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**SYSTEM DEVELOPMENT OVER THE MONITORING FOR THE PURPOSE  
OF EARLY WARNING OF POPULATION FROM THE THREAT OF  
HAZARDOUS NATURAL PROCESSES IN MOUNTAIN AND FOOTHILL  
AREA REPUBLIC OF UZBEKISTAN**



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ON GEOLOGY AND MINERAL RESOURCES**

**ADRC Visiting Researcher**

**22<sup>nd</sup> November, 2013**

**OUTLINE OF PRESENTATION**

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**I. SPECIAL AIM OF MY RESEARCH:**

Improve the reliability and timeliness of warning information about the threat of Natural Hazards.

**II. RESEARCH ACTIVITIES:**

**LANDSLIDE MONITORING FOR THE ENSURE THE SAFETY  
POPULATION IN MOUNTAIN AND FOOTHILL AREAS**

- Monitoring Landslides in Uzbekistan
- Monitoring Landslides in Japan

**EARTHQUAKE MONITORING AND INFORMATION**

- Earthquake monitoring system in Uzbekistan
- Earthquake monitoring system in Japan

**III. ACTION PLAN**

# ILANDSLIDE MONITORING FOR THE ENSURE THE SAFETY POPULATION IN MOUNTAIN AND FOOTHILL AREAS

## MONITORING LANDSLIDES IN UZBEKISTAN

### CONTENTS:

- **Activity State Service on Monitoring over the Dangerous Geological Processes**
- **Structure of the State Service on Monitoring**
- **Structure of the Monitoring System and Warning**
- **Features of Monitoring Landslide**
- **Modern Methods to Warning the Population from Landslides Disaster in Uzbekistan**

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## ACTIVITY STATE SERVICE ON MONITORING OVER THE DANGEROUS GEOLOGICAL PROCESSES

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On the basis of the Resolution of the Cabinet of Ministers Republic of Uzbekistan №194 in 1994 was established State Service on Monitoring over the Dangerous Geological Processes.

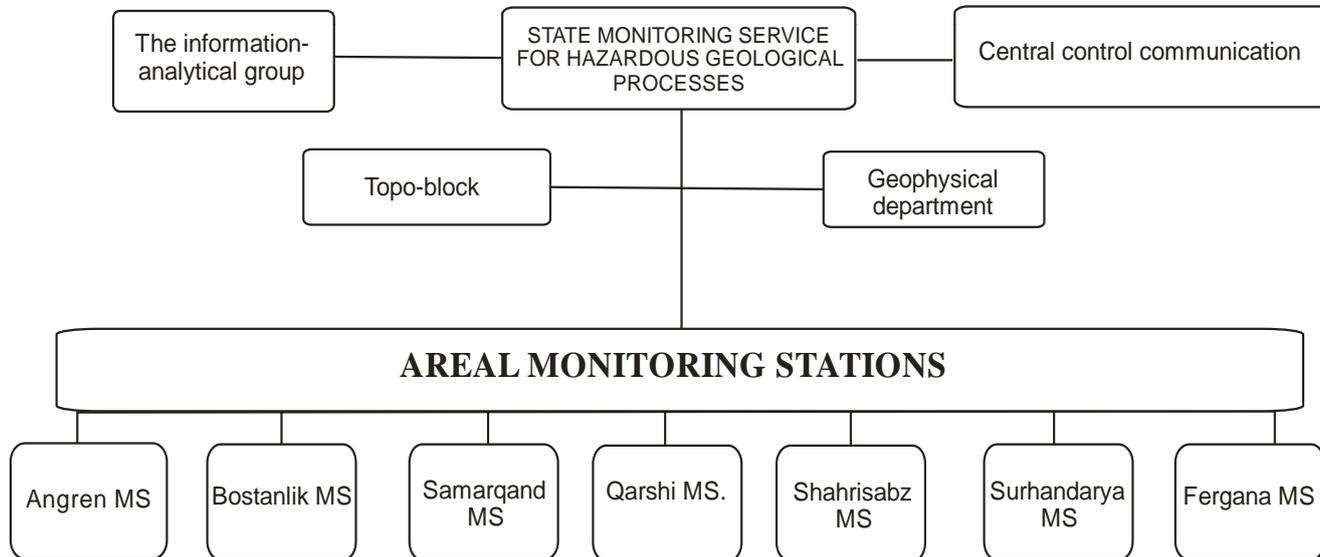
### **Main Tasks of State Service on Monitoring**

- ◆ Identification of areas of dangerous geological processes and the evaluation of their activation;
- ◆ Organization of monitoring;
- ◆ State control of dangerous geological processes;
- ◆ Preparation and issuance of recommendations;

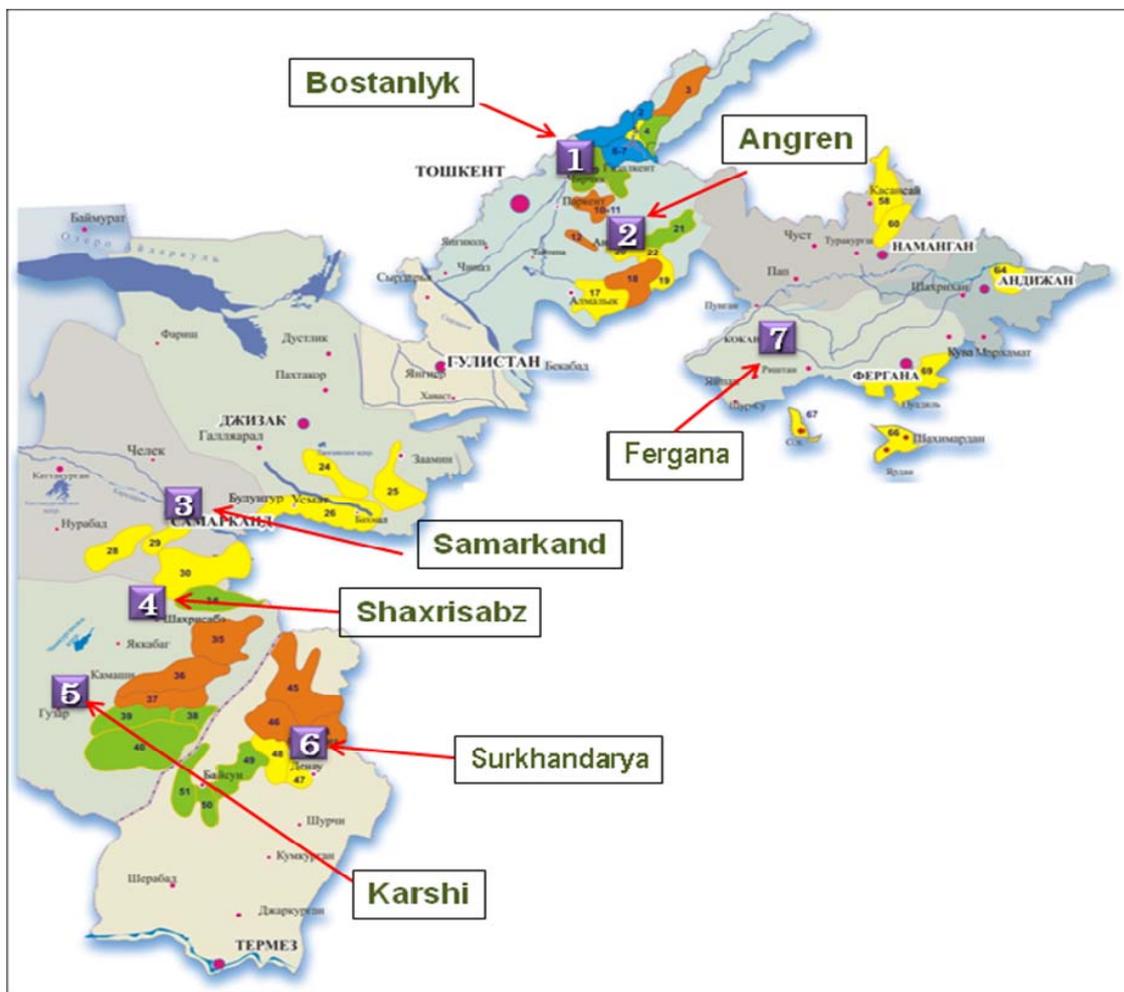
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## STRUCTURE OF THE STATE SERVICE ON MONITORING OVER THE DANGEROUS GEOLOGICAL PROCESSES (SSM)

