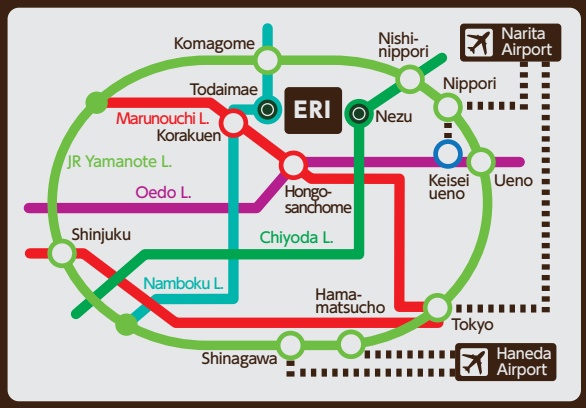
THE UNIVERSITY OF TOKYO

Earthquake Research Institute

The University of Tokyo

Our mission is
to study earthquake phenomenon scientifically,
and to find out the ways to prevent
or mitigate the disasters caused
directly/indirectly by earthquakes.



From Nezu Station, Chiyoda Line: 10 min. walk from Exit1
From Todai-mae Station, Namboku Line: 5 minutes from Exit1

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Graduate students in ERI enjoy advanced field/laboratory work with their supervisors.

Graduate education

The Earthquake Research Institute (ERI) at the University of Tokyo accepts graduate students from many departments: Earth and Planetary Science, Civil Engineering, Architecture, Information Science and Technology, Inter-faculty Initiative in Information Studies, etc. Graduate students of these departments can seek faculty members of ERI as supervisors. Please refer to the website of each Department for the details of the respective entrance examinations, and the ERI website for the list of faculty members.

International collaborations

The International Earthquake Research Promotion Office of ERI invites and sends researchers, holds international conferences and research meetings, and promotes international joint research on aftershock observations and subsurface structure surveys around the source area of major earthquakes. We aim to advance cutting edge researches and disseminate research results to the world through international collaborations.

Joint Usage/Research Center

The ERI is a nationwide Joint Usage/Research Center for earthquake and volcanic science, solid earth science related to earthquakes and volcanoes, scientific and engineering research on reduction of disasters caused by earthquakes and volcanoes. We are seeking joint research from academia, and providing facilities, equipment, historical data, etc. owned by the ERI. We are accepting visiting faculty members from Japan and overseas. We call for participation in the core-to-core collaborative research, on comprehensive disaster prevention, between ERI and Disaster Prevention Research Institute of Kyoto University.

Research Organization for Historical Materials on Earthquake and Volcanoes

Established in cooperation with the ERI and the Historiographical Institute, the University of Tokyo, the Earthquake Volcano Historical Materials Cooperation Research Organization is working with historians and seismologists to collaborate on collecting, compiling and analyzing historical materials and building a database. Long-term data on seismic activity and volcanic activity in Japan is an important resource for long-term forecast of large earthquakes and volcanic eruptions.

International Organization for Muography Research

Established in cooperation with the ERI, Medical School, Graduate School of Engineering, and Graduate School of Science, this organization developed fluoroscopic imaging technology (muography) inside volcanoes to forecast earthquakes and volcanic eruptions, and radiological diagnosis treatment. It is developing next-generation fluoroscopy technology aimed at exploring subsurface and space resources, surveying large buildings and cultural heritage. The University Museum joined this organization as of October 2019, and the public cooperation mechanism was reinforced.

Coordinating Committee of Earthquake and Volcanic Eruption Prediction Researches (CCEVPR)

For promoting The Earthquake and Volcano Hazards Observation and Research Program formulated by the Ministry of Education, Culture, Sports, Science and Technology, the CCEVPR was established at the ERI for the purpose of collaborating with universities and research institutions. The CCEVPR holds a symposium every year to exchange information about research outcomes, and makes an urgent research plan immediately after a large earthquake or during a volcanic eruption, aiming to expand scientific understanding of earthquakes and volcanoes, and ultimately contribute to disaster mitigation.

YouTube

Several videos showing some of the activities of the ERI staff are available on ERI's YouTube channel.

