



International Training Course on
**Seismology, Seismic Data Analysis,
Hazard Assessment and Risk Mitigation**

September 4 to September 29, 2017
Potsdam, Germany

Organised and sponsored by
Helmholtz Centre Potsdam
GFZ German Research Centre for Geosciences

co-sponsored by
Federal Foreign Office of Germany (Berlin)



List of institutions, lecturers and assistants

GFZ German Research Centre for Geosciences, Germany

Dr. Andrey Babeyko	andrey.babeyko@gfz-potsdam.de
Dr. Dino Bindi	bindi@gfz-potsdam.de
Dr. Tobias Boxberger	tobias.boxberger@gfz-potsdam.de
Dr. Simone Cesca	simone.cesca@gfz-potsdam.de
Prof. Dr. Fabrice Cotton	fcotton@gfz-potsdam.de
Prof. Dr. Torsten Dahm	torsten.dahm@gfz-potsdam.de
Dr. Kevin Fleming	kevin.fleming@gfz-potsdam.de
M.Sc. Michael Haas	michael.haas@gfz-potsdam.de
Dr. Sebastian Hainzl	sebastian.hainzl@gfz-potsdam.de
Dr. Oliver Heidbach	oliver.heidbach@gfz-potsdam.de
Dr. Sebastian Heimann	sebastian.heimann@gfz-potsdam.de
Dr. Jörn Lauterjung	joern.lauterjung@gfz-potsdam.de
Prof. Dr. Bruno Merz	bruno.merz@gfz-potsdam.de
Dr. Claus Milkereit	claus.milkereit@gfz-potsdam.de
Dipl.-Geol. Ralf Nestler	ralf.nestler@gfz-potsdam.de
Dr. Massimiliano Pittore	massimiliano.pittore@gfz-potsdam.de
Dr. Marco Pilz	marco.pilz@gfz-potsdam.de
Dr. Eleonora Rivalta	eleonora.rivalta@gfz-potsdam.de
Dr. Joachim Saul	joachim.saul@gfz-potsdam.de
Dr. Angelo Strollo	angelo.strollo@gfz-potsdam.de
Dr. Thomas Walter	twalter@gfz-potsdam.de
Dr. Rongjiang Wang	wang@gfz-potsdam.de
Dr. Graeme Weatherill	graeme.weatherill@gfz-potsdam.de
Dipl.-Geogr. Josef Zens	josef.zens@gfz-potsdam.de

Bonn University, Germany

Prof. Dr. Lothar Schrott	lothar.schrott@uni-bonn.de
--------------------------	----------------------------

Federal Foreign Office, AA, Germany

Jens Kampelmann	s08-60@auswaertiges-amt.de
-----------------	----------------------------

DRK, Germany

Lee-J. Schumann	Lee.Schumann@drk-lv-brandenburg.de
-----------------	------------------------------------

THW, Germany

Thorsten Meier	Thorsten.Meier@thw.de
----------------	-----------------------

Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Italy

Prof. Dr. Stefano Parolai	sparolai@inogs.it
---------------------------	-------------------

International Seismological Centre (ISC), UK

Dr. Domenico Di Giacomo	domenico@isc.ac.uk
-------------------------	--------------------

University of Bergen, Norway

Dr. Lars Ottemøller	lars.ottemoller@geo.uib.no
---------------------	----------------------------

Scientific Programme

International Training Course on Seismology, Seismic Data Analysis, Hazard Assessment and Risk Mitigation Potsdam, Germany, 4 – 29 September, 2017

1. Opening Day

Monday, Sept. 4

08.30 – 10.00

Prof. Dr. R. Hüttl

Opening of the Training Course 2017
Presentation of the Helmholtz-Centre Potsdam – GFZ
German Research Centre for Geosciences

