

Geological Survey of Japan

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*Understanding and
living with the Earth*

<https://www.gsj.jp/en/>



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The Geological Survey of Japan (GSJ), AIST is a national organization that carries out various geological surveys and researches. GSJ has provided accurate and high-quality national geological information, which is essential to build a safe and sustainable society, since its establishment in 1882. GSJ consists of three research units of the Research Institute of Geology and Geoinformation, the Research Institute of Earthquake and Volcano Geology, and the Research Institute for Geo-Resources and Environment along with two teams on geothermal energy at the Renewable Energy Research Center, the Geoinformation Service Center including the Geological Museum of AIST, and Research Promotion Division. GSJ gathers, compiles, and provides geological information, and develops its technologies for natural disaster mitigation, stable supply of natural resources, and sustainable utilization and conservation of geosphere under the national policy to improve the intellectual infrastructure. GSJ promotes domestic and international cooperation with other earth science organizations.

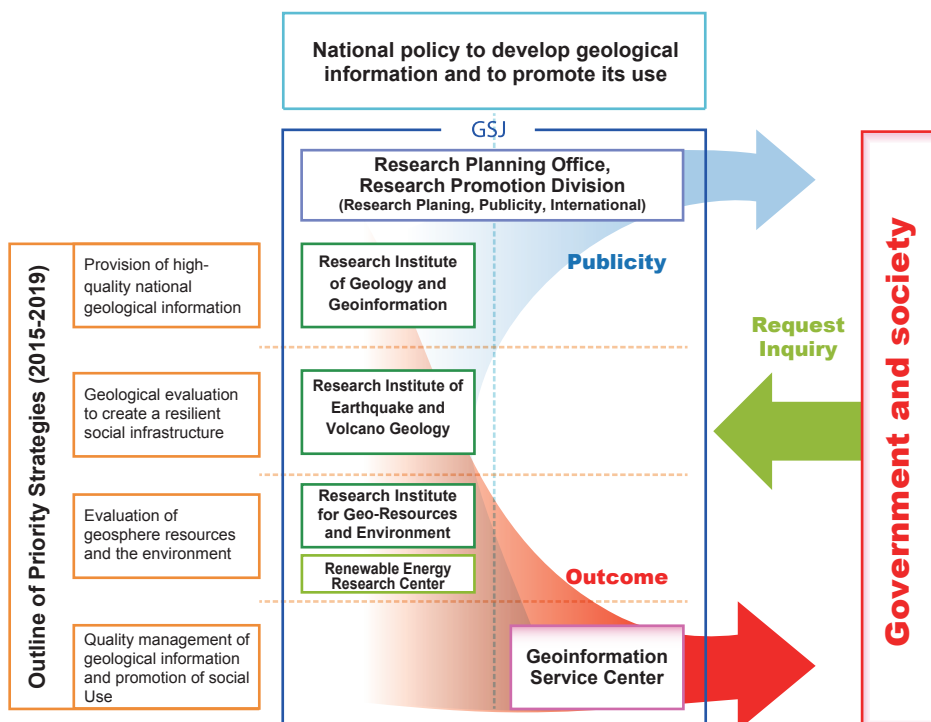
Our Mission

—Toward the realization of safe, secure, and sustainable society—

The missions of GSJ have changed throughout its history. In early days, the primary mission was natural resources exploration such as metallic and nonmetallic minerals, oil and natural gas, and coal resources. After the oil crisis in the 1970s, exploration of geothermal resources was given high priority. Today, GSJ plays a leading role in a wide range of areas of geoscience: geological hazards mitigation, water resources management, global warming prevention, geological disposal of nuclear wastes, and soil contamination.

We humans have benefited from natural resources, putting a heavy burden on the environment. Now we have come to the point where we should seriously consider how to manage the sustainable development of our society within the Earth's tolerance. To that end, it is essential to precisely evaluate natural phenomena and the impact of human activities on the Earth with the latest knowledge of the Earth's history.

We also have to learn that local problems in our daily life and small changes in surrounding living environment can often be connected to global issues. Without comprehensive knowledge of the Earth's past, which geology can tell us, how can we predict its future? GSJ keeps improving its skills, knowledge, and technique and provides better geological information so as to respond demands from society with its motto of "Understanding and living with the Earth".



