October 2012

IN THIS ISSUE

Foreword

Dear readers,

We are less than one year from our 2013 Scientific Assembly, to be held jointly with IAHS and IAPSO in Gothenburg, Sweden (22-26 July 2013). Program, registration and abstract submission are now online. Keep following the news at the conference website!

Among the highlights of this issue: A short report on the Varzaghan-Ahar twin Iranian earthquakes; The 150th Anniversary of Galitzin's birth; New book available with discount for IASPEI readers.

Enjoy reading the Newsletter and do contribute to it with short papers and announcements.

Peter Suhadolc
Secretary General

<u>*Please note:*</u>

I am sending out the Newsletter as an attachment to an e-mail, trying to limit its size. It can also be downloaded from the IASPEI website: http://www.iaspei.org/newsletters/newsletters.html

The IASPEI Newsletter is distributed to National Correspondents and other national representatives we know of, to all IASPEI officers, to IASPEI scientists who attended recent IASPEI Assemblies, and to various research organisations in countries around the world.

The 37th IASPEI Scientific Assembly Göteborg, Sweden July 22-26, 2013

SCIENTIFIC PROGRAM, REGISTRATION AND ABSTRACT SUBMISSION NOW ONLINE!!

The Conference website:

http://www.iahs-iapso-iaspei2013.com

reports now the full scientific program and it is possible already to register and submit abstracts!
Please enter in your agenda:

Abstract deadline is February 4, 2013.

If possible, please, do not wait until the very last minute to submit your abstract!

IASPEI HISTORY A REQUEST

IASPEI archives have no copies of the IASPEI Newsletters 1-16, from 1980 to1986. If anyone has copies of these we would very much appreciate if you could send them (originals or scanned copies) to the IASPEI Secretary General.

We are also looking for somebody that has kept copies of IASPEI Newsletters that were sent after 1997 but before 2004 by IASPEI bulk email.

Peter Suhadolc

Preliminary Reconnaissance Report on August 11th 2012, Varzaghan-Ahar Twin Earthquakes in NW of Iran

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Mohsen Ghafory- Ashtiany
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Chairman of IASPEI Commission on Earthquake Hazard, Risk and Strong Ground Motion

Introduction

At 16:53 of August 11, 2012 (local time), an Mw6.2 earthquake occurred near the cities of Ahar and Varzaghan in the East-Azerbaijan province in the northwest of Iran. This event was followed by another event at 17:04 (11 minutes after the first shock) with Mw6.1 within 15km distance from the first event [Fig.1].

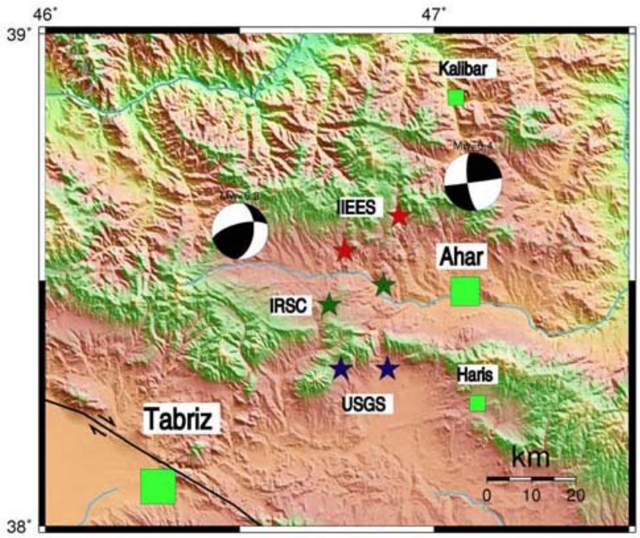


Figure 1. Location of the main seismic events

Due to these two earthquakes around 20 villages (Gourdeh, Dino, Bajebaj, Sarand, Shahsavar etc.) were completely destroyed and the cities of Varzaghan, Ahar and Heriss suffered different levels of damage. The events caused panic among two million people in the Azerbaijan province, leading many people to sleep outside for two nights. The earthquakes killed 327 people and claimed more than 3000 injuries and made 30000 homeless. Buildings in the epicentral area experienced different levels of damage. Most of the adobe buildings in villages collapsed and several masonry and framed buildings were damaged. Some of the roads were damaged due to the surface faulting and geotechnical instabilities. Furthermore, some of the bridges suffered earthquake-related damage, but were in use after the event. Many of the essential facilities (e.g. hospitals) in the worst hit areas were damaged and some industrial plants experienced economic loss due to the unsafe shutdown process after the earthquake.