Jens Kampelmann

Representative Federal Foreign Office

Prof. Torsten Dahm

Human-induced and triggered seismicity: its role in hazard programs

H, VR 2-3

10.00 – 10.30

Break for a welcome drink – Group Photo

10.30 – 11.00

Angelo Strollo

The GEOFON program and the SeisComp3 project

11.00 – 11.30

Oliver Heidbach

World Stress Map

11.30 – 12.00

Domenico Di Giacomo

The International Seismological Centre (ISC): Mission and Products

12.00 – 12.30

Thomas Walter

Remote sensing of Volcano- and seismotectonic processes with InSAR

12.30 – 13.30

Lunch Break

A27

13.30 – 14.00

Claus Milkereit

The International Training Courses

14.00 – 15.00 1.0

C. MILKEREIT

Introduction to Digital Signal Processing and Concepts

15.00 – 15.30

Coffee break

15.30 – 17.00 1.1

T. DAHM

Aims and fundamentals of seismology

Evening

18.30 – 19.30

Dinner participants + lecturers

Hotel

19.30 – 21.00

Informal get-together of participants and lecturers

2. Seismology, Instrumentation, Seismogram Analysis, Earthquake Source Parameter and Wave Propagation

A27

Tuesday, Sept. 5

08.30 - 10.00

T. DAHM

2.1 Seismic sources and source parameters

10.30 - 12.00

T. DAHM

2.2 Theory of wave propagation: Basics of numerical methods

13.30 - 15.00

C. MILKEREIT

2.3 Seismic Sensors and their calibration

15.30 - 17.00

D. DI GIACOMO

2.4 Event Location and Magnitudes I

Wednesday, Sept. 6

08.30 - 10.00

T. DAHM

2.5 Seismic waves in the real Earth, required seismic records and derived Earth models

10.30 - 12.00

J. SAUL, D. DI GIACOMO

2.6 Event Location and Magnitudes II

13.30 - 15.00

J. SAUL, D. DI GIACOMO

2.7 Event Location and Magnitudes III

15.30 - 17.00

C. MILKEREIT

2.8 Fault Plane Solution from First Motion Polarity Reading

Thursday, Sept. 7

08.30 - 10.00

S. HAINZL

2.9 Earthquake Statistics I

10.30 - 12.00

S. HAINZL

2.10 Earthquake Statistics II – Exercise

13.30 - 15.00

R. WANG

2.11 The seismic wave field in a layered half space I

15.30 - 17.00

R. WANG

2.12 The seismic wave field in a layered half space II

Friday, Sept. 8

08.30 - 10.00

R. WANG

2.13 The seismic wave field in a layered half space III

10.30 - 12.00 R. WANG
2.14 The seismic wave field in a layered half space IV

13.30 - 15.00 A. STROLLO
2.15 Seismic station integration into SeisComp3

15.30 - 17.10 Scientific Presentations of the Participants (1-6)

Evening:

19.30 – 21.15 *Cultural Presentation (1-7)*

Hotel

Saturday, Sept. 9 *Cultural Walk through Potsdam*

Sunday, Sept. 10 *Cultural Walk through Berlin*

Monday, Sept. 11

A27

08.30 - 10.00 S. CESCA
2.16 Moment Tensor Inversion Theory

10.30 - 12.00 S. HEIMANN
2.17 Earthquake Data Agencies and Formats

13.30 - 15.00 S. HEIMANN, S. CESCA
2.18 Data Access, Preparation and Visualization

15.30 - 17.00 S. HEIMANN, S. CESCA
2.19 Green's Functions

Tuesday, Sept.12

08.30 - 10.00 S. HEIMANN, S. CESCA
2.20 Synthetic Seismograms

10.30 - 12.00 S. CESCA, S. HEIMANN
2.21 Moment Tensor Inversion with RAPIDINV

13.30 - 15.00 S. CESCA, S. HEIMANN
2.22 Moment Tensor Inversion Exercise I

15.30 - 17.00 S. CESCA, S. HEIMANN
2.23 Moment Tensor Inversion Exercise II

3. Engineering Seismology and Strong Ground Motion

Wednesday, Sept. 13

08.30 - 10.00 S. PAROLAI
3.1 Ground shaking site effects.
Introduction: Effects of soft surface layers

10.30 - 12.00 S. PAROLAI
3.2 Effects of surface topography

13.30 - 15.00 S. PAROLAI, M. PILZ
3.3 Instrumental Microzonation: Surface waves based methods I

15.30 - 17.00 S. PAROLAI, M. PILZ
3.4 Instrumental Microzonation: Surface waves based methods II

Thursday, Sept. 14

08.30 - 10.00 S. PAROLAI
3.5 Estimation of site effects: Instrumental, numerical, empirical

10.30 - 12.00 S. PAROLAI
3.6 Use of micro tremor recordings for estimating site effects

13.30 - 15.00 S. PAROLAI, M. PILZ
3.7 Surface wave data acquisition III

15.30 - 17.00 S. PAROLAI, M. PILZ
3.8 Surface wave data acquisition IV

Friday, Sept. 15

08.30 - 10.00 D. BINDI
3.9 Introduction to Strong Motion Seismology

10.30 - 12.00 D. BINDI
3.10 Strong Motion data processing

13.30 - 15.00 F. COTTON
3.11 Introduction into Seismic Hazard Assessment

15.30 - 17.00 F. COTTON
3.12 The basic principles of probabilistic seismic hazard analysis (PSHA)

Evening:

19.30 - 21.15 *Cultural Presentation (8-14)*

Hotel

Saturday, Sept. 16 Excursion to Welzow and Berggießhübel and

Sunday, Sept. 17 to Freiberg and Wittenberg

4. Seismic Hazard and Risk Assessment

A27

Monday, Sept. 18

- 08.30 - 10.00 G. WEATHERILL
4.1 Earthquakes catalogues
- 10.30 - 12.00 G. WEATHERILL
4.2 PSHA seismicity models
- 13.30 - 15.00 F. COTTON
4.3 The basic principles of probability theory (PSHA)
- 15.30 - 17.00 F. COTTON
4.4 Epistemic and aleatory uncertainties