Geological maps and other publications

The catalogue of geological maps published by the Geological Survey of Japan is available at the website:

https://www.gsj.jp/Map/index_e.html

To purchase GSJ's publications, please contact the following consignment distributor:

Tokyo Geographical Society

12-2 Nibancho, Chiyoda-ku, Tokyo 102-0084, Japan

FAX: +81-3-3263-0257

E-mail: chigaku@abox9.so-net.ne.jp

<http://www.geog.or.jp/english.html>



GSJ Website <https://www.gsj.jp/en/>

The website is the one-stop portal of the GSJ research outcome.



■ GeomapNavi

(<https://gbank.gsj.jp/geonavi/?lang=en>)

The portal "GeomapNavi" facilitates easy selections, overlaying, zooming of all available digital maps.

■ Databases

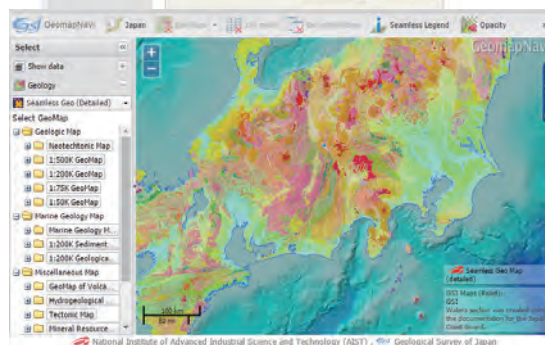
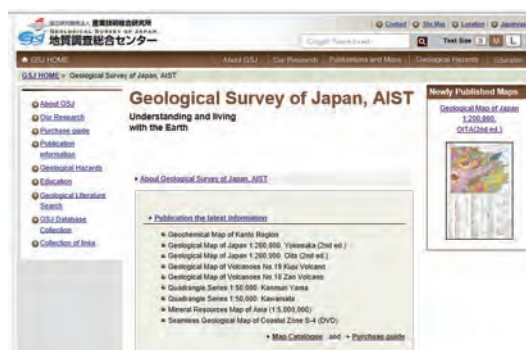
(<https://www.gsj.jp/en/database/>)

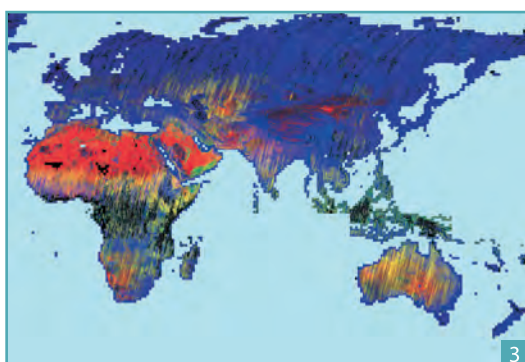
More than twenty series of the GSJ database collection are available through directory search at the website.

■ Web Map Services

(https://gbank.gsj.jp/owscontents/index_en.html)

A line of online contents is available in OGC (Open Geospatial Consortium) WMS (Web Map Service) or WMTS (Web Map Tile Services) for nation-wide domestic and East and Southeast Asian geological maps, with viewer software downloadable.





- 1 The Seamless Digital Geological Map and a geologist working at an outcrop
- 2 Seamless geoinformation of coastal zone "Northern coastal zone of Noto Peninsula"
- 3 Mineral resources index map using satellite data

The Research Institute of Geology and Geoinformation (IGG) provides useful geological information for society and contributes to environment conservation and natural disaster mitigation through its researches, focusing on urban coastal areas. Working with other domestic and foreign organizations, IGG also promotes the digitization and integration of the geological information in Asia.

■ Maps and databases

Maps and databases such as quadrangle geological map series, Seamless Digital Geological Map of Japan, gravity maps, aeromagnetic maps, and geochemical maps are kept updated with the latest geoscientific knowledge. Basic information on marine resources and environment are being collected, and marine geological maps and related databases around the Japan Islands are being compiled.

■ Urban and coastal area

Seamless geological maps that cover land, coasts, and seas are being compiled. They provide important information for disaster prediction, industrial planning, and environment conservation in coastal and urban areas.

■ Satellite-derived data

The Seamless Digital Geological Map and satellite-derived information are integrated to be used for natural resource exploration, environmental conservation, disaster reduction related to natural hazard, and others.

Research Planning Office

The Research Planning Office for Geological Survey of Japan functions as a secretariat of GSJ: it considers and selects appropriate research strategies, and coordinates industry-academia-government cooperation as well as the research tasks within GSJ. The office supports GSJ's research units to accomplish its mission and produce outstanding research outcomes, and seeks to strengthen its presence in and out of Japan.

■ Urgent field surveys

In the event of unexpected severe natural disasters, the office works as an emergency headquarter and dispatches an urgent survey team to collect necessary information and promptly deliver the results.

