

# Seismology Course

## Objective

To provide advanced techniques and knowledge in seismology so that participants can apply and disseminate earthquake (and tsunami) disaster mitigation technologies in their countries.

## Target

Technical officials or researchers of governmental organizations, research institutes, or universities having public interests in the field of seismology.

## Group training from October to May in the next year

Lectures, practices, study trips, and observation visits are included in the training.

### Curriculum

- Earthquake Observation
- Theory of Seismic Waves
- Local Earthquake Analysis
- Focal Mechanism/Moment Tensor
- Earthquake Source Process
- Earthquake Early Warning
- Crustal Deformation
- Plate Tectonics
- Seismic Tomography
- Strong Ground Motion
- Microtremor Observations
- Seismic Microzonation, etc.

### Lecturers

IISEE staff, Professors from Tokyo Univ., Kyoto Univ., Tohoku Univ., Hokkaido Univ., and other institutes.

## Individual study from May to August

Participants study their subjects with considerations of their respective circumstances and issues.

### Examples of topics

- Earthquake Source Parameter and Process
- Seismotectonics
- Earthquake Generation and Forecasting
- Crust and Upper Mantle Structure
- Crustal Deformation
- Simulation of Seismic Wave Propagation
- Strong Ground Motion Simulation
- Geophysical Prospecting
- Earthquake Early Warning
- Volcano Seismology