- Information analytical group;
- Topo-block
- Central control communication;
- Geophysical department and 7 monitoring station of the Republic of Uzbekistan.

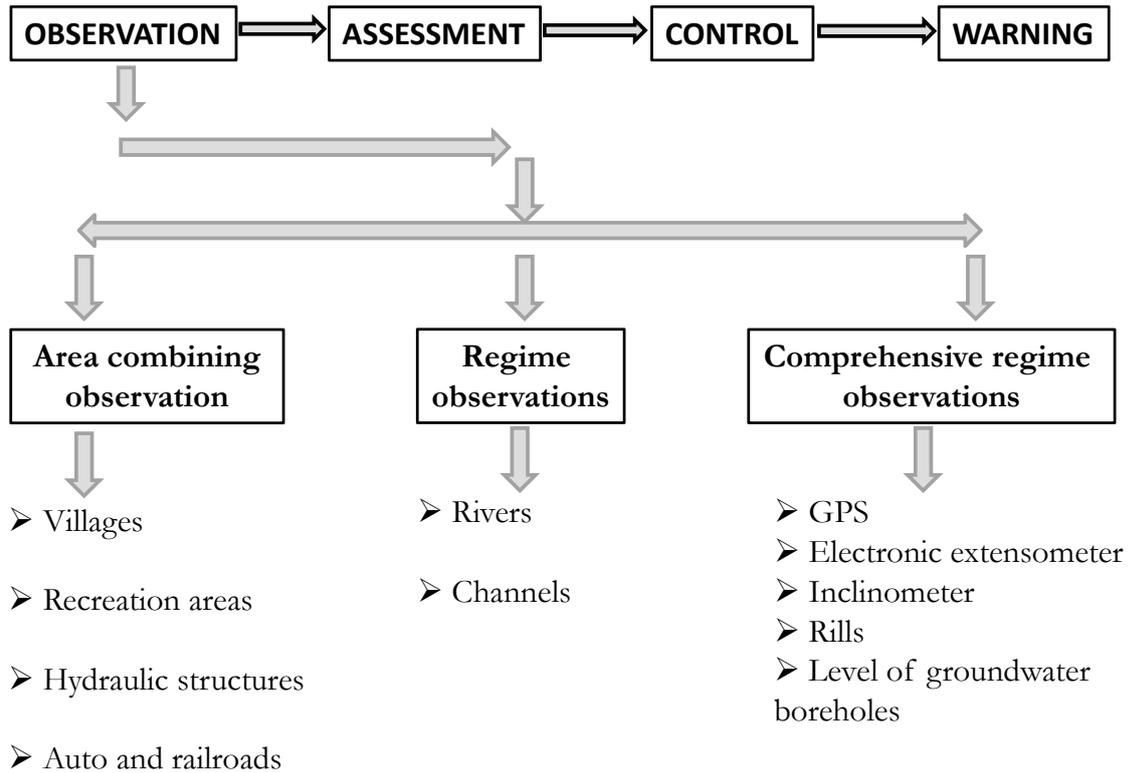


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## STRUCTURE OF THE MONITORING SYSTEM AND WARNING

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## FEATURES OF MONITORING LANDSLIDE

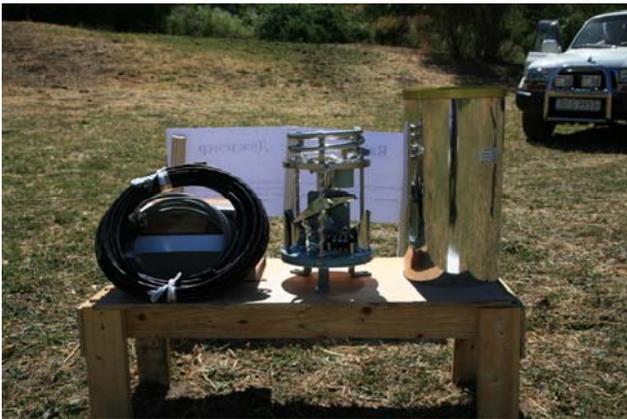
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- Daily transmission of information results observation from monitoring stations to Central Control communication of SSM, where it generalizes forwarded to the Council of SMS;
- Council of SSM reviewed daily results of observations of atmospheric precipitation forecasts, fluctuations in flow rate water springs various trends of landslides and makes the following recommendations;
- At the most hazardous events immediately sent to information of the Ministry of Emergency Situations and other interested agencies.
- Practically conducted daily control of the results of observations.

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## Technical Project with JICA , 2008-2010

1. Drilling rig YBM-IWA
2. Geophysical digital device VES
3. Extensometer
4. Inclinator
5. Rain gauge
6. Nissan-Patrol and other

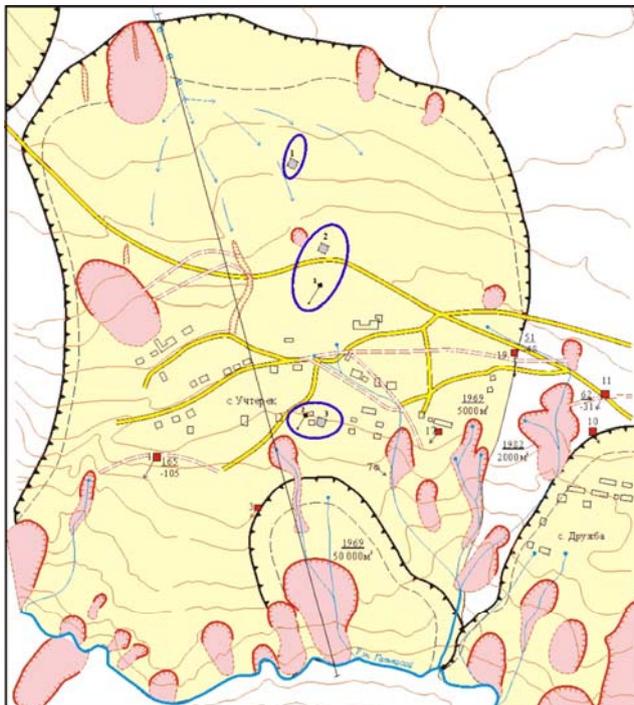


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## MODERN METHODS TO WARNING THE POPULATION FROM LANDSLIDES DISASTER IN UZBEKISTAN

### ELECTRONIC EXTENSOMETER

In Uzbekistan, 8 landslide areas are conducted monitoring observations by electronic extensometer for warning the public and ensure uninterrupted vehicular traffic in a National road in the mountainous area.