Social Coordination Group



Outreach event in Nagoya

■ Outreach activities

The group conducts GSJ activities such as exhibitions and

■ Bridging activities

The group serves as a bridge for the utilization of our geological information and geotechnology by companies



- 1 Surface rupture along the Yunodake Fault caused by the Fukushima Hamadori earthquake on April 11, 2011.
- 2 Sub-Plinian eruption of Shinmoedake, Kirishima Volcano on January 27, 2011.
- 3 Hot spring in a volcanic area (Hyoshimizu spring, Oita Prefecture).

To mitigate serious damage from geohazards, the Research Institute of Earthquake and Volcano Geology (IEVG) provides geological information and develops technologies to forecast earthquake occurrences, volcanic eruptions, and long-term geological phenomena up to 1 million years, based on geological surveys and geophysical and geochemical observations. IEVG also contributes to national research projects of earthquakes and volcanic eruptions and of safety management of nuclear energy facilities.

■ Earthquake

IEVG conducts field surveys of inland active faults and provides the active fault database of Japan. IEVG develops new evaluation methods of active faults with low activity and of a consecutive rupture possibility of neighboring active faults. IEVG also develops technologies to predict strong motions and surface deformations of active fault earthquakes. As for subduction zone earthquakes and tsunamis, IEVG updates the past tsunami inundation data and investigates large tsunamis in the past. IEVG carries out studies of medium- or short-term forecast of the Nankai Trough giant earthquakes based on the monitoring of deep slow slip in the Nankai Trough area.

■ Volcano

IEVG develops methods for evaluation and forecast of volcanic activity based on researches of eruption history and mechanisms. History of volcanic activities is studied based on geological survey to reveal evolution processes of volcanoes and temporal variation of eruption frequency and intensity. IEVG is also improving methods for precise age determination. IEVG is developing models of eruption processes and evolution processes of hydrothermal systems based on geochemical and petrological studies of eruption products, volcanic gas measurements, electromagnetic measurements and ground deformation measurements. Results of these surveys and observations are published on geological maps, database, scientific papers and reports.

■ Geological dynamics

IEVG systematically develops geological information to evaluate long-term geological phenomena such as surface erosion, crustal deformation, fault and igneous activities, underground water systems, and isolation capability of the bed-rock barrier of the geological repository to radioactive materials.

J's outreach activities
symposiums.

bridge to facilitate the
cal information and
es and governments.

International Coordination Group



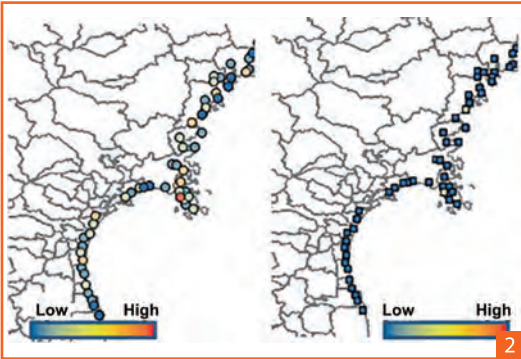
CCOP Annual Session in Sendai in 2013

■ International cooperation

GSJ promotes joint researches and personnel exchange with geological survey organizations abroad under MOU aiming to improve its research level. The cooperation spans a wide range of areas including earthquakes, tsunamis, volcanic disasters, natural resources, and geoinformation.

■ Human resource development and global geoinformation

GSJ provides scientific and technical supports to other countries especially in Asia. As a member of CCOP, CGMW and other international organizations and projects, it contributes to the improvement of quality and utilization of global geoinformation.



The Research Institute for Geo-Resources and Environment (GREEN) carries out researches below:

- Securement of natural resources such as fuels, minerals, and groundwater for industrial and public use.
 - Effective utilization of geo-environment for sustainable and stable energy cycle.
 - Preservation of geo-environment for safe and secure society.
- GREEN compiles the data and information obtained from their research activities as intellectual infrastructure and disseminates them to the world.

■ Natural resources

Surveys and researches to know the origin and genesis of mineral deposits of minor metals such as rare earth elements are given higher priority. Development and effective utilization of fuel resources such as methane hydrate and natural gases, as well as technical development for effective utilization and management of groundwater, is another major research subject.

■ Geo-environment

Development of a new safety evaluation method for CO₂ geological storage is conducted to advance carbon dioxide capture and storage (CCS). Research and technical improvement on wide-area and long-term groundwater flow investigation is aimed at technical upgrade for safety evaluation of a geological disposal of radioactive waste. Development of better evaluation technique and database of soil and groundwater contamination is also being performed.