### Supervisors

IISEE staff and researchers of universities and institutes

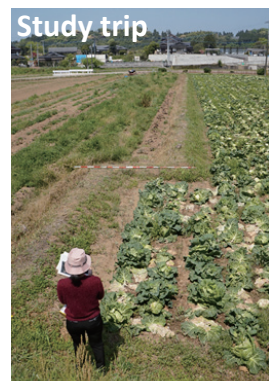
Lecture



Practice of microtremor observation

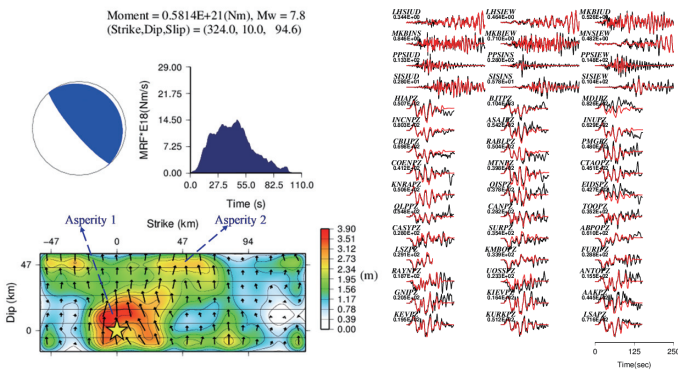


Study trip



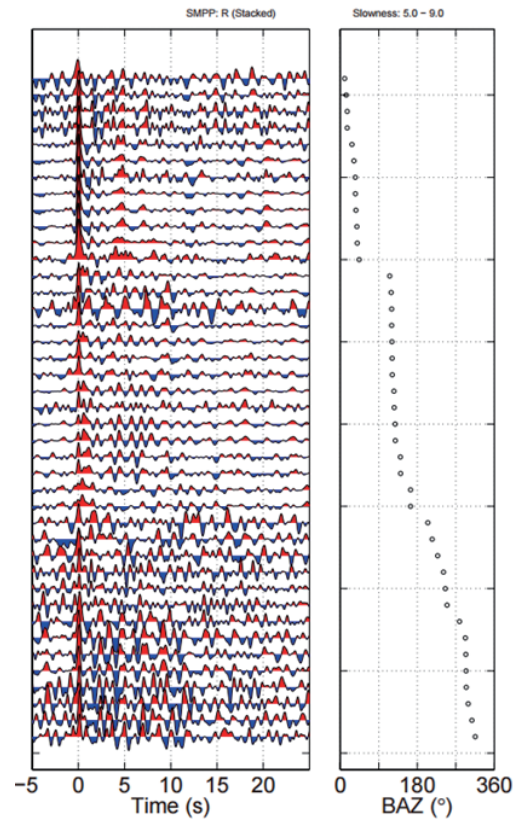
## Examples of Individual Studies

### Earthquake source process



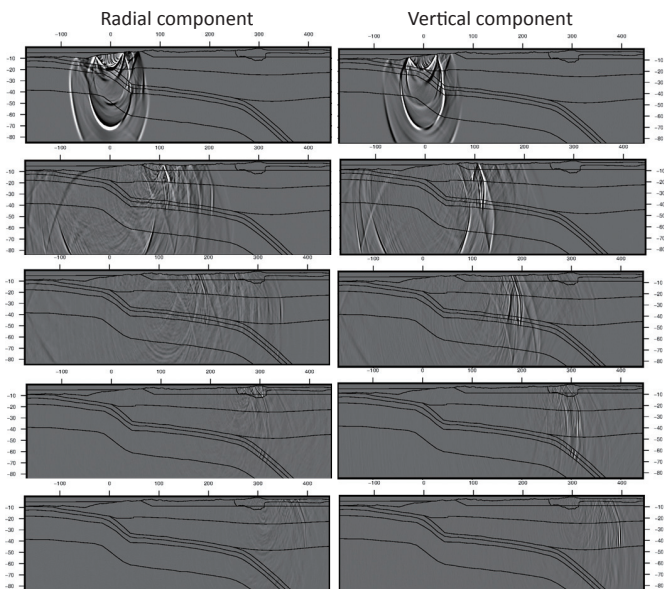
Source rupture process model of the October 25, 2010 Mentawai earthquake determined by joint inversion of teleseismic body wave and near-source strong motion data (Fatchurochman, 2011).

### Receiver function analysis



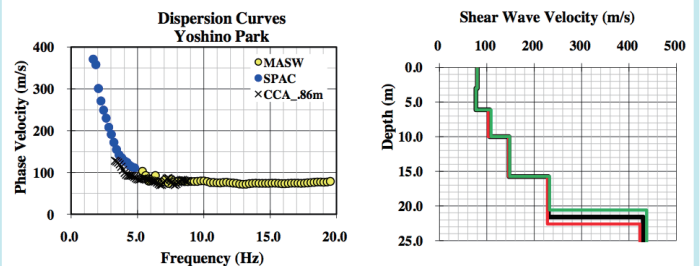
Stacked receiver functions for a broadband station (SMPP) in the Philippines for the radial component with corresponding back azimuths (Rivera, 2016).

### Simulation of seismic wave propagation from the Mexican Pacific to Mexico basin



Snapshots of seismic wave fields calculated by the finite difference method from Mexican Pacific to Mexico basin (left: the radial components; right: the vertical components). Snapshots at 10, 30, 50, 80, and 100 seconds after the origin time are shown from the top to the bottom panels, respectively (Galaviz, 2017).

### Estimation of subsurface velocity structure



The left panel: Rayleigh-wave phase velocities derived from microtremor using the spatial autocorrelation method (SPAC: blue circles) and the centerless circular array method (CCA: crosses), and the multichannel analysis of surface waves (MASW: yellow circles). The right panel: Estimated S-wave velocity structure models by heuristic search (Black, 2011).



# Collaborative Master's Program

**Disaster Management Policy Program (DMP)** with National Graduate Institute for Policy Studies (GRIPS)  
 A part of the curriculum of this JICA training course “Seismology, Earthquake Engineering and Tsunami Disaster Mitigation” is approved as a Master’s degree program and the individual study report as a Master thesis by GRIPS. Completing all graduation requirements during the program, the participants will be awarded a Master’s degree, “Master of Disaster Management” by GRIPS.