Description of the Event

The first earthquake occurred at 38.55°N 46.87°E east of Varzeghan and west of Ahar city and the second one took place at 38.58°N 46.78°E [Fig. 2]. The focal depths of the events were less than 15 km. The focal mechanisms of the both events indicate strike-slip movement probably along the Ahar fault as shown in Figures 1 and 2 [1].

Figure 2. Some examples of surface faulting

It should be noted that an investigation is underway to map the causative faults, since apparently the Ahar fault had not been considered as an active fault before. The strongest SGM acceleration PGAs of the first and the second earthquakes were 0.427g and 0.534g (uncorrected records) respectively, recorded at BHRC-Varzaghan station, as shown in Figure 3 [3]. The variation of the recorded PGA in the region is shown in Figure 4.

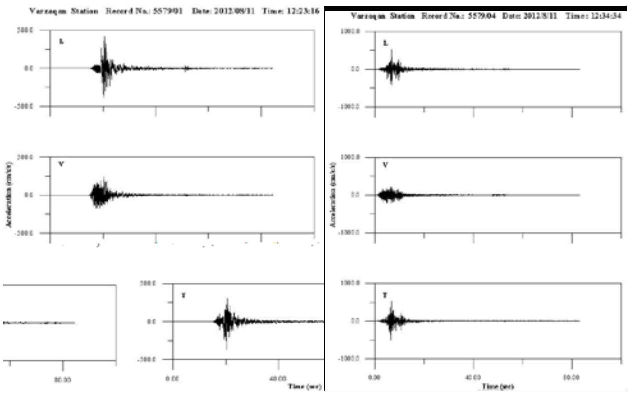


Figure 3. Acceleration time histories of the main events recorded at Varzaghan station (a) the 1st event, PGA=0.436g (b) the 2nd event, PGA=0.544g

Until Aug 20, 2012 more than 1000 aftershocks have occurred in the region, in which more than 100 had magnitude larger than 3 as shown in Fig 5. This figure shows the trend of the causative faults as well. Figure 6 shows the daily number of major recorded aftershocks within 8 days after the earthquake.

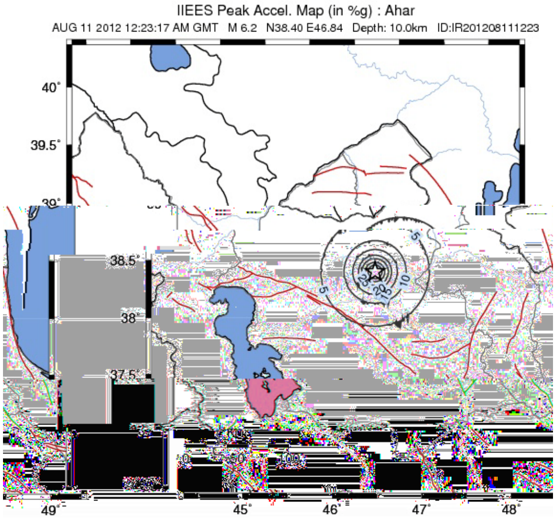


Figure 4. Variation of PGA in the affected area [IIEES]

