UNITED NATIONS **E/CONF.100/CRP.5**

ECONOMIC AND SOCIAL COUNCIL

Eighteenth United Nations Regional Cartographic Conference for Asia and the Pacific
Bangkok, 26-29 October 2009
Item 7(a) of the provisional agenda
Country Reports

Disaster Prevention Activities*

* **Prepared by the Geographical Survey Institute Japan**

Disaster Prevention Activities

Geographical Survey Institute Japan

Japan is often struck by natural disasters including earthquakes, floods, volcanic eruptions and so on, which could be disastrous.
Under such surrounding circumstances, the Geographical Survey Institute (GSI) is one of structure of designated administrative organizations based on “Disaster Countermeasures Basic Act”. It is one of important tasks of the GSI to provide various data for disaster prevention and mitigation as well as for formulation of countermeasures against those hazards. They are widely provided to all the related offices of the national and local governments, contributing to enhanced disaster prevention coordination and efforts at all levels.

Disaster Prevention
Development of Geographic Information

The geographic information of the GSI range from topographic maps, aerial photographs, to land condition maps combined with disaster prevention information given on the topographic maps. They are widely available to the public.

1) Land Condition Map

Land condition maps show landform classification, elevation of land areas, disaster prevention facilities, and other information on a scale of 1:25,000. They are used as basic materials for taking measures against wind and flood damages and land use planning.

2) Active Fault Map

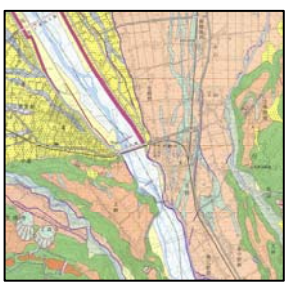
Active fault maps show the locations of active faults and active flexures in inland areas, landform classification, elevation of land areas, disaster prevention facilities, and other information on a scale of 1:25,000, centering on urban areas. They are used as basic materials for taking measures against earthquake damage.

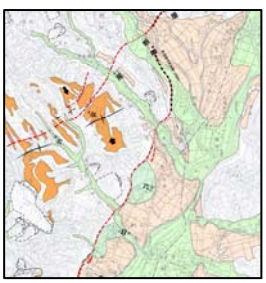
3) Land Condition Map of Volcano

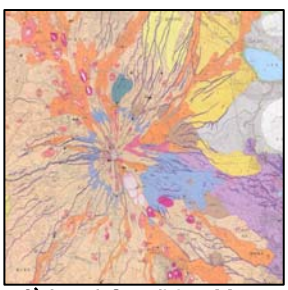
Land condition maps of volcano show lava beds, pyroclastic flows, and mudflows formed by volcanic activities, as well as disaster prevention facilities and other information. They are basic materials for predicting volcanic damage and taking preventive measures.

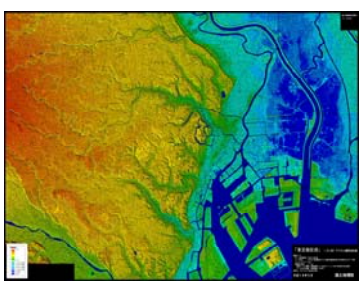
4) Precise Height Map

For major urban areas where there is concern for urban flood damage or a storm surge, high-precision and high-density elevation data obtained by airborne laser scanner analysis are shown on a topographic map of 1:25,000.