■ Intellectual infrastructure

The results of the studies on geo-resources and geo-environment are compiled in databases and maps. GREEN wants to contribute to improving the quality of national intellectual infrastructure, the fundamental information of the land, through their research activities.

- 1 Borehole drilling for minor metal exploration in South Africa.
- 2 Distribution of arsenic (As) concentration in tsunami sediments of the earthquake in 2011 (left), and its risk assessment (right).
- 3 Facilities of precise continuous gravity monitoring at a large-scale CCS test site in Tomakomai, Hokkaido.

Renewable Energy Research Center

(Geothermal Energy Team, and Shallow Geothermal and Hydrogeology Team)

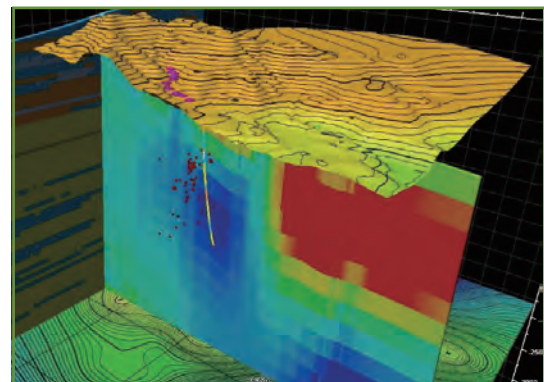


<http://www.aist.go.jp/fukushima/en/>

Renewable Energy Research Center (RENRC) of Fukushima Renewable Energy Institute, AIST conducts research and technical development to promote effective and sustainable use of geothermal energy and to achieve potential mapping and system optimization for ground-source heat pumps, collaborating with two other research institutes of GSJ: GREEN and IGG. RENRC also conducts joint research with local firms in the disaster-affected regions, to contribute to their technical growth.

■ Geothermal energy

The team develops advanced techniques to evaluate the amount and location of available geothermal resources and to monitor the reaction of the subsurface geothermal reservoir to be used to effective development and sustainable management of geothermal reservoirs. Studies on user-friendly and low-cost monitoring tools for hot spring resources are also conducted to achieve geothermal development in harmony with hot spring resources.



Development of three-dimensional integration system of geological, geophysical (MT, gravity, micro-seismic), and well data for geothermal areas.

■ Ground source heat pump (GSHP)

The team investigates regional groundwater flow for many plains and basins to develop a sustainability map of GSHP systems by numerical simulation of subsurface heat and mass transfer, because, in Japan, the heat exchange rate of GSHP systems largely depends on the local hydro-geological settings. The efficiencies of different heat exchange systems in different groundwater and geological settings are also evaluated to obtain the optimal system design for each region.



- 1 A viewer application: GeomapNavi
- 2 Collection of geological maps all over the world from the 19th century (Geological Map Library)
- 3 Special exhibition in the entrance hall of the Geological Museum.

The Geoinformation Service Center provides reliable and unbiased information in collaboration with other research units of GSJ and serves as a linkage between the society and GSJ's research activities. The Geoinformation Service Center works to improve the quality and usability of geological information as public property to be used for natural disaster mitigation, resource exploration, and environment conservation. The followings are major missions of the Geoinformation Service Center:

■ Open data distribution

GSJ publications have recently been distributed in Open Data formats, through our website. Most of the geological maps are also distributed in print, CD/DVD-ROMs, and electronic forms. Vast amount of domestic map series are being retroactively digitized in raster and vector formats and are to be also eventually downloadable. Those kinds of geoinformation are provided under the Creative Commons License (CC BY or CC BY-ND) for user derivative works.

■ Publication

GSJ is one of the national institutes providing its deliverables in planimetric map forms. High quality printed maps are published every year, covering Japan and surrounding seas. Our journals and reports are available online and also served in exchange to hundreds of domestic and foreign institutes.

■ Archive management

The GSJ Library has the largest collection of geological literatures and maps in Japan. Bibliographic search service is available on our website (GEOLIS: Geological Literature Search System). A large number of geological specimens such as rocks and minerals, which were used in GSJ's research, are archived as a research material collection on earth science. The original data obtained in the research activity have also been archived to ensure the quality and reliability of the research.

■ Dissemination and research support

The Geoinformation Service Center manages the Geological Museum, which disseminates research results of GSJ through various exhibitions and educational events, and supports the research units of GSJ by managing and preparing geological specimens.