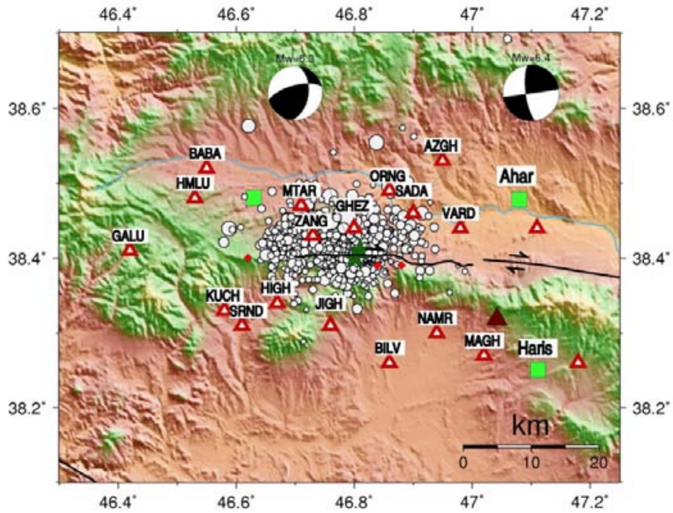


Figure 5. The locations of the aftershocks (IIEES, Prepared by Dr. M. Tatar)

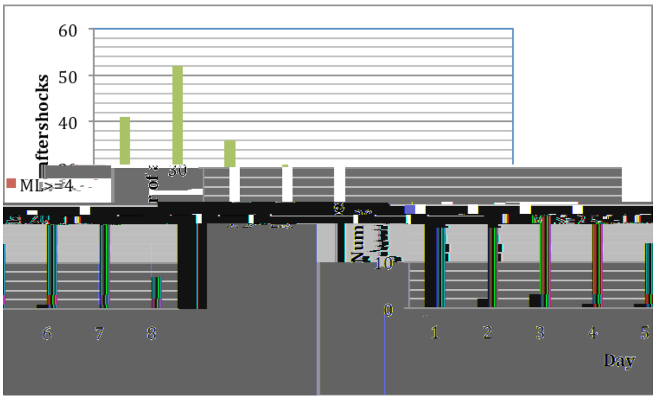


Figure 6. Number of major aftershocks until August 18, 2012

Note: The full report can be downloaded from the IASPEI website.

BORIS BORISOVICH GALITZIN (1862–1916), THE FOUNDER OF MODERN SEISMOLOGY

By A.V. Ponomarev and A.Ya. Sidorin

Boris Borisovich Galitzin was born on March 2, 1862 in Saint Petersburg. He belonged to one of the oldest and most eminent princely families in Russia. B.B. Galitzin graduated from the Naval School and Naval Academy; in both these educational institutions, his name was inscribed in gold on the marble plaques commemorating the distinguished students. After graduation from the Academy as a midshipmen, B.B. Galitzin participated in the long-range naval expedition. After resigning from the Navy, he entered the faculty of physics and mathematics of the Strasbourg University. In 1887, B.B. Galitzin defended his dissertation “On the Dalton Law” and was awarded a Summa cum laude diploma.

After returning to Russia, B.B. Galitzin lectured at the Moscow and Yuriev (Derpt) universities. In 1893, he submitted his thesis “Research into the Mathematical Physics” for the master's degree. The thesis contained a series of breakthrough ideas that were ahead of their time. This work paved the way for the emergence of quantum mechanics. Max Planck, the Nobel Laureate, noted that that study by B.B. Galitzin was a valuable gift for him.

Academician Count Boris Borisovich Galitzin, Head of the Main Military Meteorological Agency (1862-1916)

Starting from 1894 until his death, B.B. Galitzin was Director of the Physical Cabinet (laboratory) at the Russian Imperial Academy of Sciences. Later, on the basis of the Cabinet, the Physico-Mathematical Institute of the Russian Academy of Sciences was organized. In 1913, B.B. Galitzin was also elected Director of the Main Physical Observatory. While working in this position, he greatly contributed to the progress in meteorology and left a deep and fruitful imprint in this science. He greatly expanded the scientific research, organized the Synoptic Department, launched the investigations aimed at the long-term weather forecasting, created the Main Military Meteorological Agency. He reorganized the Main Physical Observatory into the Main Geophysical Observatory and substantially changed the scope of its activities.

Prince B.B. Galitzin was not only an eminent scientist; he was also a noted state and public figure. In 1899--1905, he headed the Department of State Currency Production, which was one of the largest enterprise with a staff of more than 4000 people and a huge money turnover. In this position, Galitzin focused his major attention on technical modification of the enterprise. He implemented large social reforms, significantly developed labor productivity, and turned the business that was close to failing into a profitable enterprise.