## INCLINOMETER (EL-201B)

Inclinometer used to measure the unidirectional/bilateral displacement landslide. Inclinometer probe measures the degree of inclination angle is measured by using the main body. The main body defines and records the results.

In Uzbekistan, 5 landslide areas conducted inclinometer measurements.



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## GPS METHOD 500

Geodetic Satellite Navigation System Leica GPS System 500 (with software SKI-Pro) - the automatic mode, you can get an increment of geodetic coordinates and elevations of points with no direct line your visibility between them in a more operational mode.



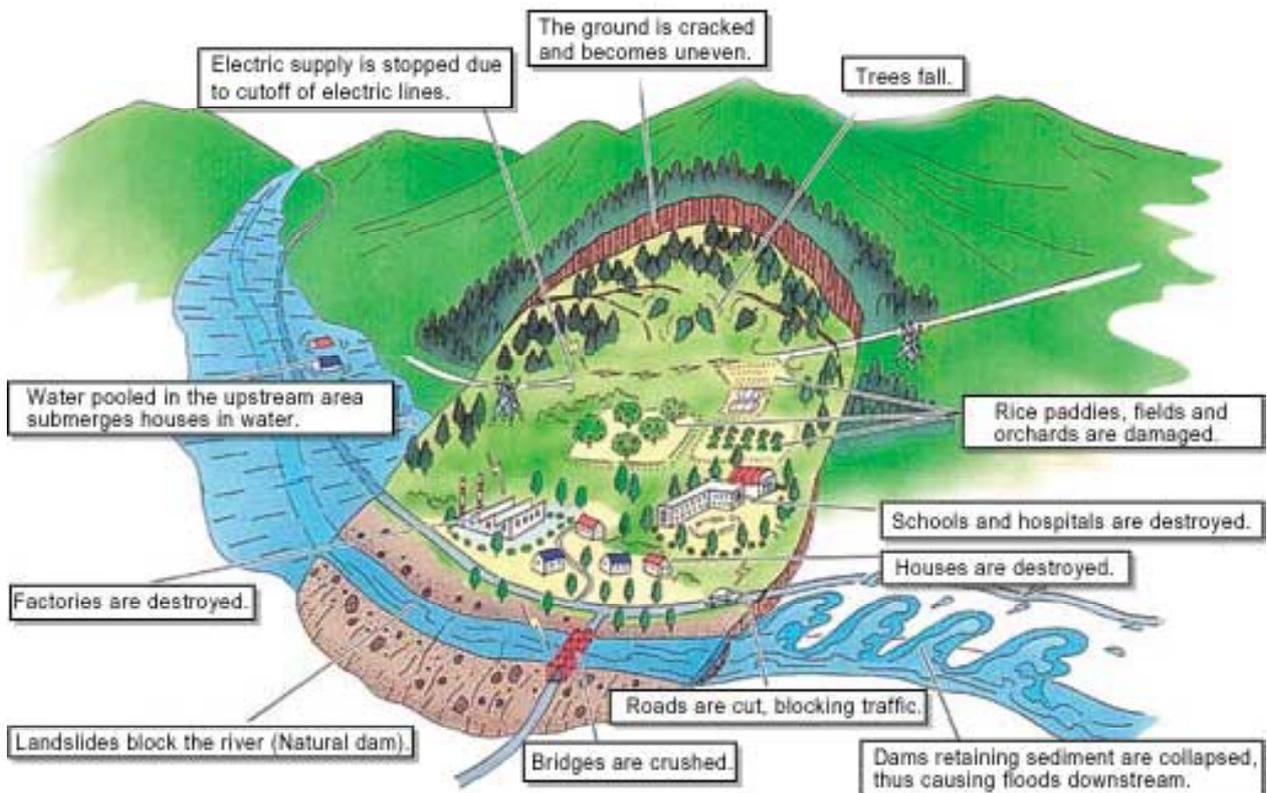
In Uzbekistan, 77 landslides conducted top geodetic observations using GPS.

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CONTENTS:

- Landslide
- Major Landslides in Recent years
- Modern Methods to Warning the Population from Landslides Disaster in Japan

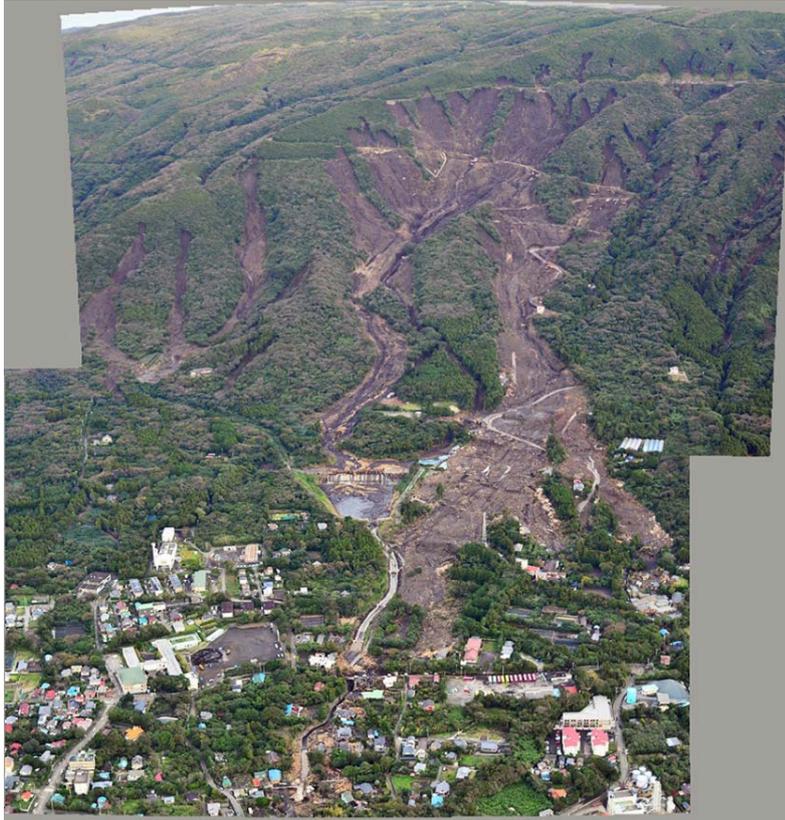
LANDSLIDE



# MAJOR LANDSLIDES IN RECENT YEARS

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Izu-Oshima Island, October, 2013



Tohoku-Taiheiyo Earthquake,  
Shirakawa, Fukushima (March 2011)





Kamikitayama, Nara (Jan 2007)

Road #169



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## MODERN METHODS TO WARNING THE POPULATION FROM LANDSLIDES DISASTER IN JAPAN

### GROUND SURVEY BY MEANS OF UNMANNED HELICOPTER.



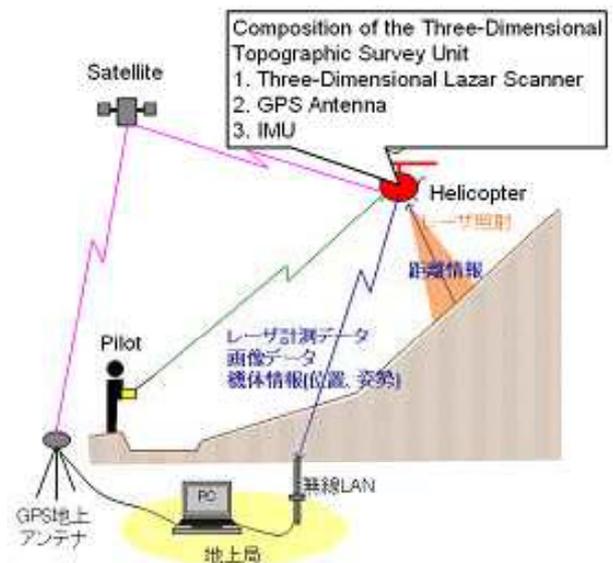
➤ Free operation is possible regardless of day or night. No flight permission is required and an operation is possible even in the crowds.