Geological Museum

<https://www.gsj.jp/Muse/>



The Geological Museum provides opportunities for people to learn about the geology of Japan, natural resources, volcanoes, earthquakes and active faults, and so on with plain explanation and exhibitions of appropriate geological specimens. Special exhibitions, lectures and other events are held on a variety of geoscientific topics including a recent geological hazard.

Special guided tours are available for free. Please contact the tel/fax number on the left in advance for groups of 15 or more. There is a corner to sell GSJ's publications and museum goods.

[Opening hours] 9:30 - 16:30, from Tuesday to Sunday
Closed on Monday except for National Holidays (closed on the next weekday instead), and from December 28 to January 4.
[Admission] Free
TEL : +81-29-861-3750 / FAX : +81-29-861-3746

Contact

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AIST Regional Base and Site

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 1F Shouwa Building, 5-8 Odori-Nishi, Chuo-ku, Sapporo, Hokkaido 060-0042
 TEL: +81-11-219-3359 / FAX: +81-11-219-3351
http://www.aist.go.jp/hokkaido/index_en.html

Tohoku (Fukushima)

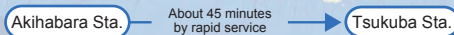
Renewable Energy Research Center
 Fukushima Renewable Energy Institute, AIST
 2-2-9 Machiike-dai, Koriyama, Fukushima 963-0298
 TEL: +81-24-963-1805 / FAX: +81-24-963-0824
 E-mail: frea-info-ml@aist.go.jp

Access

Geological Survey of Japan

http://www.aist.go.jp/aist_e/guidemap/index.html

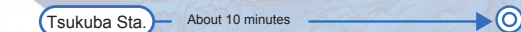
Tsukuba Express Line



Kantetsu Bus



Taxi



※ There is free shuttle bus service by AIST from Tsukuba Center to AIST (weekdays only)

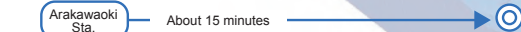
JR Joban Line



▼ **Kantetsu Bus:** Take a bus going to "Tsukuba Center" at Arakawaoki Station



Taxi



Joban Highway Bus (Tokyo-Tsukuba Center)

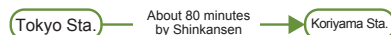
※ [Tsukuba~Tokyo Line] Take a bus going to "Tsukuba Center" or Tsukuba Daigaku" at bus terminal No. 2 near Yasesu-South Exit of JR Tokyo Station



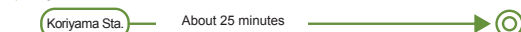
Fukushima Renewable Energy Institute, AIST

<http://www.aist.go.jp/fukushima/en/>

JR Tohoku Shinkansen



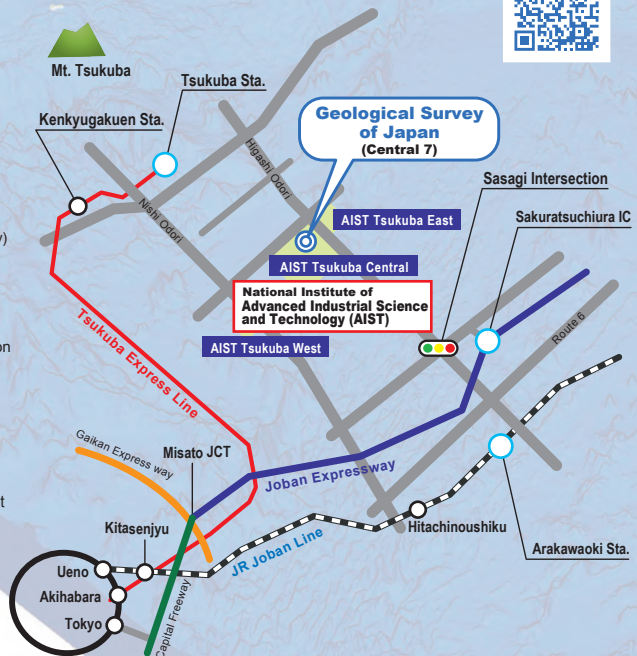
Taxi



▼ **Fukushima Kotsu Bus:** Take a bus going to "Seibu Kogyo Danchi" at No. 8 pole of Koriyama station bus terminal.



※ The bus operation is less frequent.



商標登録第5076332号

GSJ, AIST [Feb. 2016]

Cover: 3D Geological Map of Japan
 Compiled based on the Geological Map of Japan (1:1,000,000), the 3rd edition and JTOPO30 (developed by the Marine Information Research Center, Japan) is used as DEM.