



## 1. OBJECTIVES AND PROGRAMME OF THE TRAINING COURSE

The disastrous consequences of destructive earthquakes place a heavy burden on many societies and their economies, particularly in developing countries. In order to avoid or at least to mitigate the negative effects of such events a thorough scientific knowledge of their geological and geophysical causes, their structural, kinematics and dynamic characteristics and destructive effects as well as a developed capability to monitor and to analyse them is indispensable. The vulnerability of human societies and related human and economic losses due to earthquakes are steadily growing as a consequence of rapid population growth and urbanization. Accordingly, improved risk assessment and effective disaster mitigation measures are prerequisites to ensure sustainable development in earthquake-prone countries.

The GFZ German Research Centre for Geosciences is running an annual four weeks international training course in the field of seismology and seismic hazard assessment. This training course is part of related programs of the United Nations (OCHA and UNESCO) aimed at promoting training and know-how transfer, especially to nationals from developing countries. The courses are a contribution to the Sendai Framework for Disaster Risk Reduction 2015-2030.

In 2019, the GFZ organizes and runs the course in Potsdam, Germany in the time period 12 August to 6 September 2019 for the benefit of participants from earthquake-prone developing countries under the main topics:

### **"SEISMOLOGY, SEISMIC DATA ANALYSIS, HAZARD ASSESSMENT AND RISK MITIGATION".**

The training course 2019 is sponsored by the Federal Foreign Office (FFO) of Germany (Berlin) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. It is also supported by the United Nations Educational, Scientific and Cultural Organization

(UNESCO, Paris), the Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (INOGS) Italy, and by the University of Bergen and the United Nations University (Bonn). Until 2018, more than 1100 participants from 119 countries, amongst them graduate students, university lecturers as well as senior staff and directors of reputed research institutes, have attended the seismology training courses organized and supported by the GFZ Potsdam. Since the foundation of the GFZ in 1992 these courses are, as an essentially new feature, held alternately every second year in Potsdam and as regional courses in a hosting country of Africa, Asia or Latin America. In the latter case, the course topics are specifically tailored to the needs and potentials of the respective region and integrate many local lecturers into the international team of instructors.

More details on the training courses, including the circular, programme and application form for the course in 2019 can be found on the GFZ web-page under <http://www.gfz-potsdam.de/en/centre/education-and-training/seismology/>.

In line with the steadily growing demand by participants in former courses for mainly practice-oriented training and workshop discussions related to case studies, the current course programme comprises, besides introductory and state-of-the-art review lectures on the various subjects of earthquake seismology and risk assessment, extensive practical exercises, demonstrations, workshop discussions and scientific excursions. The excursion in 2019 will focus on visits to (geo-) physical and seismological observatories. Generally, the course programme aims at developing interdisciplinary problem understanding, acquaintance with the theoretical fundamentals and basic features of modern instrumentation, commonly used models and algorithms as well as developing practical skills in data evaluation and analysis.

The scientific-technical background and work duties of the course participants are usually rather different. None the less, there are generally two main groups of applicants:

- those mainly working in the field of seismic hazard and risk assessment, earthquake zonation and microzonation and/or earthquake engineering and disaster management;
- those responsible for the installation, maintenance, operation of and/or data analysis at seismic stations or network centres.

The detailed scientific programme of the course is annexed to this circular. Several changes are introduced with the training course 2019, mainly following suggestions of former course participants as well as adapting to modern possibilities in running such a course:

- The training course is planned as a 4-week course. The training is dedicated to fundamental lessons and exercises on Seismology, Microzonation, Strong Ground Motion, and Seismic Hazard Assessment and Risk Estimation. Additional topics are the use of InSAR and geodynamic modelling. In addition, the course participants will also closely work together with experts in small groups for 2 days (Expert Days). Already with the application, an interested person can propose a topic he/she wants to work on during the Expert Days and which data and methods they want to apply.

- Some sessions of the training course are dedicated to scientific-technical presentations by the course participants. He/she has to report about his/her work. The scientific-technical presentations are planned as talks to the other course participants and interested colleagues from the GFZ.

- In case a course participant wants to use his own data (seismic data, instrumental microzonation, earthquake catalogue, etc.) during the time of the Training Course a copy of the data has to be sent to the GFZ before arrival for checking and quality control.

Starting with this year there is an **important extension** for further qualification available. Former course participants can apply for additional support from the International Training Course. In case you have an idea for a project, or an interest in gaining further qualifications, you can submit a short application (1 page).

