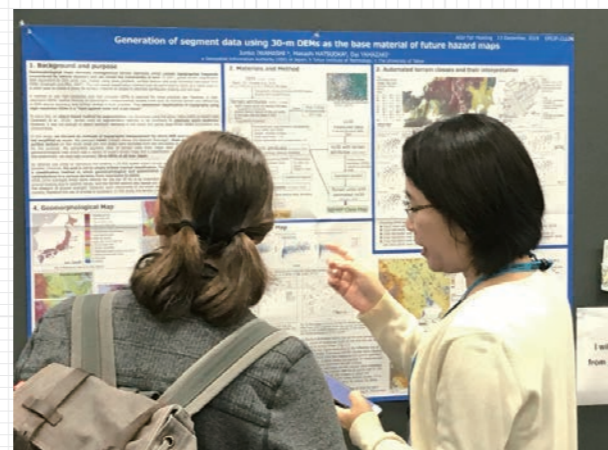


Research & development for the near future

Using big data, GSI studies for establishing an AI system for mapping in order to increase efficiency in mapping, achieve automatic update of the existing maps and speed up the identification and sharing of disaster situations in the future. Other research activities concern earthquake occurrence mechanisms for coping with huge earthquakes that threaten to occur, sophistication of space geodesy and practical application of new techniques in near future. Results of these studies and researches have been widely published in bulletins of domestic and international scientific societies and magazines, thus contributing to a progress of sciences for the public's benefit.



Research results disclosed at a conference of an international scientific society (in U.S., December 2019)

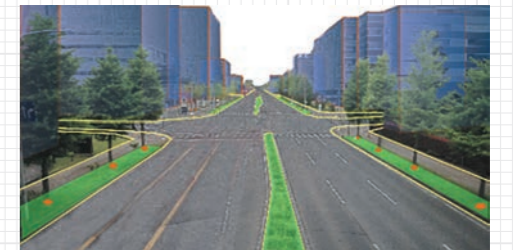
Research and technological development

AI-using automatic mapping and updating

Using its own huge amounts of accumulated aerial photographs and geospatial data as big data, GSI has been engaged in the research on an AI-assisted technique for automatic creation of cartographic data from images. Cartography greatly depends on technical personnel's skills and experience. Tremendous amounts of time and effort are required for a complete cycle of map making. So, GSI intends to gradually automatize the map making process in order to construct a database that integrates real-time changes of the reality. Results of this research will be useful for automatized recognition of damage caused by a disaster. GSI is also engaged in the technical development of a system for immediately identifying flooded range from photographs taken by a helicopter and creating cartographic data for public sharing.

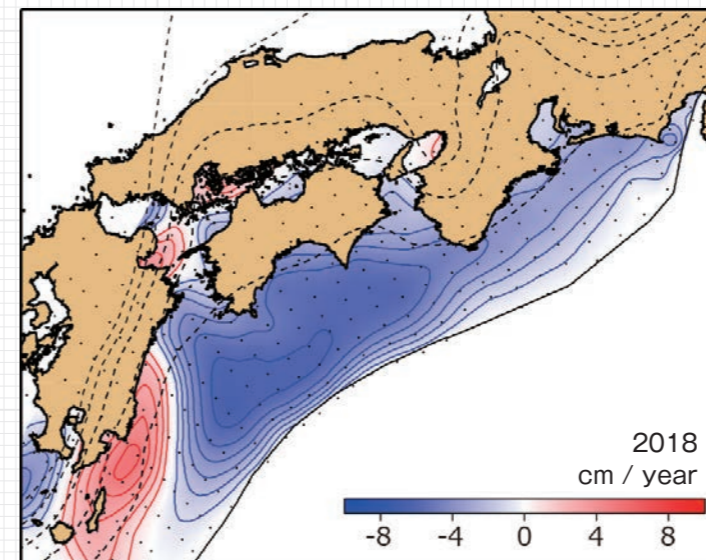


Aerial photographs and data from sensors



Illustrated image of a database integrating changes of the reality based on AI recognition

Unraveling the mechanism of the Nankai megathrust earthquakes



Experts point out that a huge earthquake could occur in the near future around the Nankai Trough which spreads offshore along the coastal line of the Tokai Region to the Kyushu Region. One of the phenomena that may occur before such a huge earthquake is a change in asperities at the plate boundary. It is said to be of great importance to focus on monitoring such changes. GSI is also engaged in the research and development activities for identifying such changes in asperities at the Nankai Trough in more accurate and frequent manner.

Asperities at the plate boundary (Blue: energy is accumulated before a huge earthquake)

Constructing location information, basis for supporting the future

Efforts are being made for realizing an "integration of cyberspace (virtual space) and physical space (real space)" aimed in the "Society 5.0" concept, through utilization of IoT, AI and Big Data technologies which have recently made great progress. Such an integration at advanced levels requires that location information provided by maps as basis for giving accurate locations exactly corresponds to the locations of the real space. Thus, GSI is working for sophistication of space geodesy for promptly detecting the earth's forms and their alterations in order to be able to update the existing location information immediately after a sudden deformation of the earth's surface occurs due to earthquake or volcano eruption.