1） Land Condition Map


2） Active Fault Map


3) Land Condition Map of Volcano


4) Precise Height Map

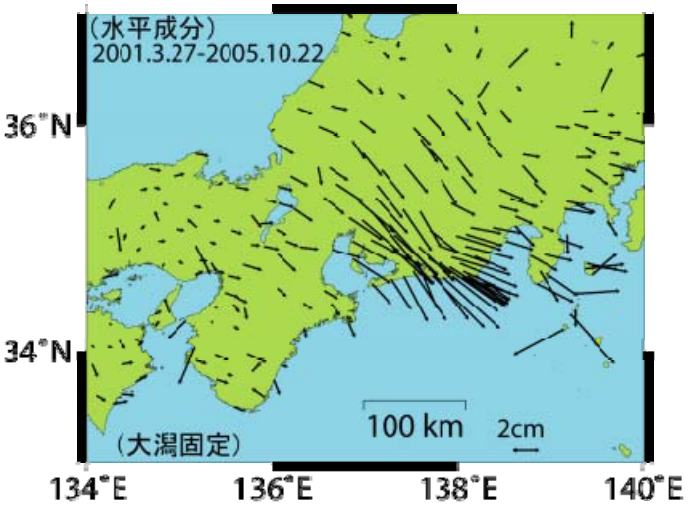
Disaster Prevention

Crustal Deformation Monitoring using GPS

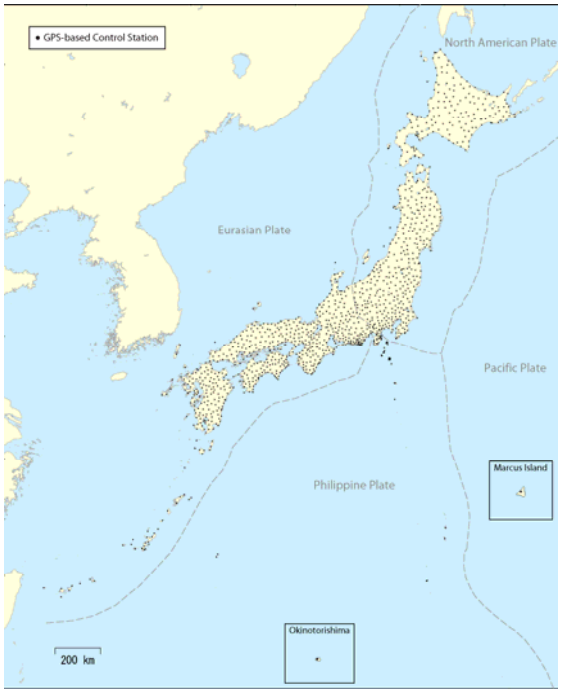
The GSI has 1240 (as of April 2009) GPS-based control stations in Japan.

Near real-time observation of crustal movements is made possible by continuous observation at the GPS-based control stations, where radio waves from the GPS satellites are constantly received. The observation data are sent in real-time from those stations established throughout the country to the GSI by a dedicated line. They underpin crustal movement analysis and monitoring efforts.

