



International Training Course on

Seismology, Seismic Data Analysis, Hazard Assessment and Risk Mitigation

September 10 to October 5, 2018
Accra, Ghana

Organised and sponsored by

Helmholtz Centre Potsdam
GFZ German Research Centre for Geosciences

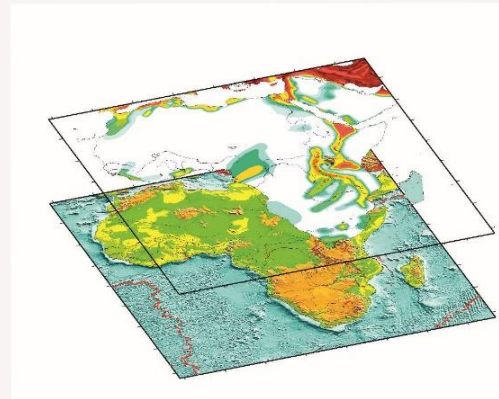
Geological Survey of Ghana
Accra, Ghana

co-sponsored by

Federal Foreign Office (FFO), Berlin, Germany



Circular



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Seismology, Seismic Data Analysis,
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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 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 scientists and engineers from developing countries. In 2018, the GFZ organizes and runs a regional course for Africa in cooperation with Geological Survey of Ghana in the time period 10 September to 5 October for the benefit of participants from earthquake-prone countries of Africa under the main topics:

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

The training course 2018 is co-sponsored by the Federal Foreign Office (FFO) of Germany (Berlin). It is also supported by the United Nations Educational, Scientific and Cultural Organization (UNESCO, Paris), by the University of Bergen, the Geological Survey of Ghana, the University of Ghana and the Ghana Institution of Engineers.

Until 2017, 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 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 all training courses since 1992, including the circular, programme and application form for the course in 2018 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 2018 focuses on visits to geological sites and geophysical 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 detailed scientific programme of the course is annexed to this circular. After each major topic, time is reserved for workshop discussions based on short (15 min.) oral presentations by the participants. Data brought along or case studies can also be taken up for discussion.

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.

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 2018 is arranged for the benefit of participants from earthquake-prone countries from Africa. To make the training effective, the number of participants is limited to about 26. Preference is given to young candidates engaged in seismology, seismic monitoring and zonation, earthquake data analysis, hazard, vulnerability and/or risk assessment. They should have active interest and obligations in these fields. Applicants 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.) or diploma in geosciences, physics or engineering from a recognized university. Preferably they 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 short paper (about 15 minutes) on their research or operational work and/or specify a problem or case study** they wish to discuss with their instructors and fellow participants. In the latter case they should bring along relevant data, documents and/or computer programmes for demonstration and analysis.

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 by supervisors or heads of nominating institutes/organisation. These letters should refer to the personality, academic qualification, obligations and performance as well as to future job requirements of the candidate;**
- **the applicants also explicitly confirm to have appropriate command of the English, if possible by adding copies of respective language certificates;**
- **the application form is accompanied by a letter of motivation (1/2 - 1 page);**
- **the applicants give the title/topic of their scientific presentation in the application form (with abstract);**
- **The applicants confirm, that an international travel and health insurance will be concluded.**

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

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 discuss about.

All participants have to present, at social evening get-togethers (cultural evening), slide, power point or video shows (self-made) 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 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 in the field of 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 Federal Foreign Office (FFO) 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;
- (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.

One copy of the application documents should be sent by email as scanned documents to course-un@gfz-potsdam.de not later than **May 3, 2018**.

Candidates will be informed of the decision of the Academic Board by June 15, 2018 and, if accepted, will receive further instructions by the GFZ in a letter of acceptance and a Letter of Invitation from the hosting Geological Survey of Ghana. 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 (5 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, life 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 hospital 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, laundry, telephone, internet, excess luggage, etc.);
- Re-routing tickets or making visa arrangements other than those required for entering or leaving Ghana on the shortest possible way.

Participants may exchange their own freely convertible currency 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.

<p>With their signature under the application form all applicants and their nominating institutions accept these conditions irrevocably.</p>

For more information please contact:

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Fax: (+49 331) 288 -1296 or -1204
E-mail: course-un@gfz-potsdam.de**

3. GENERAL INFORMATION

3.1 Location of the course

The venue of the 2018 Regional Training Course is in the main Conference Hall of the Ghana Geological Survey Authority's Seismological Observatory in the Achimota Forest in Accra - Ghana (with 5°38'29.1"N / 0°12'25.8"W Coordinates). It's located at the western end of the University of Ghana - Legon, opposite Ghana Institute of Management and Public Administration (GIMPA) and adjacent to the Forestry Commission's National Head Office. The Achimota Forest is about 16.2km along the western part of the Greater Accra Metropolitan Area (GAMA west). Human settlement has now developed and split the forest at several places.

Ghana is officially known as the Republic of Ghana. Ghana means "Warrior King" in the Soninke Language. It practices a unitary presidential constitutional democracy. It has a landmass of about 238,535 km². Ghana is bordered by the Ivory Coast in the west, Burkina Faso in the north, Togo in the east and the Gulf of Guinea and the Atlantic Ocean in the south.

A multicultural nation, Ghana has a population of approximately 27 million, with a variety of ethnic, linguistic and religious groups. Five percent of the population practices traditional faiths, 71.2% adhere to Christianity and 23.6% are Muslim.