➤ All the flight can be programmed. Unmanned flight has nothing to do with injury accident.

➤ High precision survey is possible by hovering flight.

➤ Helicopter allows to get close up to shoot and monitor targets. High resolution images of targets without any blind spot are therefore guaranteed.

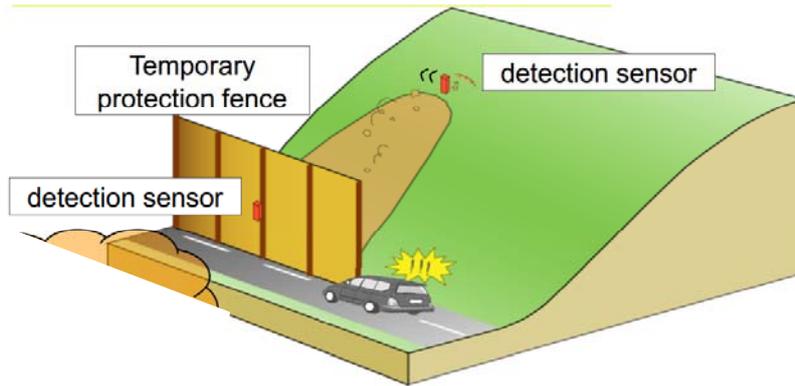
➤ Images and data can be displayed on the monitor in real time.



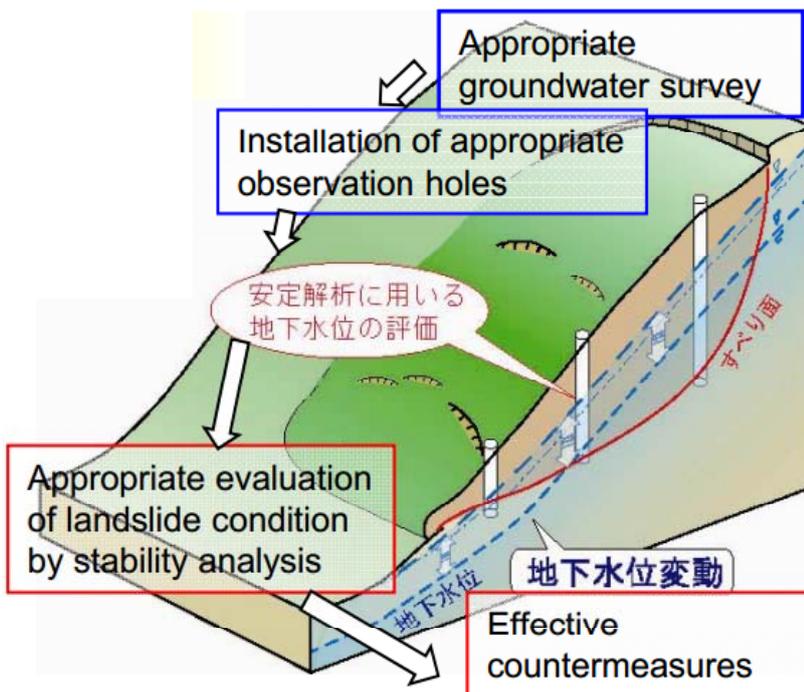
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**METHOD FOR EMERGENCY MEASURES OF SLOPE FAILURE AT ROADSIDE**

Numerous temporary protection fences are used at the time of a disaster or during construction on roadside slopes. Cases have been reported in which temporary protection fences were damaged due to unexpected rock falls and slope failures because no external forces were considered such as rock falls along the slope and sediment failures.

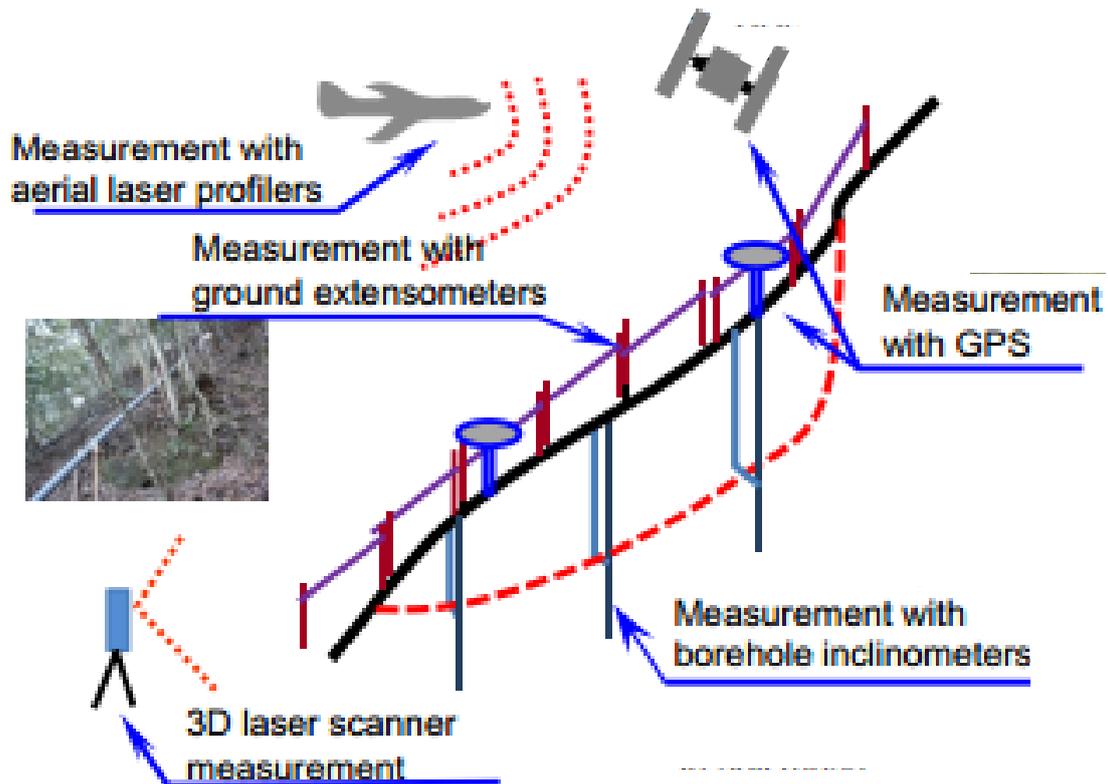


**OBSERVATION METHOD OF UNDERGROUND WATER LEVEL.**



Condition of the geological and hydrological features is very intricateness in the mountainous district slope. Furthermore, underground water condition is more complicated in landslide. So it is difficult to measure underground water level which is related to the water pressure fluctuation of slip plane.

