this quadriennium. IRIS is archiving the scanned seismograms.

Several projects have been completed and are in progress, among the latter: *Project for the preservation, by scanning, of the old Batavia seismograms*, funded by the Earth Observatory of Singapore (EOS) in cooperation with the Meteorological, Climatological and Geophysical Agency of Indonesia (BMKG).

The IUGG-funded IASPEI-ISC Project *Networking of world seismologists (Improving Geophysical Science Link to the Society during Natural Extreme Events, Especially in Developing Countries)* was completed within this quadrennium. IASPEI and ISC have developed and are maintaining a worldwide registry of seismologists & geophysicists willing to serve as a point of contact in countries with and without affiliation to IUGG. This registry is available for scientific & research institutions, governmental bodies, charitable and relief organizations and media following natural extreme events such as earthquakes and tsunamis.

### **Publications**

#### *IASPEI New Manual of Seismological Observatory Practice (2<sup>nd</sup> edition) on the Web*

Some 2,000 hard copies of the first printed edition of the IASPEI New Manual of Seismological Observatory Practice (NMSOP 2002) are currently in use in more than 100 countries at seismological observatories, data and analysis centers, in teaching, research, and field applications, used as basic material in national and international seismology training courses, or by private enterprises and individual scientists.

In 2014, a rigorously updated and amended electronic second edition, NMSOP-2, was completed and put online, thanks to the efforts of Peter Borman. This version, as well as future ones, are professionally maintained, further developed and edited by the GFZ German Research Centre for Geosciences under a long-term commitment, the auspices of IASPEI and its Commission on

Seismological Observation and Interpretation (CoSOI). All versions, including the slightly corrected 2009 electronic version of the first edition, are freely available and downloadable via <http://nmsop.gfz-potsdam.de>. This Website is mirrored by IASPEI (<http://www.iaspei.org/projects/NMSOP.html>) and the ISC (<http://www.isc.ac.uk/standards>). With some 2000 pages of texts and figures, plus linked sources of information, NMSOP-2 is the largest seismology E-book available to date.

The following publications are available from the IASPEI Secretariat. IASPEI on approval distributes free copies of its publications to institutional libraries in less developed countries.

- *IASPEI: Cooperation for Better Understanding of the Earth* (26-page brochure).
- *International Handbook of Earthquake and Engineering Seismology (Part A and B)*, a two-volume comprehensive review, a state-of-the-art reference for seismologists, earthquake engineers, geologists, and geophysicists. For more information, consult the website, <http://www.academicpress.com/quake>.

## **IASPEI Newsletter**

The IASPEI Newsletter is distributed regularly as pdf file attachment to e-mails. The Newsletters are also available for downloading from the website. Apart from reports on IASPEI and its Commissions activities, it contains also special articles about anniversaries of several important seismologists of the past and obituaries for prominent scientists. 17 issues were distributed worldwide in the quadrennium 2011-2014.

## **IASPEI Website**

IASPEI has its own website [www.iaspei.org](http://www.iaspei.org). In 2011 the domain moved from the USA to a new server at BGS, UK (maintained by the webmaster Alice Walker), whereas in late 2014 the website was moved from the BGS in Edinburgh to the ISC in Thatcham (UK). The new IASPEI webmaster is now Przemek Ozgo. A complete restyling the website is to be accomplished within 2015.

## **IASPEI Medal**

IASPEI has decided to award no more frequently than biennially an IASPEI Medal for outstanding service in furthering the aims of IASPEI. The first IASPEI medal was awarded to Robin Adams during the IASPEI Scientific Assembly in Gothenburg, Sweden (2013).