GPS-based control station



Monitoring changes of horizontal component

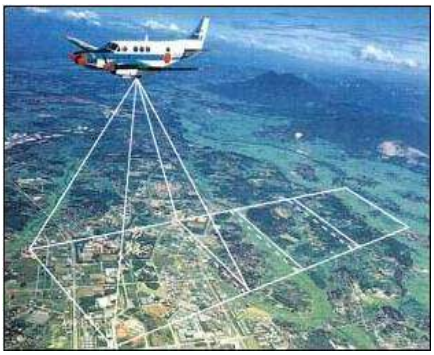


Distribution map of GPS-based control stations

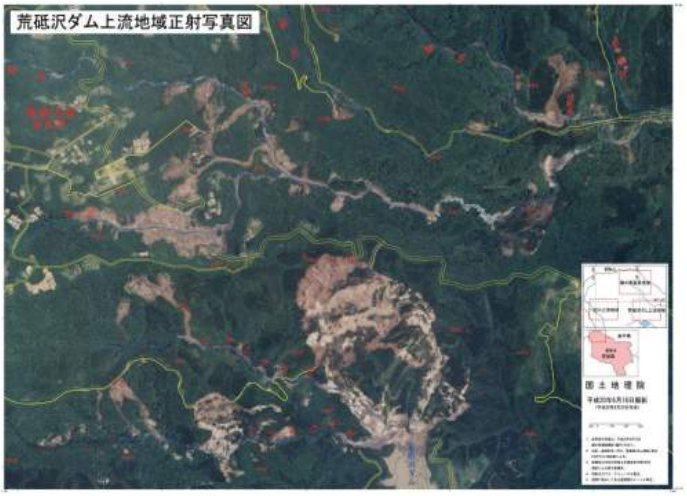
Emergency Measures

Aerial Photographs

Aerial photographs are photographs taken from an airplane by an aerial camera. The image data they provide of land surface are widely used for various administrative purposes and others, notably for national land utilization, security and disaster prevention planning. They have proved to be effective in disaster prevention efforts of the national and local governments and other related organizations. A comparison of aerial photos of the same site before and immediately after a disaster will be helpful in assessing the extent of damages and disaster prevention planning.



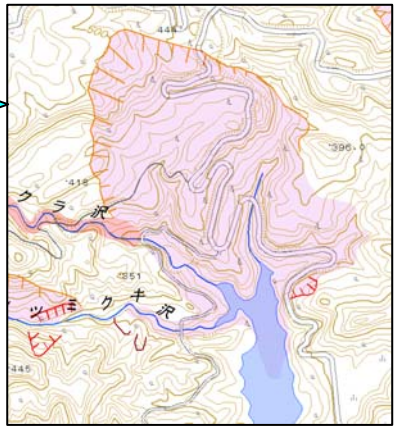
Aerial Photographs
(image)



Ortho Photo Map

An ortho photo map is a type of maps which partial information of a topographic map of 1:25,000 is superimposed on an orthographic aerial photo.

As a result of measurement using aerial photos, it shows that the maximum of 148m of landslide had occurred at upstream of Aratozawa dam.
Also, it was confirmed that sediment had moved to horizontal direction by 300 meters and more.



It becomes easy to understand by arranging damaged area on the map.