## RESEARCH METHODS FOR ASSESSING LANDSLIDE



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## EARTHQUAKE MONITORING AND INFORMATION

### EARTHQUAKE MONITORING SYSTEM IN UZBEKISTAN

#### CONTENTS:

- Activity of Institute Seismology of the Academy of Sciences of Uzbekistan
- Earthquake Monitoring Network
- Information about the Latest Earthquake

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## ACTIVITY OF INSTITUTE SEISMOLOGY OF THE ACADEMY OF SCIENCES OF UZBEKISTAN

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**Research Lab: 11**

**Complex Expedition: 1**

**Seismic Stations: 22**

**Complex prognostic stations: 9**

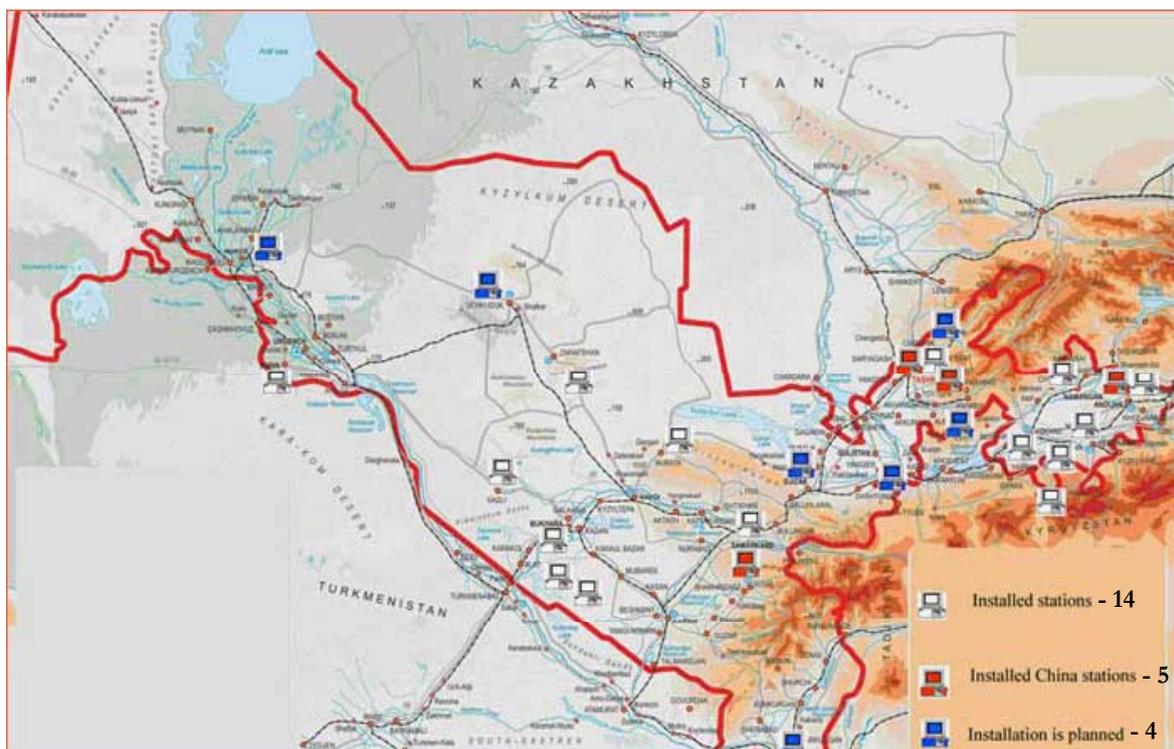
**Staff : 424**

The major scientific problem of the Institute is "Estimate of seismic hazard, seismic zoning of different levels, long-term prediction of earthquakes, assessment of seismic risk, output of methods middle-short-terms prediction of earthquakes".

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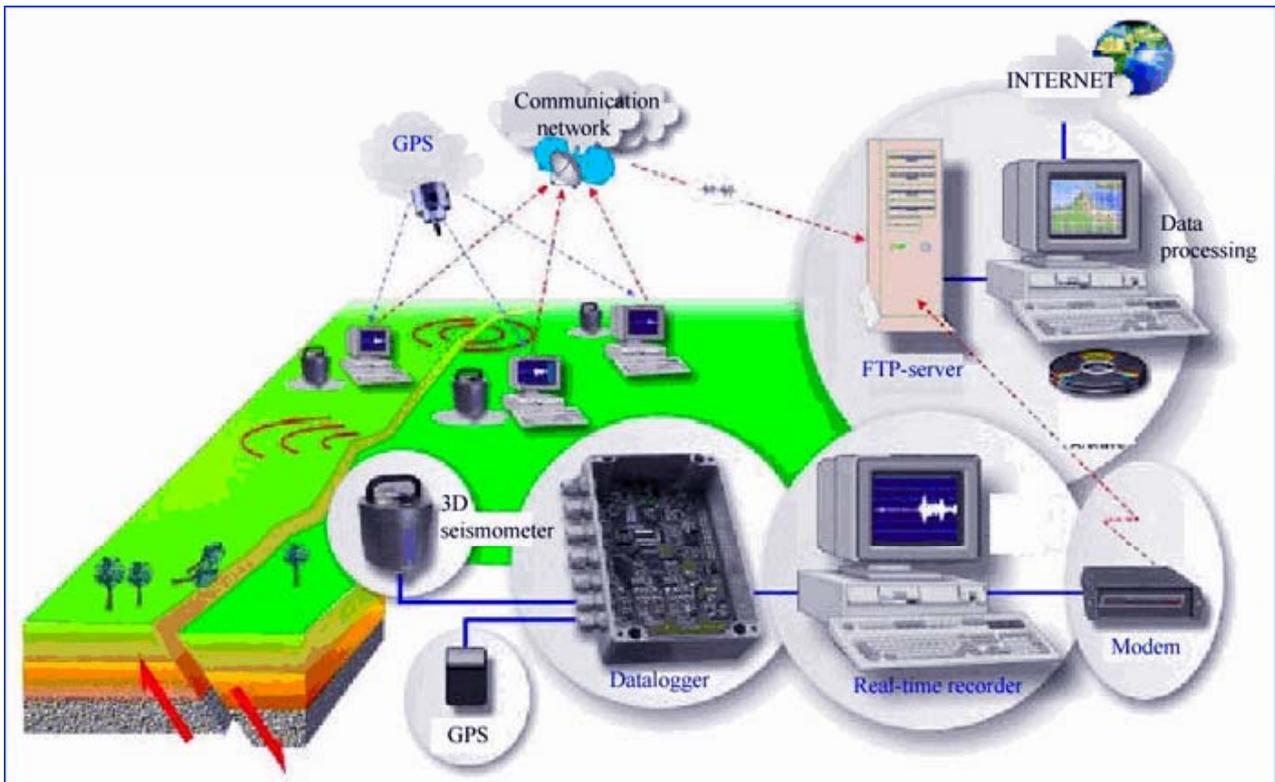
## EARTHQUAKE MONITORING NETWORK