This proposed project should build upon the background you gained as a course participant. We can provide (for a short period of time) a limited number of instruments, as well as software tools for data analysis. The aim should be to produce a common publication for submission to an international journal. Any acquired data will have to be made publically available in an electronic form. You will need a partner (lecturer) from the training course. The time for the project should be "short" – we cannot support a full Master or PhD project (note, there are other funding possibilities offered by DAAD or the Humboldt Foundation). However, we can support your visit to the GFZ or another institution with a travel grant and even a short-term scholarship. A board of lecturers will select the projects to be supported.

Throughout the course the completion of exercises by the participants as well as their contributions to workshop sessions and topical discussions are evaluated.

**The successful participation in the course is acknowledged by a certificate at the end of the course.**

## 2. APPLICATION AND ADMISSION

### 2.1 Conditions for application and admission

The course is arranged for the benefit of participants from earthquake-prone countries. To make the training effective, the number of participants is limited to 25. Preference is given to young candidates engaged in seismology, seismic monitoring and zonation, earthquake data analysis, hazard, vulnerability and/or risk assessment. Applicants should have active interest and obligations in these fields. Engineers with background and duties in earthquake engineering and disaster management who want to deepen their understanding of seismological phenomena, methods and data products are also considered, as are researchers or university lecturers in geosciences who may act as conveyers of the knowledge acquired in the course (training of trainers).

**Applicants must have** a scientific degree (B.Sc. or M.Sc., diploma or higher) in geosciences, physics or engineering from a recognized university, a focus will be on PhD-students. Preferably applicants should have several years of professional experience in subjects covered by the course. Applicants must also have **a thorough knowledge of English** which is **the only working language of the course**.

It is also **mandatory** for admission to the course that applicants are able and willing to present **a paper (15 minutes + 5 minute discussion) on their work and the specialisation during the Expert Days**.

Priority is given to applicants who are able to cover the cost for travel from domestic institutional or development-aid project funds for training. Only a limited number of **Travel grants** are available to selected participants from developing countries in need of support.

**An application is considered only** when:

- **the attached application form is duly filled-in and submitted in time**
- **the application form is accompanied by two letters of recommendation**

- **applicants give the topic they want to work on during the Expert Days**
- **the applicants give the title of their scientific presentation in the application form (with abstract)**
- **a sound motivation letter written by the applicant himself is submitted (½-1 page)**

Those who intend to present and discuss additionally in a special workshop session data, methods used or case studies from their country should indicate this separately in the registration form and submit an abstract giving details about the subject, method applied, kind of data available as well as of the open questions they want to thresh out.

**Without such specifications and accompanying documents an application will not be considered!**

All participants have to present, at social evening get-togethers (**cultural evening**), slide, power point or self-produced video shows or any other suitable kind of material or personal performances (dances, songs, instruments) which can convey to their fellow participants some impressions about geography, culture, customs, music and daily life in their respective home countries. Such presentations should be limited to max. 10 - 15 min.

In the selection of participants **preference is given to those applicants**, who (as confirmed in the application forms and accompanying letters):

- are most in need of training in the subjects covered by the course;
- are concerned with the operation of and data analysis at seismic stations or network centres;
- are working with seismic hazard assessment or microzonation;
- are involved in vulnerability and risk assessment, engineering seismology, and/or disaster management and mitigation projects;
- can serve as multipliers in spreading the knowledge and skills acquired;
- can make an active contribution to the workshop sessions and discussions;
- had applied already earlier for the course, been found eligible/qualified but could not be accepted due to the limited number of fellowships available for each course;
- can pay their travel.

The application forms and accompanying candidates' files will be carefully screened by the Academic Board and Selection Committee of the course. Members of the board are prominent geoscientists of the GFZ German Research Centre for Geosciences and representatives of the Foreign Office as the main sponsor of the course. Chairman is Prof. Dr. T. Dahm, head of section 2.1 "Physics of Earthquakes and Volcanoes" at the GFZ.

### 2.2 Application formalities

Applications should include the following information:

- (1) Filled-in application form;
- (2) List of scientific publications; (if available)
- (3) Two letters of recommendation or reference which give details on the applicants personality, duties and performance in seismic station operation, data analysis or other specified applied or research projects;
- (4) Confirmation of appropriate command of English;
- (5) Title and one page abstract of the proposed topic or case study to be presented or discussed in a special workshop session;
- (6) Title and kind of intended cultural presentation;
- (7) Letter of motivation;

(8) Topic or field of interest during the 2 Expert Days.