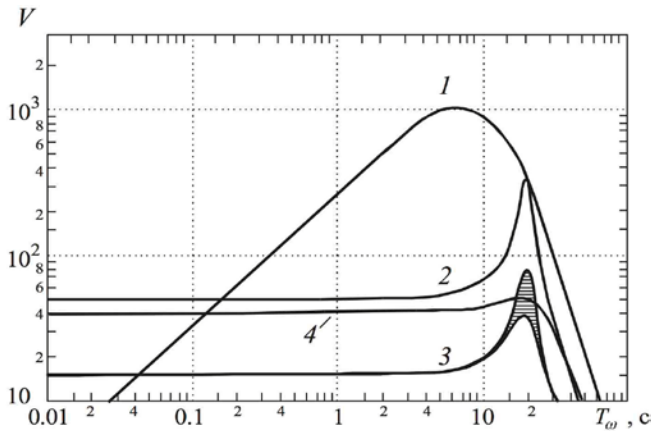
Due to his outstanding services in the creation of the Russian aviation, B.B. Galitzin is often referred to as the founder of the Russian aircraft. He initiated the production of airplanes at the Russo-Baltic Wagon Factory and invited I.I. Sikorsky to work as a chief designer. Sikorsky, who held that position before 1917, has later become the greatest aircraft designer in the USA.

During several years, B.B. Galitzin was member of the Municipal Council and took part in the activities of the Commission on public education. He developed the education reform project; many concepts suggested in that project were implemented in the school that he opened at the Department of State Currency Production.

However, the heart of B.B. Galitzin's life was seismology. He was among the pioneers who laid the foundation of this science. In the opinion of B.B. Galitzin, the main objective of seismology is to determine the true elements of the ground motion. He developed the general theory of a horizontal pendulum that considers all the six components of the ground motion. This theory has first been presented at the session of the Imperial Saint Petersburg Academy of Sciences on January 16, 1902 and then published in the same year.

The name of B.B. Galitzin is associated with the development of the rigorous mathematical theory of seismic rays and calculation of the true ground displacements from the records of seismic waves. He solved the problem of locating the epicenter of the earthquake using the data recorded at a single station; the method suggested by Galitzin is widely used even now. He developed the way to locate the epicenter of the earthquake by analyzing the seismic records at two stations; he also studied the polarization of seismic waves.

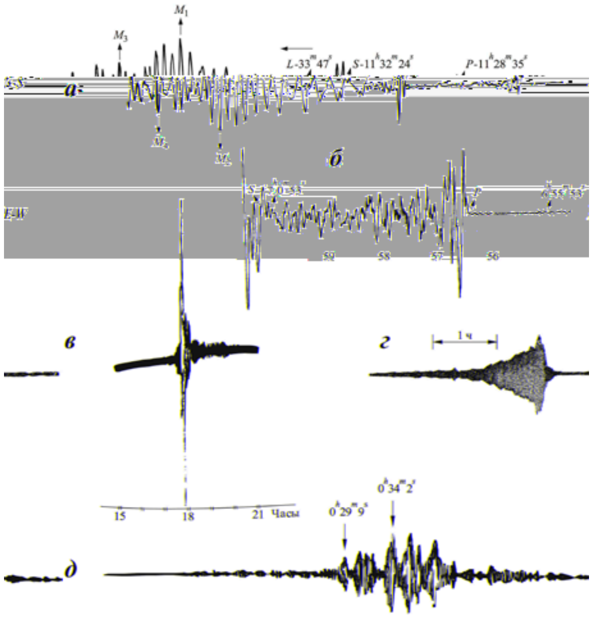
B.B. Galitzin was the first to suggest determining the energy of the earthquake from the seismogram. He verified this method by the case study of the Sarez earthquake of 1911. His idea was to estimate the seismic energy emitted by the source of the earthquake using the data on the energy density of the vibrations at the remote point located far from the epicenter; this energy density is proportional to the ratio of the amplitude of the vibrations to their period. At present, this idea is widely used in various magnitude scales of the earthquakes. B.B. Galitzin proposed an elegant way to investigate the structure of the Earth's interior by analyzing the departure angles of longitudinal seismic waves on the Earth's surface. He developed the theoretical basis for this method and, using the data observed at the seismic stations in Pulkovo, assessed the probable variations in the properties of the Earth at a depth of 106, 232, 492, and 1444 km.