Various scientific investigations like these make it possible to more accurately understand what happens inside volcanoes.

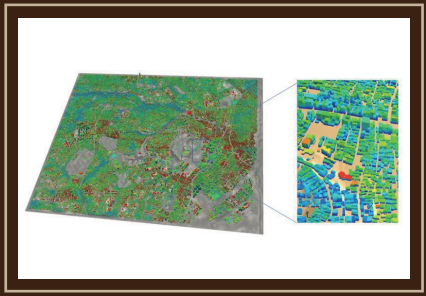
The people of Edo, the former name of Tokyo, were punisghing the catfish that was thought to have caused the 1885 earthquake.

Aiming for disaster prevention and mitigation

Develop new obs

Earthquake disaster simulation

Use supercomputers to simulate strong ground motions, and forecast the damages by shaking a large number of buildings in a city, using high resolution models of subsurface structures, etc. Also, we are exploring the use of artificial intelligence, trained with large volumes of high resolution simulation results, to rapidly estimate the intensity of strong ground motion.

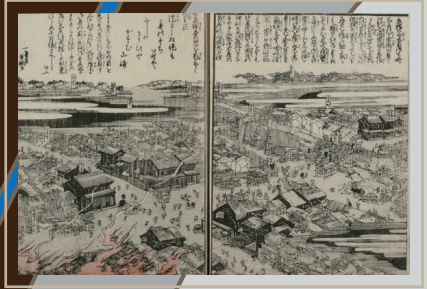


Seismic engineering / building seismic observation

In order to suppress building damage caused by strong ground motions and protect human lives, we are conducting research related to earthquake-resistant design of buildings through large shake table tests and computer simulations. We use accelerometers to determine the states of the damages and collapse of buildings that have received strong shaking.

Historical documents and historical earthquakes

Many historical documents with records of earthquakes and volcanic disasters were written over 1000 years. Collecting and analyzing documents from a time when no modern observation instruments were available provides important information for long-term prediction of earthquakes and volcanic eruptions.

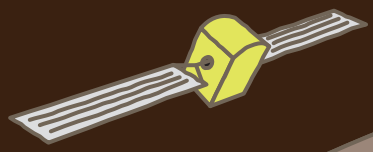


Offshore cable observation and tsunami forecast

We have developed an ocean bottom cable seismic and tsunami recording system that can quickly detect the occurrence of tsunamis. The observations are made in the Pacific Ocean and the Sea of Japan in cooperation with other organizations. We are also developing technology to forecast arrival of tsunamis to the coast based on real-time observation data. In addition, we analyze tsunami deposits that were transported to land by past events, and investigate the recurrence history of huge earthquakes and tsunamis.

Big observation data and forecast

Fusing big data obtained from high-density seismic observations with large-scale simulations based on theoretical models, we are developing new seismic analysis algorithms that take into account uncertainties of the observations and simulations through statistical considerations. It is expected to deepen the understanding of earthquake phenomena through advanced data analysis and forecast the future from simulations, contributing to disaster mitigation.



Continental Plate

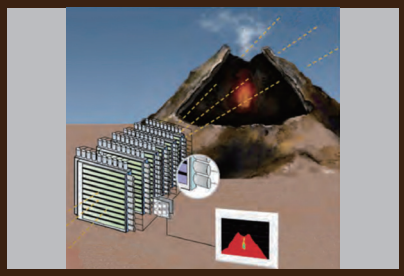
Upper mantle

Lower mantle

Core

servation equipment and analysis methods

Examine the mechanism o and volcanic eruptions

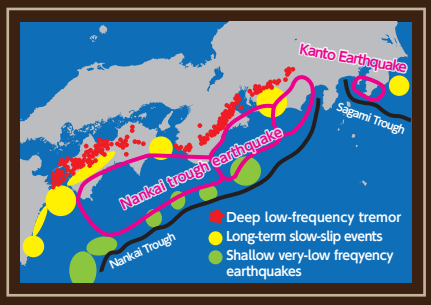


Perspective of the Earth by muon

Muon particles contained in cosmic rays falling on the earth are more permeable through objects than X-rays. Using this, the internal structure of a volcano can be examined like radiography to investigate the mechanism of eruptions by examining the state of magma paths and deep magma. We have developed a highly sensitive muon detector and are promoting field mobility observation.