One copy of the application documents should be posted or faxed or sent by email as scanned documents to reach the address below not later than **April 26, 2019**:

**Candidates will be informed of the decision of the Academic Board by May 24, 2019** and, if accepted, will receive further instructions by the GFZ in a letter of acceptance. Any additional questions may be directed to the address above.

### 2.3 Services provided to selected participants

Fellowships granted to participants entitle them to the following services:

- Accommodation in single rooms, meals and tea-break refreshments within the facilities and arrangements provided by the organizers; (Only during the excursion we may ask the participants to stay for one or two nights in double rooms).
- Tuition, printed course material, scientific and cultural excursions;
- Collection of scientific textbooks and software which participants can take home;
- A small amount of pocket money (6 EURO per day) to cover incidental expenses;
- Local transport in connection with the official programme, field excursions and pick-up arrangements for meeting participants arriving at and departing from the airport.

Travel grants to cover the cost of international air travel might be available for only some of the selected participants. Therefore, every applicant is urged to look into available possibilities to cover travel expenses on his/her own with the support of his/her nominating or sponsoring institution and to make, an explicit statement to this effect in the application form.

### 2.4 Costs borne by participants or nominating agencies

Participants or their nominating governments/agencies are required to bear the following:

- Cost of personal travel, accident, live and medical insurance;
- All expenses in the home country for travelling abroad, including passports, visa, medical examinations, inoculations, domestic travel, etc.;
- Salary and related allowance during the period of participation in the training course;
- Any expenses other than the travel grants for selected participants and the living and accommodation expenses at the seminar place (see 2.3) including subsistence and incidental expenses during travel, any expenses incurred during stop-over en route and any additional costs for travel by other route than the one originally provided with the ticket;
- Any costs for excess luggage.

Neither the GFZ nor any other co-organiser or co-sponsor of the course will assume responsibility for the following expenditures or services:

- Costs incurred by participants with respect to travel insurance, medical bills and hospitals fees in connection with their attendance at the training course;
- Loss of or damage to property while attending the training course;
- Compensation in the event of death or disability of participants in connection their attendance at the training course;
- Any claim towards expenses incurred by participants other than those mentioned in section 2.4 above (e.g. for accommodation in hotels, food and drink orders or private trips of the participants own choice, shopping, excess luggage, etc.);

- Re-routing tickets or making visa arrangements other than those required for entering or leaving Germany on the shortest possible way.

Participants may exchange their own freely convertible currency into Euro to cover themselves the cost for any additional personal needs beyond what is provided under 2.3.

By attending the International Training Course on Seismology, you grant the GFZ German Research Centre for Geosciences the right to use your name, photograph and biography in GFZ news, or promotional material, whether in print, electronic or other media, including the GFZ website.

**With their signature under the application form all applicants and their nominating institutions accept these conditions irrevocably.**

### For more information please contact:

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## 3. GENERAL INFORMATION

### 3.1 Location of the course

The GFZ German Research Centre for Geosciences (GFZ) is situated in a wooded area on the top of a hill (Telegrafenberg) called Science Park "Albert Einstein". Potsdam, the capital of the federal State of Brandenburg ([www.potsdam.de](http://www.potsdam.de)), is surrounded by many lakes and beautiful parks. It lies on the river Havel and has about 170,000 inhabitants. Potsdam is particularly famous for its beautiful 18<sup>th</sup> and 19<sup>th</sup> century palaces and gardens of the Prussian kings, notably Park Sanssouci, which have been included in the world list of UNESCO of the cultural heritage of mankind.

The opening day of the course takes place at the GFZ, also the lectures are held at the GFZ German Research Centre for Geosciences. Only the cultural evenings and the informal meeting on the Opening Day will take place in the hotel, where the participants are accommodated.

Berlin and Potsdam are neighboring cities. Berlin ([www.berlin.de/international](http://www.berlin.de/international)) has no definite centre and pockets of attractions are dotted all over. The densest array of sights lies to the east of the Brandenburg Gate, on either side of *Unter den Linden*. West Berlin has also a lot to offer. Visitors should take a look at the broken shard of a church, the Kaiser Wilhelm Gedächtniskirche, which serves as a brutal reminder of World War II. The nearby Zoo and Aquarium also provide a happy distraction.