Tuesday, Sept. 19

- 08.30 - 10.00 D. BINDI
4.5 Exercise on Strong Motion data processing
- 10.30 - 12.00 D. BINDI
4.6 Ground Motion Predictive Equations
- 13.30 - 15.00 F. COTTON
4.7 Seismic building codes
- 15.30 - 17.00 F. COTTON
4.8 Site Specific PSHA

Wednesday, Sept. 20

- 08.30 - 10.00 F. COTTON, D. BINDI
4.9 Challenges of PSHA (case studies, discussion)
- 10.30 - 12.00 F. COTTON, D. BINDI
4.10 Challenges of PSHA (case studies, discussion)
- 13.30 - 15.00 M. PITTORE
4.11 Introduction to Seismic Risk Assessment
- 15.30 - 17.00 M. PITTORE
4.12 Ingredients to OpenQuake

5. Satellite Methods and Modelling

Thursday, Sept. 21

- 08.30 - 10.00 T. WALTER
5.1 Introduction to InSAR

- 10.30 - 12.00 T. WALTER
5.2 Examples of Remote sensing of Volcano- and seismo-
tectonic processes
- 13.30 - 15.00 T. WALTER
5.3 Remote sensing of Volcano- and seismotectonic processes
- 15.30 - 17.00 T. WALTER
5.4 Remote sensing of Volcano- and seismotectonic processes

Friday, Sept. 22

- 08.30 - 10.00 E. RIVALTA
5.5 Introduction to Seismotectonics I
- 10.30 - 12.00 E. RIVALTA
5.6 Introduction to Seismotectonics II
- 13.30 - 15.00 E. RIVALTA
5.7 Introduction to Seismotectonics III
- 15.30 - 17.00 E. RIVALTA
5.8 Introduction to Seismotectonics IV

Evening:

19.30 - 21.00 *Cultural Presentation (15-21)*

Hotel

Saturday, Sept. 23

Leisure Time

Sunday, Sept. 24

Leisure Time

6. Expert Days

Different Locations

Monday, Sept. 25

- 08.30 - 17.00
Expert Day – 1
During 2 days participants will form small working groups and will closely work together with an expert. The participants can choose according to their interest and availability. We also would like to encourage general discussions on seismology and seismic hazard. Please bring with you your own data or papers about research ideas or a list of questions.

Tuesday, Sept. 26

Expert Day – 2

Different Locations

7. Disaster Management

Wednesday, Sept. 27 Workshop on Disaster Risk Reduction and Rapid Response

A27

08.30 - 08.40	Welcome
08.40 - 09.00	C. MILKEREIT Introduction – An Earthquake Scenario
09.00 - 10.00	L. SCHROTT Risk Management in Higher Education
10.00 - 11.00	J. ZENS, R. NESTLER Public Interest and Media
11.00 - 12.00	J. KAMPELMANN Rapid Response in Europe and Germany
13.00 - 14.00	T. MEIER A Manifold Range of Tasks for Civil Protection
14.00 - 15.00	L.-J. SCHUMANN Humanitarian Support Worldwide in Crisis Situations
15.30 - 20.00	Travel by train to Berlin Schönefeld Airport
~ 17.00	Mr. Christian Hörl, Mrs Alexandra Rüth (DRK) Humanitarian Response in the Red Cross and Red Crescent Movement. New Approaches and Innovations
~ 18.00	Mr. Clemens Pott, (DRK) Guided Tour through the DRK Logistic Centre
~ 19.30	Return to Potsdam, ~20 o'clock Arrival in Potsdam

Thursday, Sept. 28

08.30 - 09.00	Summary of Day I, Outline of Day II
09.00 - 10.00	B. MERZ Cognitive Biases in Risk Assessment and Management
10.00 - 11.00	M. PITTORE, M. HAAS Rapid Risk Assessment
11.00 - 12.00	M. HAAS, M. PITTORE Earthquake Scenarios - Caravan Software

13.00 - 15.00 M. PITTORE, M. HAAS, K. FLEMING, R. NESTLER
The SENSUM Game

15.00 - 16.00 S. PAROLAI, M. PILZ, K. FLEMING
Loss based earthquake early warning: a tool for risk mitigation

16.00 - 17.00 J. LAUTERJUNG
Tsunami Early Warning: Preparation and reaction of communities at risk

Summary – Wrap Up

17.15 - 19.00 *Dinner* at the Café Freundlich (GFZ) **A34**

Evening:
19.00 - 20.30 *Cultural Presentation (22-27)* **H, VR 1**

Friday, Sept. 29

08.30 - 10.10 Scientific Presentations of the Participants (7-12)

10.30 - 12.10 Scientific Presentations of the Participants (13-19)

13.30 - 15.00 Scientific Presentations of the Participants (20-27)

15.30 - 16.00 Final Discussion

Evening:
19.30 **Closing of the Training Course 2017**
Handing out of the course certificates

Saturday, Sept. 30 Departure of Participants

Sunday, Oct. 1 Departure of Participants