The typical characteristics of the seismographs with various pendulum designs: 1 the Galitzin's seismograph with galvanometric recording; 2 the von Rebeur-Paschwitz seismograph; 3 the Milne's seismograph; 4 the heavy horizontal pendulum designed by Galitzin, with mechanical recording and magnetic damping.

However, B.B. Galitzin's most profound influence on science is associated with his contribution to the progress in seismometry. He invented and began manufacturing the seismometers that converted the seismic signal into the electric signal. The high-quality seismograms provided by the instruments designed by B.B. Galitzin made it possible to pose and solve appreciably more difficult seismological problems, in particular, to study the dynamical characteristics of the seismic waves. B.B. Galitzin suggested the optical system in which the signal induced in the coils is recorded on the moving photosensitive tape with the aid of the galvanometer mirror. Simultaneously in 1902, he also proposed the new method for pendulum damping, namely, the electromagnetic damping.

Later, Galitzin replaced the electromagnet by the permanent magnets. He noted that the records by the Milne pendulums that have no damping are of a very low value for solving the questions concerning the propagation of the earthquakes. At the Hague meeting of the International Seismological Association in 1907, he proposed to everywhere provide the pendulums with damping. The development of the theory, the design of the seismographs with galvanometric recording, and the use of the magnetic damping to suppress the free oscillations of the pendulums, have instantaneously raised seismometry to a principally new level. A new era started in the evolution of seismometry and seismology. The devices designed by Galitzin were used as the basic instruments at many seismic stations worldwide up to the middle 1970-s; for example, in Strasbourg, they have been decommissioned in 1975.



The examples of original seismograms recorded by various seismographs. a, b are the seismograms of the earthquakes on February 9, 1909 (a) and January 13, 1915 (b) recorded at the Pulkovo observatory by the horizontal seismograph designed by Galitzin. c, d are the records by the Rebeur-Paschwitz instrument at the seismic station in Germany: the seismogram of the earthquake in Tokyo on April 17 1899 (c) and the seismogram of the earthquake in San Francisco on April 14, 1906 (d). e is the seismogram of the earthquake on April 5, 1901 recorded by the seismograph designed by Milne.

In order to calculate the true ground displacements using the records by the seismograph and to solve a number of other problems, one needs to know the instrumental characteristics of the measuring system, i.e. the instrumental coefficients of seismic devices. With this purpose, Galitzin developed the methods and the means for calibrating the instruments. In 1901, he suggested using a movable vibration platform for this, and in the same year, the first platform was built. He established that the atmosphere directly affects the pendulums of the long-period seismographs and was first to suggest placing the pendulum into a vacuum camera.

B.B. Galitzin developed an objective macroseismic scale, in which the acceleration and the intensity of the earthquake were evaluated from the tipping of the standing blocks of various sizes. Galitzin was the first to suggest using the recorded acceleration data for calculating the seismic loads on the constructions and developing the efficient measures for their protection. Soon he designed and scrupulously tested the instrument for direct recording the accelerations. The operation principle of this devise implemented the original idea of Galitzin that the mechanical vibrations can be converted into the electric oscillations by utilizing the piezoelectric effect of quartz. B.B. Galitzin has investigated the vibrations in various points within the 5-store building and suggested the practical measures for improving the seismic stability of buildings and constructions at the stage of their design engineering.

B.B. Galitzin carried out the detailed study of microseisms and found that the enhancement in microseismic vibrations precedes the occurrence of the cyclone. He hypothesized that this phenomenon could be used for forecasting the cyclonic activity. He developed the first program on earthquake prediction research in Russia and started its implementation. B.B. Galitzin believed that the earthquakes occur as a result of the accumulation of the elastic stresses in the rocks, and therefore he emphasized the necessity to monitor the slow displacements of some rocks relative to the other rocks, which manifest themselves by the bradiseismic phenomena close to the Earth's surface.

