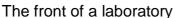# Seismological Training Laboratory

●About the Laboratory

International Institute of Seismology and Earthquake Engineering (IISEE) provides training courses on seismology, earthquake engineering and tsunami disaster mitigation to researchers and engineers from developing countries. The seismological training laboratory, which was built in 1979 have been used for comprehensive training related to earthquake observation, data acquisition and signal processing. Throughout the training courses, IISEE turns out many professionals who are engaged in earthquake observation and disaster mitigation tasks. Earthquake motion has a wide variety of amplitude range (1/1,000,000 meters ~ several meters) and periodic characteristics (less than 0.1 second ~ more than 300 second) and therefore researchers/engineers have to select suitable instruments in order to detect signals they need. There are many kinds of seismometers and data acquisition systems in the laboratory in order to respond to participant's various needs. The instruments make it possible for participants to learn about not only mechanism of seismometers and handling methods but also the history of earthquake observation. The laboratory is also equipped with workplaces for BRI research staff members.

The front of a laboratory

Displayed seismometers

■ Exhibition of Seismographs and Seismometers

Seismic sensors (seismographs, seismometers) are classified broadly into three types: broadband sensors, short-period sensors and strong-motion sensors. Broadband sensors are used for recording long-period seismic motions generated by far-field earthquakes and nuclear explosions. Short-period sensors are used to detect seismic motions from small and moderate earthquakes. Strong-motion sensors are used for recording strong ground or building shaking without clipping. In the laboratory, old and new style sensors are preserved and displayed.

■ Seismological Training

Classical analogue seismographs and classical optical recording devices used from the 1960s to the 1980s are kept in the seismograph room. In the training on seismology, participants learn basic principles and mechanism of the instruments and history of earthquake observation. Participants also learn data processing techniques using recorded digital data.

■ Strong Motion Observation Training

In Japan, the development of strong ground motion sensors started in the 1950s. Initial strong motion sensors (seismographs with large pendulums) were designed robustly in order to record strong shaking even if the building collapses during a quake. Now the small and high-performance sensors are the mainstream. The successive representative strong-motion sensors are kept in the strong motion observatory to learn about the history, mechanics and handling methods.

■ Geophysical Survey Training

Small-amplitude ambient vibration of the ground (microtremor, ambient noise etc.) caused by natural phenomena such as ocean waves and wind, and human activities contains information about underground soil structure and ground motion properties of the site. Now the ambient vibrations as well as forced vibrations are widely used in geophysical surveys as one of the applicable approach of subsurface explorations. In our training course, participants learn a series of processes from observation to analysis.

■ Use for Individual Study

This laboratory is equipped with a branch library of IISEE, holding various documents on seismology and recent damaging earthquakes. There is also a self-study room for training participants.