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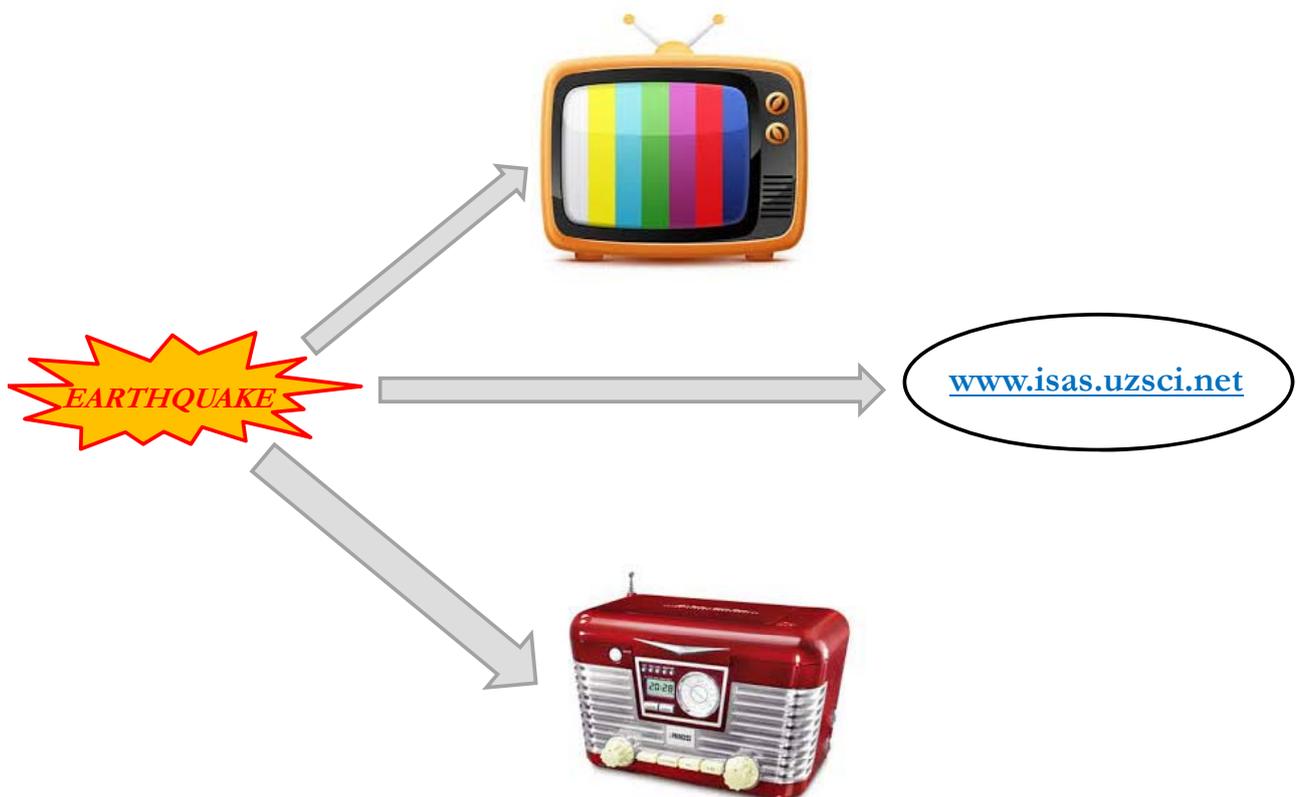
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## SEISMIC NETWORK CIRCUIT



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## INFORMATION ABOUT THE LATEST EARTHQUAKE



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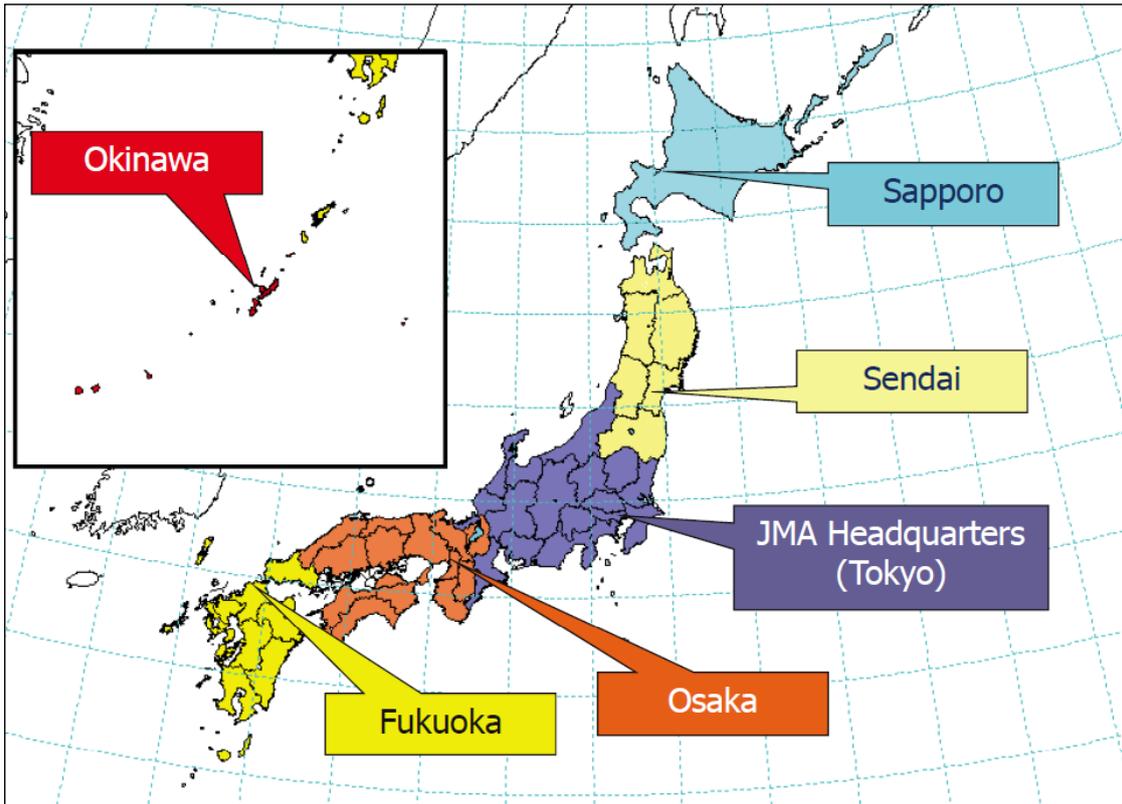
Last earthquakes										
19   november   2013   Last 20										
No	date [GMT]	lat	lon	depth	n	sta	ms	mb	l0	region name
2013-11-16										
1	2013-11-16 20:48:58	36,83	71,08	33	6	3,0				Afghanistan-Tajikistan Border Region
2	2013-11-16 16:54:06	40,83	73,76	33	6	2,5				Kyrgyzstan
3	2013-11-16 09:21:02	37,90	68,95	33	6	2,9				Afghanistan-Tajikistan Border Region
2013-11-15										
4	2013-11-15 06:57:13	40,66	73,17	33	6	4,8				Kyrgyzstan
2013-11-14										
5	2013-11-14 20:56:28	39,22	73,94	33	6	3,5				Tajikistan-Xinjiang Border Region
6	2013-11-14 06:52:10	36,94	69,94	80	6	4,2				Hindu Kush, Afghanistan
2013-11-12										
7	2013-11-12 16:30:27	37,50	68,69	33	6	4,6				Afghanistan-Tajikistan Border Region
8	2013-11-12 00:40:27	39,15	73,53	33	6	4,0				Tajikistan-Xinjiang Border Region
2013-11-11										
9	2013-11-11 02:21:03	38,49	69,02	33	6	4,0				Tajikistan
2013-11-10										
10	2013-11-10 05:15:13	38,20	69,38	10	6	5,0				Tajikistan
2013-11-06										
11	2013-11-06 21:29:52	36,98	70,78	180	7	3,8				Hindu Kush, Afghanistan
12	2013-11-06 14:15:05	38,22	66,33	10	3	3,4				Southeastern Uzbekistan
2013-11-02										
13	2013-11-02 07:11:37	37,47	69,46	10	5	3,5				Afghanistan-Tajikistan Border Region
14	2013-11-02 04:59:50	36,87	70,98	180	7	4,7				Hindu Kush, Afghanistan
2013-10-29										
15	2013-10-29 04:18:40	37,53	71,52		3	3,6				Afghanistan-Tajikistan Border Region
2013-10-25										
16	2013-10-25 01:09:48	37,7	69,98		3	3,0				Afghanistan-Tajikistan Border Region
2013-10-21										
17	2013-10-21 02:26:43	35,57	76,95	10	6	5,0				Eastern Kashmir
2013-10-17										
18	2013-10-17 00:54:43	39,45	71,94		3	2,5				Tajikistan
2013-10-13										
19	2013-10-13 16:11:40	36,96	71,16	170	4	4,0				Hindu Kush, Afghanistan

