

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

Sunday 5 October 2025 - Saturday 18 October 2025

Antananarivo, Madagascar

Scientific Programme

1. Opening Day

Welcome

Sunday, Oct. 5

09:00 - 10:00

Dr. Simone Cesca - Welcome
NN, IOGA - Welcome and presentation of IOGA
Prof. Dr. Torsten Dahm - Presentation of the GFZ
Dr. Simone Cesca - Presentation of the ITC 2025

10:00 - 10:30

Break for a welcome drink - Group Photo

10:30 - 11:15

Dr. S. Cesca - Magmatic induced seismicity in Southeastern Africa

11:15 - 12:00

Dr. H. Razafindrakoto - Title tbc

12:00 - 13:30 *Lunch Break*

13:30 - 15:00

T. DAHM - Aims and fundamentals of seismology

15:00 - 15:30 *Coffee break*

15:30 - 17:00

T. DAHM - Seismic sources and source parameters

Evening:

18:00 - 20:00

Dinner and Informal get-together of participants and lecturers

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

Introduction to seismology, SeisComP

Monday, Oct. 6

08:30 - 10:00

T. DAHM - Theory of wave propagation: Basics of numerical methods

10:30 - 12:00

T. DAHM - Seismic waves in the real Earth, required seismic records and derived Earth models

13:30 - 15:00

P. EVANS, A. STROLLO - Introduction to SeisComP

15:30 - 17:00

A. STROLLO, P. EVANS - Event location and Magnitudes in SeisComP

SeisComp – data acquisition, handling and curation

Tuesday, Oct. 7

08:30 - 10:00

P. EVANS, A. STROLLO - SeisComP setup and quick start

10:30 - 12:00

P. EVANS, A. STROLLO - SeisComP quick start and playback demonstration

13:30 - 15:00

A. STROLLO, P. EVANS - Hands-on exercise: Event location, focal mechanisms and magnitudes with SeisComP

15:30 - 17:00

A. STROLLO, P. EVANS - FDSN/EIDA/ORFEUS services: contributing and using them

Pyrocko - Source inversion

Wednesday, Oct. 8

08:30 - 10:00

S. HEIMANN - Introduction to Pyrocko

10:30 - 12:00

S. HEIMANN - Earthquake data access, agencies and formats

13:30 - 15:00

S. CESCO - Data visualization and pre-processing

15:30 - 17:00

S. CESCO - Green's functions and synthetic seismograms

19:00 – 20:30

Scientific Presentations of the Participants (1-10)

Moment tensor inversion

Thursday, Oct. 9

08:30 - 10:00

S. CESCA - Source inversion in seismology

10:30 - 12:00

S. HEIMANN, S. CESCA - Source inversion with Grond

13:30 - 15:00

S. HEIMANN, S. CESCA - Source inversion exercise

15:30 - 17:00

S. HEIMANN, S. CESCA - Source inversion exercise

Numerical Modeling, finite fault

Friday, Oct. 10

08:30 - 10:00

M. MAI - Title tbd

10:30 - 12:00

M. MAI - Title tbd

13:30 - 15:00

M. MAI - Title- tbd

15:30 - 17:00

M. MAI - Title tbd

Excursion

Excursion

Saturday, Oct.11 / Sunday, Oct. 12

3. Engineering Seismology, seismic hazard and risk assessment, Seismic Hazard Assessment and Seismic Risk

Strong Motion

Monday, Oct. 13

08:30 - 10:00

F. COTTON - Introduction into Seismic Hazard and Risk Assessment

10:30 - 12:00

F. COTTON - Factors controlling strong ground-shaking characteristics

13:30 - 15:00

F. COTTON - Introduction to strong motion seismology

15:30 - 17:00

F. COTTON - Strong motion data and processing

Seismic Hazard

Tuesday, Oct. 14

08:30 - 10:00

F. COTTON - Principles of seismic hazard analysis I

10:30 - 12:00

F. COTTON - Principles of seismic hazard analysis II

13:30 - 15:00

F. COTTON - Seismic hazard assessment in practice: lessons learned from recent earthquakes

15:30 - 17:00

F. COTTON - Challenges of Seismic hazard assessment: uncertainty evaluation, city effects and effects of climate change on seismic risk

Wednesday, Oct. 15

08:30 - 10:00

F. COTTON - Ground motion models in PSHA

10:30 - 12:00

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)

Site effects

Thursday, Oct. 16

08:30 - 10:00

M. PILZ - Seismic site effects: Introduction

10:30 - 12:00

M. PILZ - Assessment of site effects: Single station methods

13:30 - 15:00

M. PILZ - Assessment of site effects: Array-based methods

15:30 - 17:00

M. PILZ - Inversion of H/V and dispersion curves

4. Geodesy

InSAR

Friday, Oct. 17

08:30 - 10:00

S. METZGER - Introduction

10:00 - 12:00

S. METZGER - Introduction

13:30 - 15:00

S. METZGER - Practical exercise

15:30 - 17:00

S. METZGER - Practical exercise

Saturday, Oct. 18

08:30 - 10:00

S. METZGER - Introduction to SAR Interferometry (InSAR) and multi-temporal InSAR analysis

10:30 - 12:00

S. METZGER - Introduction to SAR processing using SNAP