### 3.2 Excursions

During the weekends, there will be two full-day excursions in Potsdam and Berlin. There will also be a 3 days scientific excursion by bus to different Helmholtz Research Centres. During this excursion the participants may have to sleep in double rooms. For details see the annexed programme.

### 3.3 Climate and recommended dressing

August and September is fairly dry in Germany; some rain is to be expected every third day, on average. In September, the average maximum temperature reaches 15°C to 20°C. No frost is expected during the nights. It is recommended that the participants bring along a sweater and a rain coat or an umbrella as well as proper shoes for the (soft) field excursions. No formal dressing is required during the course.

### 3.4 The Helmholtz Centre Potsdam, German Research Centre for Geosciences

The GFZ is the national research centre for geosciences of Germany and belongs to the Hermann von Helmholtz Association of German Research Centres. It has been jointly established by the Federal Ministry of Education and Research and by the Ministry of Science, Research and Culture of the State of Brandenburg on January 1, 1992. The grand challenges and the complexity of system Earth require a close multidisciplinary interaction and integration across scientific competence fields to secure advances in understanding and solutions. For these reasons, and to achieve our scientific mission, we coordinate our research via five Research Units (RU) that foster the required long-term research collaborations and that transcend the organizational / management units. These five RUs are:

- Global Processes – Integrated monitoring and modelling: How are linked processes controlling the global dynamics of the Earth and change in the Earth System?
- Plate Boundary Systems – Understanding the dynamics that affect the human habitat: How do the dynamic processes of the solid Earth's most dynamic systems function and how do they control related hazards and resource formation?
- Earth Surface and Climate Interactions – Probing records to constrain mechanisms and sensitivities: How does climate change today and in the past affect the Earth surface and how do surface processes, in turn, influence the atmosphere and climate?
- Natural Hazards – Understanding risks and safeguarding the human habitat: How can we better predict and understand natural hazards, their dynamics, and their consequences?
- Georesources and Geoenergy – Raw materials and contributions to the energy transition: How can georesources and the geological subsurface be used in a sustainable way.

Earthquake disaster related topics of the GFZ are:

- development of early warning systems concerning earthquakes;
- microzonation studies;
- multidisciplinary task-force missions to be dispatched into areas which are struck by devastating geological events with the aim to collect first-hand data about damage,
- vulnerability, aftershocks or other post-event activity, local underground effects, seismotectonic conditions, etc.;

- triggered and induced seismic events;
- assessment of seismic hazard, vulnerability and risk;
- Tsunami research and installation of a Tsunami Early Warning in the Indian Ocean.

Other research projects deal with deep seismic and electromagnetic soundings and with seismology and seismic tomography. The seismology project is mainly concerned with the installation and operation of a global digital broadband system for research (GEOFON), with operational quick determinations of source parameters from strong regional and global earthquakes and with the investigation of deep seismic structures, material properties such as anisotropy and the nature of discontinuities in the Earth's mantle and core.

The training course on "Seismology and Seismic Hazard Assessment" is part of the activities of the Geophysics Department. Disaster related topics of the Department are research on earthquakes and volcanic eruptions, multidisciplinary task force missions to be dispatched into areas which are struck by devastating, geological events with the aim to collect first-hand data about damages, vulnerability, aftershocks or other post events activity, local underground effects, seismotectonic conditions.

The GFZ is situated on the Telegrafenberg (Telegraph Hill) in Potsdam, where world famous scientific institutes for astrophysics, geodesy, geomagnetism and meteorology were founded already between 1876 and 1892. Seismology has a long tradition in Potsdam too. On 17 April 1889, E. von Rebeur-Paschwitz, with a tilt-meter installed at the Telegrafenberg, obtained the world's first record of a teleseismic event, an earthquake near Japan. In 1902 the Potsdam seismic station began to operate and in 1906 the famous San Francisco earthquake was recorded there with a Wiechert seismograph. In 1969, the Geodetic and the Geomagnetic Institutes in Potsdam were united with the Geodynamic Institute in Jena and the Tectonic Institute in Berlin to form the Central Institute for Physics of the Earth (ZIPE) of the Academy of Sciences of the German Democratic Republic.

This institute initiated in 1979 the international UNESCO-sponsored training course on "Seismology and Seismic Hazard Assessment". After the unification of Germany, ZIPE was dissolved in December 1991. Part of its former facilities are now incorporated in the GFZ under a new scientific concept with a wider scope of national and international research activities and international co-operation.

More information is available from the GFZ home-page <http://www.gfz-potsdam.de/> .