## EARTHQUAKE MONITORING SYSTEM IN JAPAN

### CONTENTS:

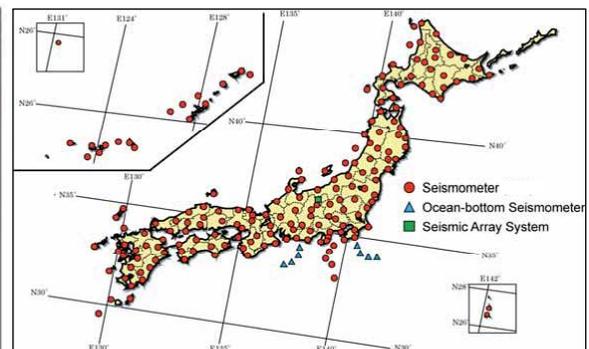
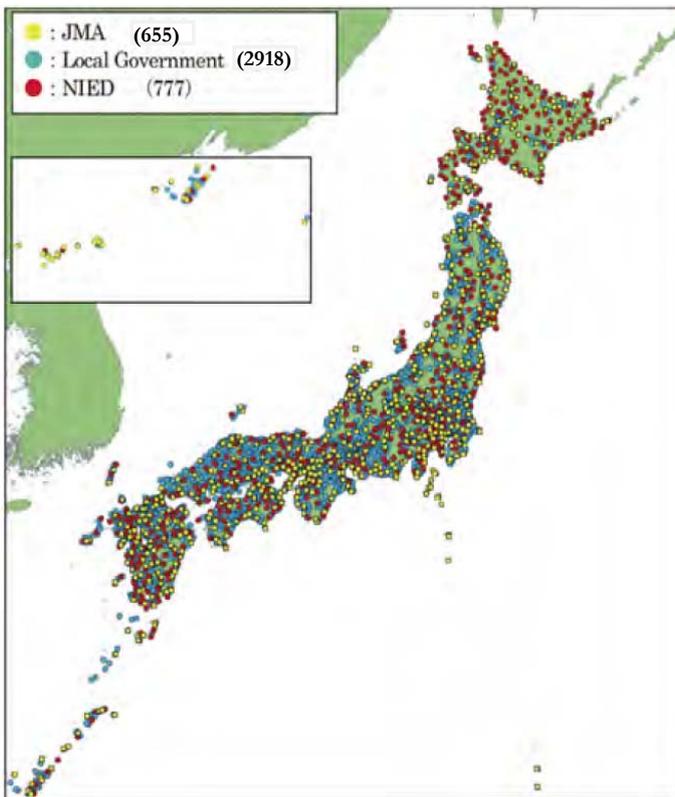
- JMA Headquarters & District Meteorological Observatories
- Earthquake Monitoring Network
- Earthquake Early Warning System
- Emergency Operation Triggered by Seismic Intensity Information

## JMA Headquarters & District Meteorological Observatories



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## EARTHQUAKE MONITORING NETWORK

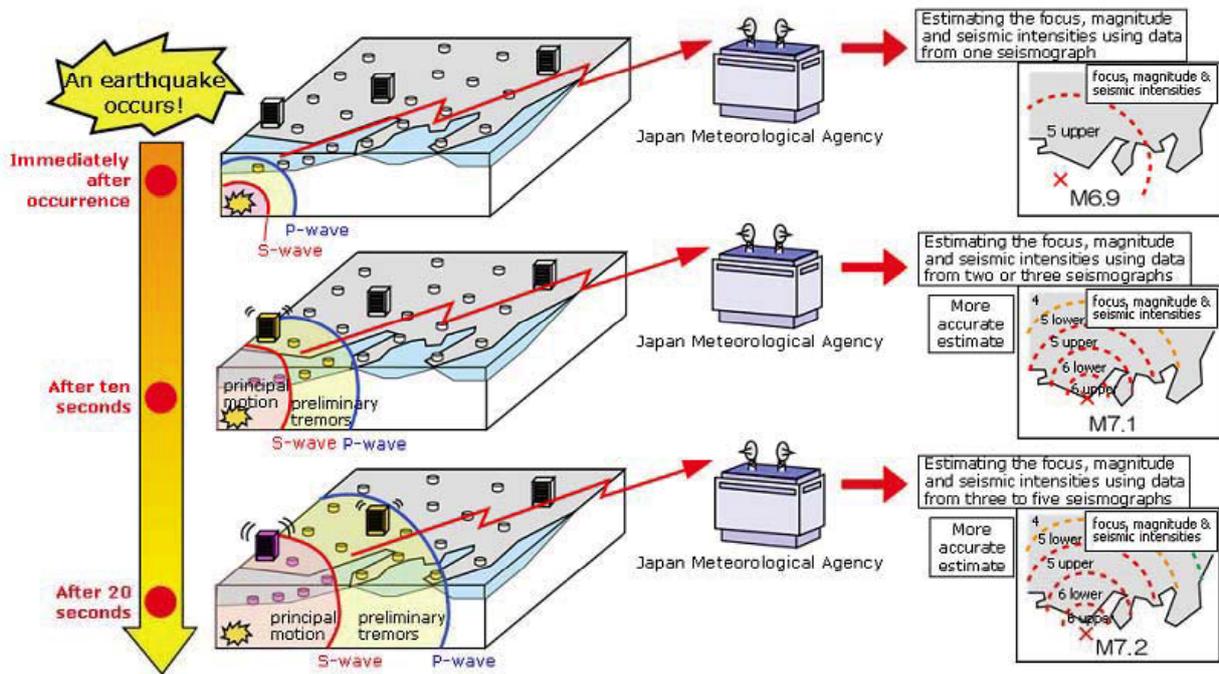


The main part of the EEW system uses 220 JMA multi-function SI meters which cover the whole Japanese Archipelago