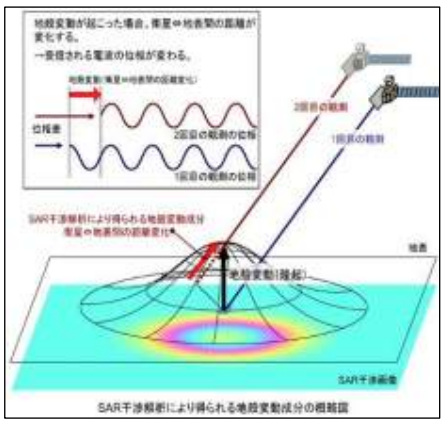
Emergency Measures

Crustal Deformation Monitoring using Satellite

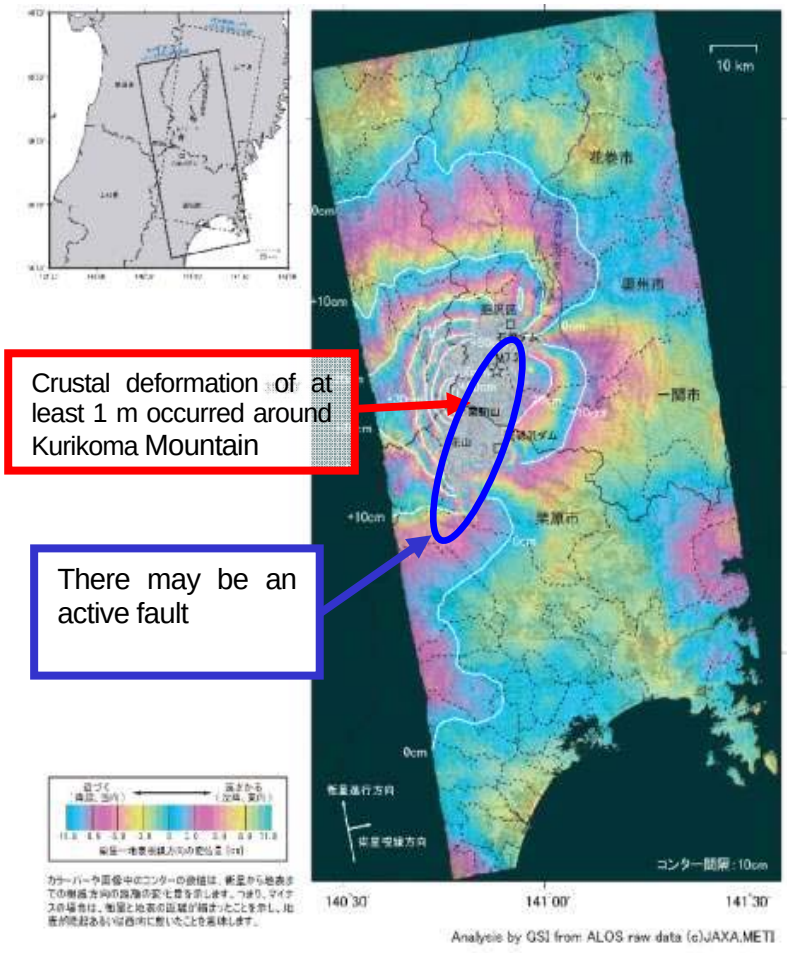
Synthetic Aperture Radar(SAR) is a remote sensing technique where microwaves (electromagnetic waves) are irradiated to the surface of the earth from satellites and the undulation or the characteristics of the earth's surface are grasped by receiving reflected waves. The GSI uses the method of interferometric SAR to grasp the face-element crustal deformation in the disaster-stricken area.

ALOS Satellite

Image of Advanced Land Observing Satellite (ALOS) “Daichi” (launched in January 2006)