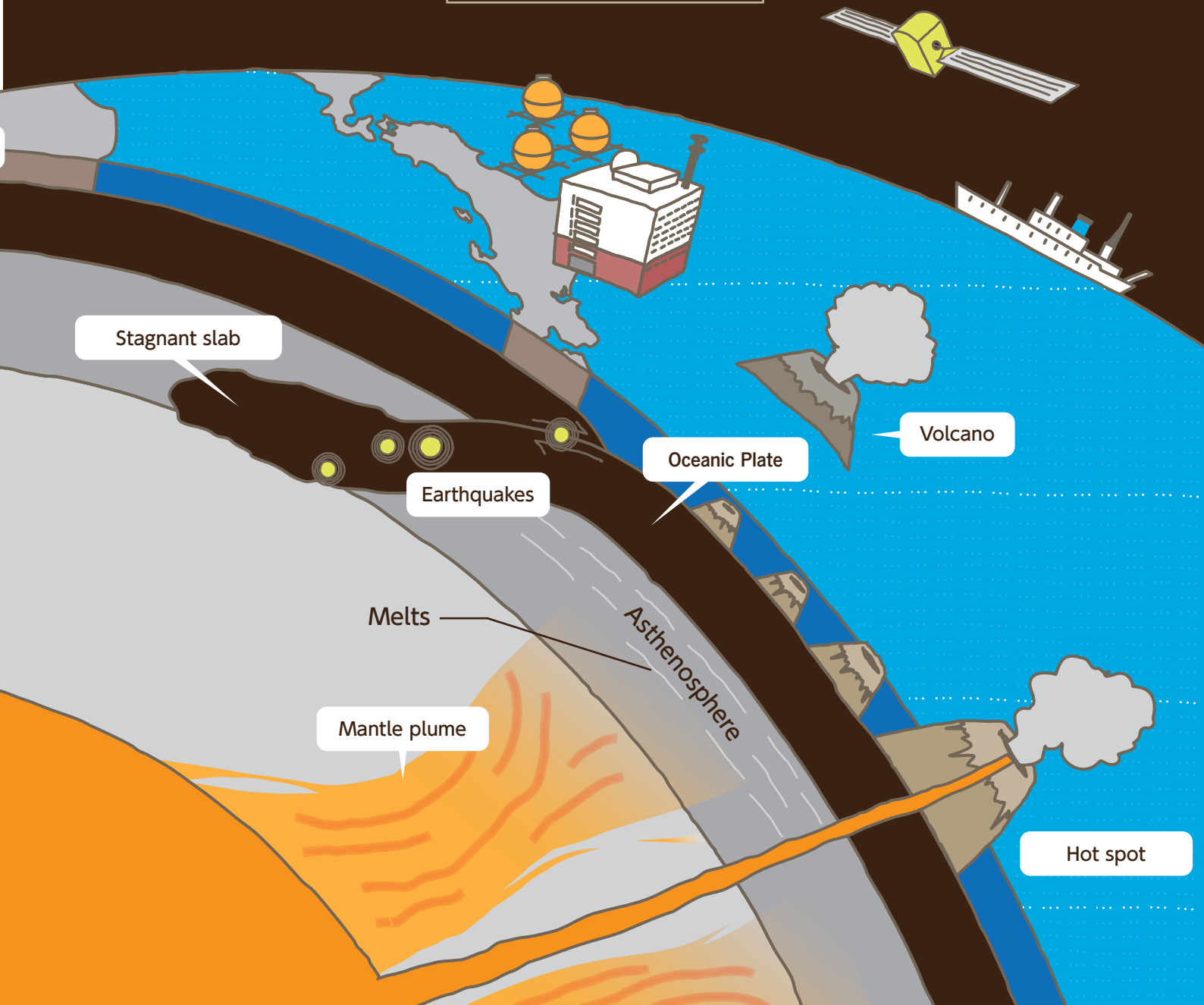
Slow earthquakes and huge earthquakes

Slow earthquakes are phenomena that occur with plate slipping much slower than ordinary earthquakes. It has been observed in many subduction zones around the world since it was first discovered in Japan, about 20 years ago. Slow earthquakes occur surrounding the source area of major subduction zone earthquakes. Out studies are motivated by this relevance of slow earthquakes to the occurrence of a huge earthquake.