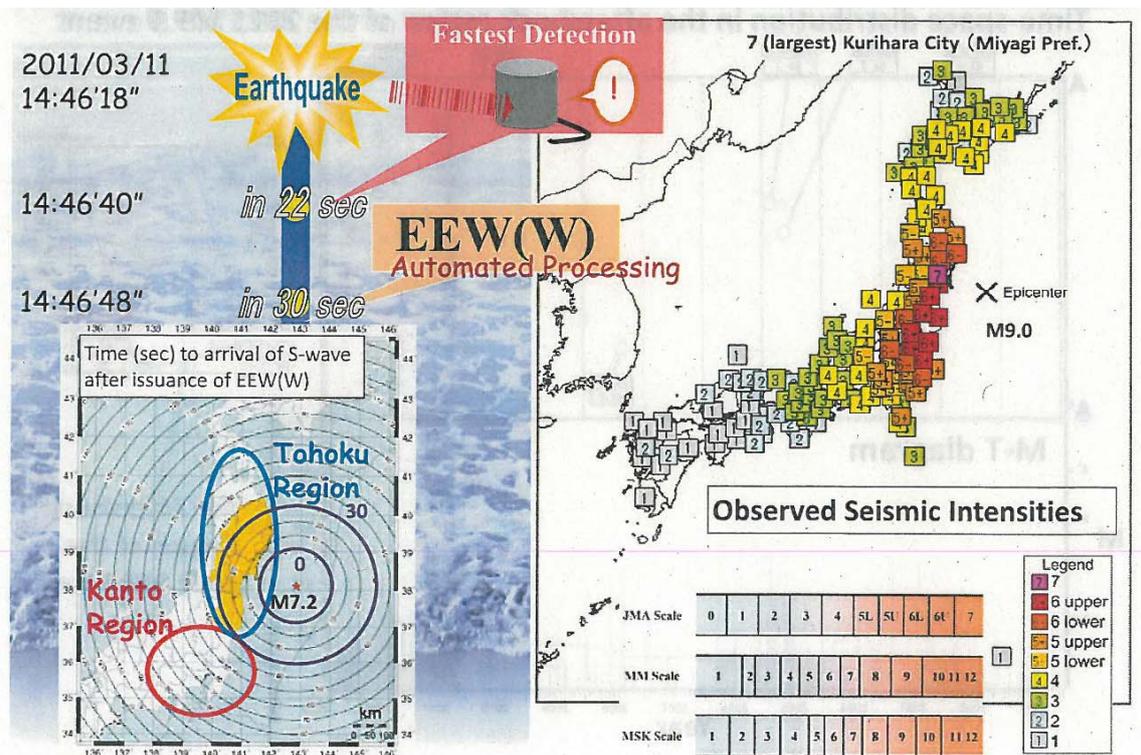
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# EARTHQUAKE EARLY WARNING SYSTEM



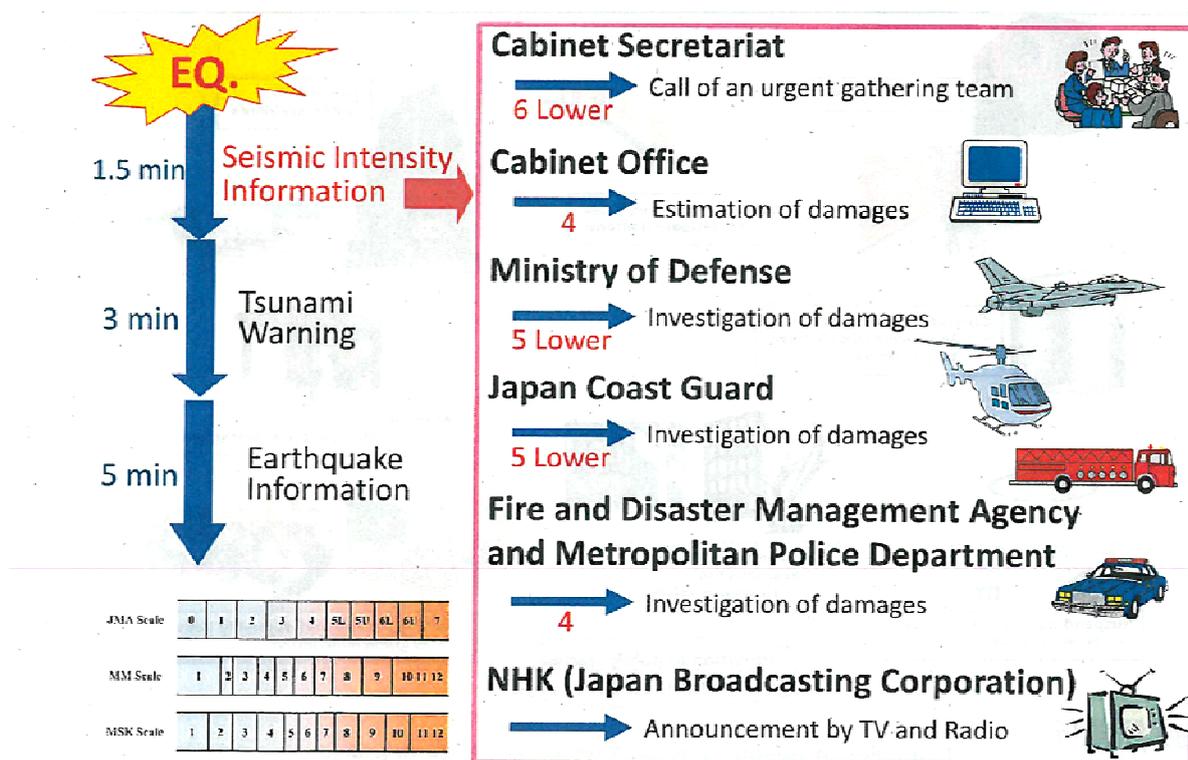
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## The 2011 off the Pacific Coast of Tohoku Earthquake



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## EMERGENCY OPERATION TRIGGERED BY SEISMIC INTENSITY INFORMATION



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### ACTION PLAN

- Improve the system of monitoring dangerous geological processes.
- Establish a unified interconnected system of remote, ground and underground types of observations dangerous geological processes.
- open a new scientific research direction "Influences of the earthquake on dangerous geological processes"
- Create a unified database of hazardous natural processes (floods, earthquakes, droughts, landslides etc.);
- Create a Monitoring Center of the Earthquake in Tashkent.
- Create an Earthquake Alert System via mobile phones.
- Make a map of natural hazards caused by earthquakes, melting snow and heavy rain by region of the republic.
- Establish a system of public notification of the impending threat in the form of a siren or light signals.

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An aerial photograph of a volcano, likely Mount Fuji, showing a large, dark crater with a bright, glowing center. The surrounding landscape is covered in dense green forest, with some white clouds or smoke rising from the slopes. The text "Domo Arigato Gozaimashita!" is overlaid in white, serif font at the top.

Domo Arigato Gozaimashita!

THANK YOU FOR YOUR ATTENTION!