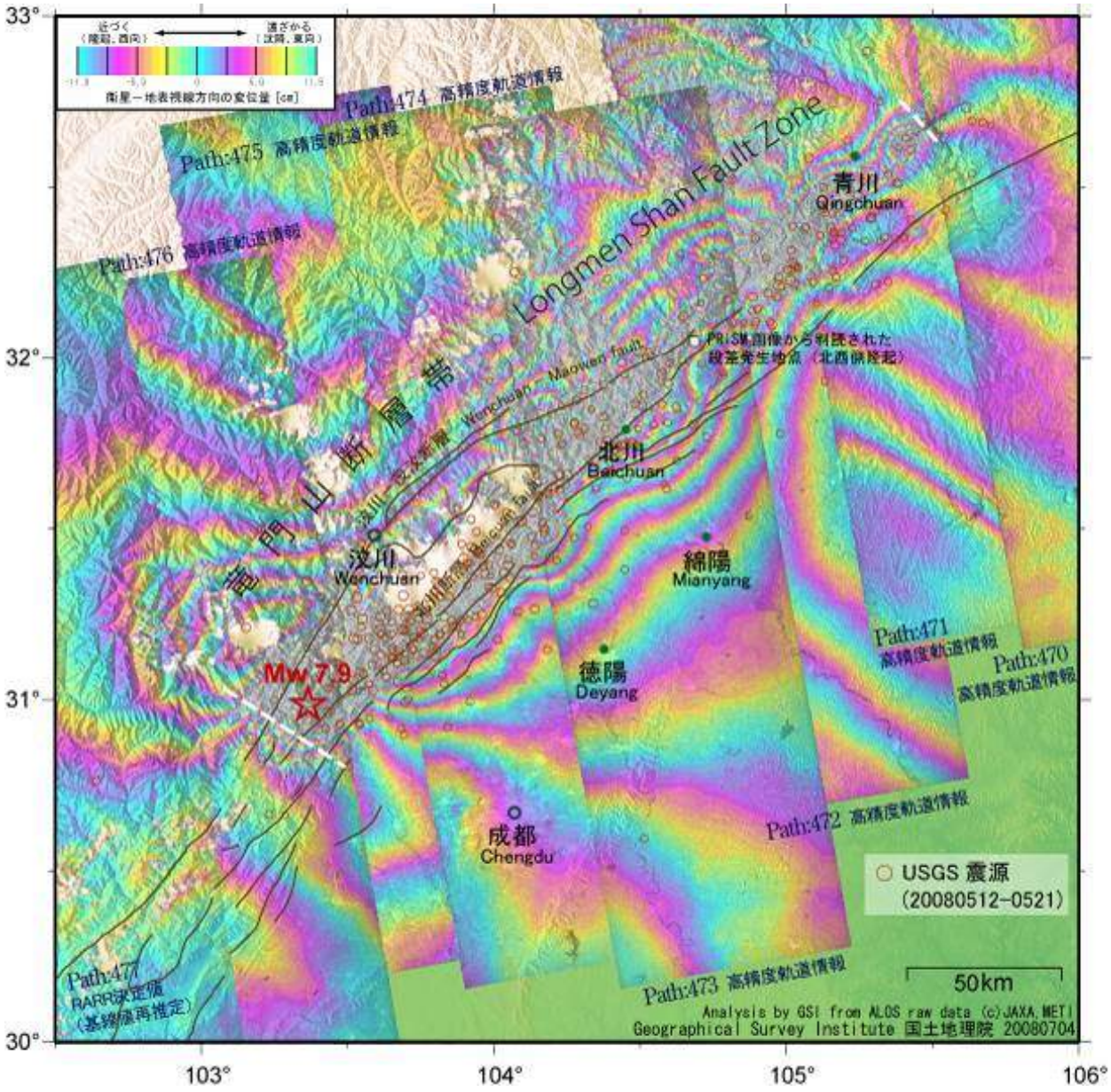
Synthetic Aperture Radar Interferometry



Crustal deformation of at least 1 m occurred around Kurikoma Mountain

There may be an active fault

Crustal Deformation and Source Fault of the Sichuan (Wenchuan) Earthquake in 2008



Crustal deformation and faults determined by synthetic aperture radar (SAR) analysis

(1) The concentrated zone of crustal deformation runs northeast-southwest along the Longmenshan fault zone and its vicinity.

(2) The width of the concentrated zone ranges from several km to about 20 km. The crustal deformation extends more than 100 km from north to south, including the concentrated zone.

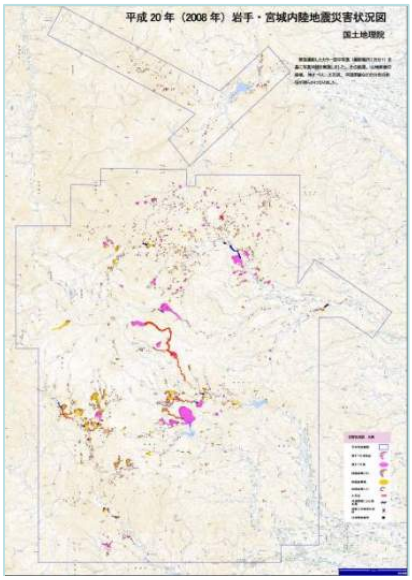
(3) The rough locations of both ends of the source fault are identified by the interferometric SAR images (white broken line).
The length of the source fault is estimated to be about 285 km ± 5 km.

Open Information Access

Development and Provision of Disaster Maps

Disaster maps are drawn to grasp the disaster situation, such as affected places and damage scale, and they are provided on “Digital Japan” (Open access at the GSI Web Pages).
The disaster situation shown on “Digital Japan” is mainly obtained by aerial photos. The GSI displays related information on top of a disaster map, such as the location of the epicenter, photos taken in the emergency field survey, aerial photos, landform classification map (certain areas only), and other information.

Photo of the scene: landslide is reached to the road



Once a disaster occurs, the maps covering an extensive disaster area are prepared to enable a prompt response. Such disaster maps are used in order to develop disaster measures, notably for the emergency measures.