Active faults and structural exploration

Based on reflection seismic surveys that record man-made tremors reflecting back from the underground with high density seismometer array, the location and structure of earthquake faults are revealed. In addition, the active faults that appeared on the surface and their histories of activities are investigated to understand the earthquake recurrence interval.



Looking inside the earth

Volcano observation

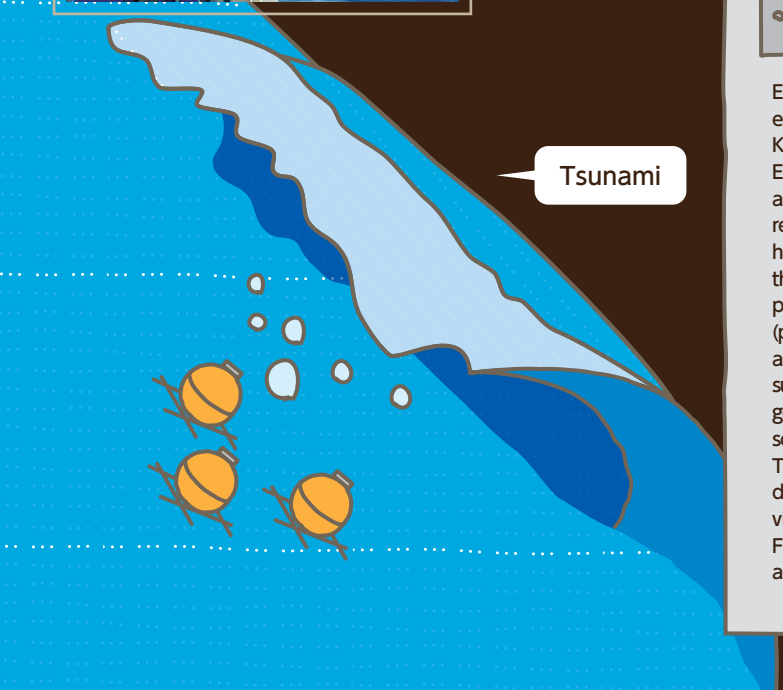
There are about 110 active volcanoes in Japan. Seismometers and magnetometers are installed around craters of some volcano to capture the movement of the magma inside the volcanoes. Changes in volcanic gas components are also investigated for predicting eruptions. We are also investigating historic eruptions by analyzing volcanic deposits and conducting simulation to predict the ash fall of large-scale eruptions.

Ocean bottom observations

Because large earthquakes occur under the sea away from land, we have developed ocean bottom seismometers and electro-magnetometers, which are installed thousands of meters beneath the sea level, and lead the Pacific Array Project, an international joint research, to unravel the mantle structure of the ocean and study its origin by installing many observation arrays over the Pacific Ocean.

Earthquake observation

We analyze the data from many seismometers installed in the Japanese archipelago, for investigating the relation between strong ground motions and the subsurface structure, and the cause of destructive earthquakes. Immediately after occurrence of large earthquake, a dense array of seismometers are installed near the epicenter for investigating the structure around the source fault in detail by using the aftershock data, measurements of electromagnetic and electrical conductivity, etc.



About the Earthquake Research Institute

Earthquake Research Institute (ERI) was established in 1925, two years after the Great Kanto earthquake in 1923. The mission of ERI is to promote research on earthquakes and volcanic eruptions and for mitigating related disasters. It also requires a comprehensive understanding of the dynamics of the Earth's interior which drives these phenomena. ERI has about 85 research staff (professors, associate professors and research associates) with various specializations such as seismology, volcanology, geophysics, geochemistry, geology, geodesy, information science, social infrastructure, architecture. There are about 80 graduate students and dozens of post-doctoral researchers and visiting professors from Japan and overseas. Further, ERI has about 90 administrative and technical staff.