

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

5 - 18 October 2025
Antananarivo, Madagascar

Scientific Programme
DRAFT (30.04.2025)

Organised and sponsored by

GFZ Helmholtz Centre for Geosciences

with the local support of

Institut et Observatoire de Géophysique d'Antananarivo(IOGA),
Université d'Antananarivo
Madagascar

List of institutions, lecturers and assistants contributing to the International Training Course on "Seismology, Hazard Assessment and Risk Mitigation", October 5 to 18, 2025 in Antananarivo, Madagascar

GFZ German Research Centre for Geosciences, Germany

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Scientific Programme
International Training Course on
Seismology, Seismic Data Analysis,
Hazard Assessment and Risk Mitigation
 Antananarivo, Madagascar, October 5 to 18, 2025

Saturday, Oct. 4		Arrival of Participants
1. Opening Day		
Sunday, Oct. 5		Opening
09:00 - 10:00		<i>Dr. Simone Cesca</i> <i>Welcome</i>
		<i>NN, IOGA</i> <i>Welcome and presentation of IOGA</i>
		<i>Prof. Dr. Torsten Dahm</i> <i>Presentation of GFZ</i>
		<i>Dr. Simone Cesca</i> <i>Presentation of the ITC</i>
10:00 - 10:30		<i>Break for a welcome drink - Group Photo</i>
10:30 - 11:15		<i>Dr. S. Cesca</i> Magmatic induced seismicity in Southeastern Africa
11.15 - 12:00		<i>Dr. H. Razafindrakoto</i> Title
12:00 - 13:30		<i>Lunch Break</i>
13:30 - 15:00	1.1	T. DAHM Aims and fundamentals of seismology
15:00 - 15:30		<i>Coffee break</i>
15:30 - 17:00	1.2	T. DAHM Seismic sources and source parameters
<i>Evening:</i>		
18:00 - 20:00		Dinner and get-together of participants and lecturers

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

Monday, Oct. 6 Introduction to seismology, SeisComP

08:30 - 10:00	2.1	T. DAHM Theory of wave propagation: Basics of numerical methods
10:30 - 12:00	2.2	T. DAHM Seismic waves in the real Earth, required seismic records and derived Earth models
13:30 - 15:00	2.3	P. EVANS Event Location and Magnitudes
15:30 - 17:00	2.4	P. EVANS SeisComP setup

Tuesday, Oct. 7 SeisComp – Data acquisition

08:30 - 10:00	2.5	P. EVANS SeisComP quick start
10:30 - 12:00	2.6	P. EVANS SeisComp Playback demonstration
13:30 - 15:00	2.7	P. EVANS Event location with SeisComP
15:30 - 17:00	2.8	P. EVANS FDSN/EIDA/ORFEUS services and data access

Wednesday, Oct. 8 Pyrocko - Source inversion

08:30 - 10:00	2.9	S. HEIMANN Introduction to Pyrocko
10:30 - 12:00	2.10	S. HEIMANN Earthquake data access, agencies and formats
13:30 - 15:00	2.11	S. CESCO Data visualization and pre-processing
15:30 - 17:00	2.12	S. CESCO Green's functions and synthetic seismograms
19:00 – 20:30		<i>Scientific Presentations of the Participants (1-10)</i>

Thursday, Oct. 9		Moment tensor inversion
08:30 - 10:00	2.13	S. CESCO Source inversion in seismology
10:30 - 12:00	2.14	S. HEIMANN, S. CESCO Source inversion with Grond
13:30 - 15:00	2.15	S. HEIMANN, S. CESCO Source inversion exercise
15:30 - 17:00	2.16	S. HEIMANN, S. CESCO Source inversion exercise
Friday, Oct. 10		Numerical modeling, Finite fault
08:30 - 10:00	2.17	M. MAI Title
10:30 - 12:00	2.18	M. MAI Title
13:30 - 15:00	2.19	M. MAI Title
15:30 - 17:00	2.20	M. MAI Title
Saturday, Oct. 11		Excursion
Sunday, Oct. 12		Excursion
3. <u>Engineering Seismology, seismic hazard and risk assessment, Seismic Hazard Assessment and Seismic Risk</u>		
Monday, Oct. 13		Strong Motion
08:30 - 10:00	3.1	F. COTTON Introduction into Seismic Hazard and Risk Assessment
10:30 - 12:00	3.2	F. COTTON Factors controlling strong ground-shaking characteristics
13:30 - 15:00	3.3	F. COTTON Introduction to strong motion seismology

15:30 - 17:00	3.4	F. COTTON Strong motion data and processing
Tuesday, Oct. 14 Seismic Hazard		
08:30 - 10:00	3.5	F. COTTON Principles of seismic hazard analysis I
10:30 - 12:00	3.6	F. COTTON Principles of seismic hazard analysis II
13:30 - 15:00	3.7	F. COTTON Seismic hazard assessment in practice: lessons learned from recent earthquakes
15:30 - 17:00	3.8	F. COTTON Challenges of Seismic hazard assessment: uncertainty evaluation, city effects and effects of climate change on seismic risk
Wednesday, Oct. 15 Seismic Hazard		
08:30 - 10:00	3.9	F. COTTON Ground motion models in PSHA
10:30 - 12:00	3.10	F. COTTON Modelling site effects for regional hazard and risk assessment
13:30 - 15:00		Scientific Presentations of the Participants (11-15)
15:30 - 17:00		Scientific Presentations of the Participants (16-20)
Thursday, Oct. 16 Site effects		
08:30 - 10:00	3.11	M. PILZ Seismic site effects: Introduction
10:30 - 12:00	3.12	M. PILZ Assessment of site effects: Single station methods
13:30 - 15:00	3.13	M. PILZ Assessment of site effects: Array-based methods
15:30 - 17:00	3.14	M. PILZ Inversion of H/V and dispersion curves

4. <u>Geodesy</u>		
Friday, Oct. 17		InSAR
08:30 - 10:00	4.1	S. METZGER Introduction
10:00 - 12:00	4.2	S. METZGER Introduction
13:30 - 15:00	4.3	S. METZGER Practical exercise
15:30 - 17:00	4.4	S. METZGER Practical exercise
Saturday, Oct. 18		InSAR
08:30 - 10:00	4.5	S. METZGER Introduction to SAR Interferometry (InSAR) and multi-temporal InSAR analysis
10:30 - 12:00	4.6	S. METZGER Introduction to SAR processing using SNAP
18:00		<i>Closing Dinner</i>
Sunday, Oct. 19		Departure of Participants