Its diverse geography and ecology ranges from coastal savannahs to tropical jungles. There are, nonetheless, four distinct geographical regions. Low plains stretch across the southern part of the country. To their north lie three regions - the Ashanti Uplands, the Akwapim-Togo Ranges, and the Volta Basin. The fourth region, the high plains, occupies the northern and northwestern sector of the country. Like most West African countries, Ghana has no natural harbors. Because strong surf pounds the shoreline, two artificial harbors were built at Takoradi and Tema to accommodate Ghana's shipping needs.

Ghana is a democratic country led by a president who is both the Head of State and the Government. Ghana's growing economic prosperity and democratic political system have made it a regional power in West Africa. It is a member of the Non-Aligned Movement, the African Union, the Economic Community of West African States (ECOWAS), Group of 24 (G24) and the Commonwealth Group of Nations.

The capital and largest city of Ghana is Accra, which has an urban population of 2.27 million. The Greater Accra Metropolitan Area (GAMA) has about 4 million inhabitants, which makes it the 11th largest metro area in Africa.

The modern city is centered on the original British, Danish, and Dutch forts and their surrounding communities: Jamestown near the British James Fort, Osu near the Danish fort of Christiansborg (now Osu Castle), and Ussherstown near the Dutch Ussher fort.

Tourist attractions include the National Museum of Ghana, the Ghana Academy of Arts and Sciences, the National Archives of Ghana and Ghana's central library, the National Theatre, the Accra Centre for National Culture, and the Jamestown Lighthouse.

In 2010, the Globalization and World Cities Research Network think tank designated Accra a Gamma-minus-level world city, indicating a growing level of international influence and connectedness.

<https://en.wikipedia.org/wiki/Accra>

<https://en.wikipedia.org/wiki/Ghana>

<http://worldpopulationreview.com/countries/ghana-population/>

3.2 Excursions

During weekends, excursions will be organized.

3.3 Climate and recommended dressing

It is recommended that the participants bring along a sweater and a rain coat or an umbrella as well as proper shoes for the field excursions. No formal dressing is required during the course.

3.4 The Helmholtz Centre Potsdam, GFZ 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.

Research is carried out in seven departments and further centers:

- Geodesy;
- Geophysics
- Geochemistry;
- Geomaterials;
- Geoarchives;
- Geotechnologies.

Besides this, the GFZ:

- provides effective management for major joint geoscientific research projects;
- executes research drilling projects, runs observatories and provides extensive modern facilities, equipment and logistics for both large-scale field projects as well as laboratory measurements;
- performs research with satellites;
- provides, in close cooperation with universities and within the framework of international collaboration, training, expertise and equipment to other countries in need;

Earthquake disaster related topics of the GFZ are:

- research on the Physics of Earthquakes and Volcanoes
- 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.;

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 Department "Geophysics". 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 international UNESCO-sponsored training course on "Seismology and Seismic Hazard Assessment" was initiated in 1979. After the unification of Germany, the GFZ has been founded and took over the course 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/>

3.5 Geological Survey of Ghana

The Ghana Geological Survey was established in 1913 as a Department by the colonial administration under the Directorship of Sir Albert Kitson. The mission of the Department was to investigate and establish more exactly the extent and quality of both existing and yet undeveloped areas of mining activities and to prepare for their exploitation. The first office of the Department was located at the River Ankobra Junction in Prestea in the Western Region of Ghana. The Department was later moved to a more spacious Office in Saltpond (Central Region of Ghana) in 1946. In 1962 the Department was moved to Accra - the capital city - where major policy decision on mining was taken.

In 2016, the Ghana Geological Survey Authority (GGSA) was established to advise, promote and research on geo-scientific issues concerning mineral resources, groundwater, environment, geo-hazards and land use planning to support sustainable economic development in Ghana.

Functions of the Authority is to

- advise the Government on matters related to geology, geohazards and the search for and exploitation and development of mineral resources in the country
- conduct geological, geochemical, geophysical, seismological, hydrological, geochemical, and geo-environmental survey, mineral exploration, systematic mapping of rocks and other geological or geoscience materials including soil and clays of the country including its offshore areas
- develop and maintain a National Seismic Network to monitor earthquakes, tsunamis and blasts that have the potential to impact negatively on persons and property in the country and for optimum land-use planning
- serve as a national repository for geoscientific data and information generated by public and private entities including mining and mineral exploration companies which operate in the country
- collaborate with relevant local and international bodies on geoscientific matters that the Board established under section 5 considered necessary
- conduct site or foundation investigations and issue certified reports prior to major construction works or projects that have the potential to impact on the subsurface structure, socio-economic, cultural and aesthetic environment
- conduct ground surveys or airborne surveys, take samples and make boring necessary for the conduct of investigations and preparation of relevant reports to assist with national development
- liaise with relevant public agencies involved in land-use planning for sustainable use of the special environment in Ghana
- perform the functions and undertake investigations that the Minister may assign to the Authority
- perform any other functions conferred on it by this Act or that are ancillary to the achievement of the objectives of the authority

For the purposes of the promotion of research, the Authority shall

- Undertake research in the field of mineral exploration and prospecting on behalf of the Republic, a government institution, a private institution or an individual;
- Carry out geoscientific research such as geological, geochemical, geophysical, seismological, geotechnical, hydrological, and geo-environmental activities or mapping to meet national development objectives and to also attract investment into the mining and related sectors of the national economy;
- Undertake joint research projects and cooperate with educational institutions and scientific or technical societies for the promotion of the education and training of researchers, technical experts and supporting personnel; and
- Undertake geoscientific investigations or research as the Minister may assign to the Authority.