The memorial kit of the Galitzin's seismograph at the Pulkovo station (2012). Photo by A.Ya. Sidorin.

It is clear that he meant regular geodetic observations. B.B. Galitzin also suggested instrumental monitoring of seismic velocities, the outputs of the springs, and some other parameters. He designed the specialized instruments and developed the models describing the emergence of the precursors for this program. Galitzin believed that the velocities of longitudinal and transversal seismic waves are strongly controlled by the physical properties of the upper layers of the Earth; based on this idea, he developed the concept of seismic prospecting.

B.B. Galitzin also greatly promoted the progress in a number of other important fields of seismology. In particular, he noted that the seismograms could probably contain the information about the free oscillations of the Earth; he noticed that the properties of the subsoils strongly affect the seismic records; he accounted for the occurrence of the earthquakes by the accumulation of the elastic stresses; he hypothesized triggering effects of seismicity, etc.

The contribution of B.B. Galitzin to seismology is so valuable that he is worldwide acknowledged as the father of this science.

On May 17, 1916, B.B. Galitzin died of a cold that he caught when hunting.

NEW BOOK

Although this book is meant for the wider public, we publicise it here, since it can be of use to those who are engaged in Educational Seismology in Schools. The book can be a great introduction to seismology for a young enthusiast.

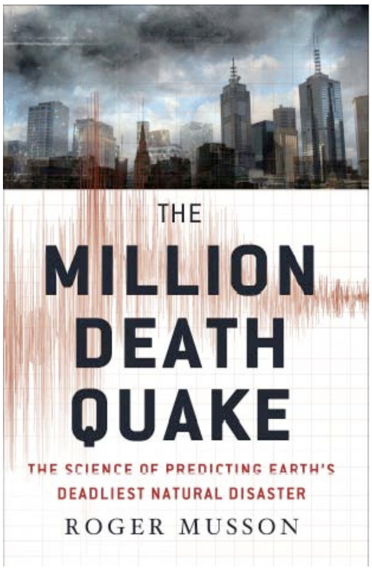
The Million Death Quake

The Science of Predicting Earth's Deadliest Natural Disaster

Roger Musson

About the Author

Roger Musson is a leading seismologist with the British Geological Survey, and their chief spokesman after any major earthquake, speaking to media outlets worldwide including *Time* magazine, the *New York Times,* the *Associated Press*, *Reuters*, ABC, CNBC the BBC, and the National Geographic Channel, among others.



About the book

We have weeks of warning prior to volcanic eruptions, days of warning before a blizzard, and hours of warning before tornadoes. Yet scientists are still unable to predict when and where an earthquake will strike next. Thousands of quakes occur every year around the globe, and many densely populated cities are at risk from the next catastrophic earthquake that could kill millions.

Seismologist Roger Musson has been studying earthquakes for three decades. In this original and groundbreaking book, he takes the reader on an informative journey of everything you wanted to know about earthquakes. Musson explores how the powerful geological forces that drive earthquakes and tsunamis were first discovered. He explains why places such as California and Japan are hot spots, and why rogue quakes can potentially strike in unlikely places such as Charleston, South Carolina and Hong Kong. The real danger of earthquakes isn't from the ones we are expecting—it's from the ones we aren't. Surveying the future of earthquake prediction, Musson breaks down the science behind one of the world's most terrifying natural disasters, and shows how amazing feats of engineering are now making our cities earthquake-proof.
Highlighting hotspots around the world from Mexico City to New York City this is a compelling scientific adventure into nature at its fiercest.

Technicalities
Binding: Hardback
Publication Date: 16 October 2012
Price: £16.99
Extent 272 pp, Format 235x156mm
ISBN 978-0-230-11941-3
Publisher: Palgrave Macmillan Ltd
www.palgrave.com

Receive 20% off the RRP of *The Million Death Quake* by visiting www.palgrave.com and entering discount code XP356ED for USA and Canada orders and WIASPEI20* for UK and rest of the world at the checkout.