## Schedule An example for the courses from Oct. 2023 to Sep. 2024

2023 Oct.	Nov.	Dec.	2024 Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
<b>Group Training</b>							<b>Individual Study</b>				
							Lectures Experiments Practices Observation/ Study Trips				

## Expenses No self-burden

The following expenses will be provided to the participants by JICA:

- A round-trip ticket between an international airport in your country designated by JICA and Japan will be borne by JICA.
- Allowances for accommodation, meals, living expenses, outfit, and shipping.
- Expenses for study tours in Japan (basically in the form of train tickets).
- Travel insurance that covers from the time of arrival in Japan till departure from Japan.
- Medical expenses for participants who become ill after arriving in Japan.
- Expenses for program implementation, including materials.
- Application fee, admission fee and tuition for the Master’s Degree Program of GRIPS will be provided by BRI.

## Nominee Qualifications

Nominees must meet the following qualifications:

- be nominated by their national government.
- be technical officials, engineers or researchers who have university degrees in seismology, earthquake engineering, tsunami or equivalent.
- be an employee of governmental organizations, research institutes or universities having public interest in seismology, earthquake engineering or tsunami disaster mitigation (more than 3 years of working experience is recommended).
- be well versed in advanced mathematics and proficient in computer.
- be basically between the ages of 25 and 42 years as of October 1, 2023. Those who are not fit into the age qualifications may be considered as eligible applicants, depending on the circumstance in the applicants’ countries.
- have a competent command of spoken and written English. Admission priority will be given to applicants who have a TOEFL iBT score of 79 or higher, or an IELTS Academic score of 6.0 or higher.

## How to apply An example for the courses from Oct. 2023 to Sep. 2024

Important Months/Dates	Actions	Actors
July to August 2022	Selection and Nomination of this course in the JICA’s course list	National Government of the applicant’s country and JICA
January 2023	Document for Recruitment called “General Information” will be delivered to the applicant’s country.	JICA
From January to April 2023	Nomination of candidates and application process	Applicants, their National Government and JICA
May to July 2023	Screening and selection of course participants for 2023- 2024	JICA, IISEE (and GRIPS for those who wish to enroll)

Inquire at the JICA office in your country about the Knowledge Co-Creation Program:  
 “Seismology, Earthquake Engineering and Tsunami Disaster Mitigation”.

Note that the application must be submitted to JICA office in the applicant’s country by the National Government of the applicant’s country. Then, applicants must obtain full agreement of their National Government beforehand.

# More than 60 years: More than 1,900 participants

The International Institute of Seismology and Earthquake Engineering (IISEE) at the Building Research Institute (BRI) in Tsukuba, Japan provides training program in seismology, earthquake engineering and tsunami disaster mitigation to researchers and engineers from developing countries to strengthen the capacity of earthquake / tsunami disaster mitigation in target countries. Since 1960, a total of 1,968 participants from 105 countries have completed the training courses (as of March 2022).

IISEE mainly conducts one-year (regular) training courses named [Seismology Course](#), [Earthquake Engineering Course](#) and [Tsunami Disaster Mitigation Course](#), and two-month course named [Global Seismological Observation Course](#) and [Latin American Earthquake Engineering Course](#). Short-term training courses focusing on specific themes take place occasionally.

## IISEE Course Classification

Training Course		Field	Estimate	Period	Commencement
Regular	Seismology	Seismology	5	1 year (Oct.-Sep.) Lectures in Class (8 months) Individual Study (3 months)	1960
	Earthquake Engineering	Earthquake Engineering	10		
	Tsunami Disaster Mitigation	Tsunami	5	2006	
Latin American Earthquake Engineering		Earthquake Engineering	10 to 15	2 months (2 weeks in Latin America)	2014 (2014-2016)
Global Seismological Observation		Seismology	10	2 months (Jan.-Mar.)	1995
Individual		Seismology/ Earthquake Engineering/ Tsunami	Several	Upon request	1968

Courses currently being held are shown.

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