- Valid until 31st December 2012.

Disclaimer
The content of a book advertised in the Newsletters does not necessarily reflect IASPEI stands. IASPEI Executive Committee maintains the right to refuse without explanations the advertising of a given book in its Newsletters.

Meetings Calendar

A calendar of scientific meetings relevant to the interests of IASPEI scientists is maintained at:

http://www.iaspei.org/meetings/forthcoming.html

where more details can be found. We report below just the titles, dates, places and websites of the forthcoming meetings.

2012

The 2012 84th Eastern Section-SSA Annual Meeting
28-30 October 2012, Blacksburg, Virginia, USA
Hosted by VA Tech
Webpage:
http://www.geol.vt.edu/outreach/vtso/esssa2012/

Conference and Advanced School on QUANTIFICATION OF EARTHQUAKE HAZARDS IN THE CARIBBEAN: THE GONAVE MICROPLATE
November 26 to December 7, 2012
Santiago de Cuba, Cuba
Submit applications online through the activity webpage
http://agenda.ictp.it/smr.php?2380
Contact: smr2380@ictp.it
Website: http://www.ictp.it/

1st International Conference on Frontiers in Computational Physics:Modeling the Earth System
December 16 – 20, 2012, Boulder, CO, USA
Website:
http://www.frontiersincomputationalphysics.com/
Fall Meeting of the Americal Geophysical Union
December 3-7, 2012, San Francisco, CA, USA
Website:
http://fallmeeting.agu.org/2012/

2013

EUG General Assembly 2013
April 07–12, 2013, Vienna, Austria
Website: http://www.egu2013.eu/

2013 Seismological Society of America Annual Meeting
17–19 April 2013, Salt Lake City, Utah, USA
Website: http://www.seismosoc.org/meetings/

AGU Meeting of the Americas
14–17 May 2013, Cancun, Mexico
Website: http://moa.agu.org/2013/

Joint Scientific Assembly of IAHS-IAPSO-IASPEI
July 22 – 26, Gothenburg, Sweden
Contact: iahs.iapso.iaspei2013@congrex.com
Website: www.iahs-iapso-iaspei2013.com

8th International Symposium on Rockbursts and Seismicity in Mines
September 2013, St.-Petersburg and Moscow, Russia
Website: http://pts.mi-perm.ru/rasim.

General Information about IASPEI

The International Association of Seismology and Physics of the Earth's Interior is one of the eight Associations of the International Union of Geodesy and Geophysics [IUGG].

The other IUGG Associations are:

Int'l Association of Cryospheric Sciences (IACS)
Int'l Association of Geodesy [IAG]
Int'l Association of Hydrological Sciences [IAHS]
Int'l Association of Meteorology and Atmospheric Sciences [IAMAS]
Int'l Association for the Physical Sciences of the Oceans [IAPSO]
Int'l Association of Geomagnetism and Aeronomy (IAGA)
Int'l Association of Volcanology and Chemistry of the Earth's Interior [IAVCEI]

Scientific Assemblies

IASPEI holds an Ordinary General Assembly every four years in conjunction with each Ordinary General Assembly of IUGG. Between the General Assemblies, IASPEI holds a Scientific Assembly, sometimes meeting with one of the other Associations of IUGG.

Participation in IASPEI Activities

IASPEI welcomes all scientists throughout the world to join in research into Seismology. IASPEI is subdivided into a number of Commissions, many of which have working groups for the study of particular subjects in their general areas of interest. On occasion, these internal IASPEI groups issue their own newsletters or circulars and many maintain their own web sites. At the IASPEI Assemblies, the groups organize specialist symposia, invite scholarly reviews and receive contributed papers that present up-to-the-minute results of current research. The IASPEI web site gives, or provides links to, information on the range of IASPEI activities.

The IASPEI Web site

Information on IASPEI can be found at:
http://www.iaspei.org/

Contacting IASPEI

The Secretary-General is the main point of contact for all matters concerning IASPEI.

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