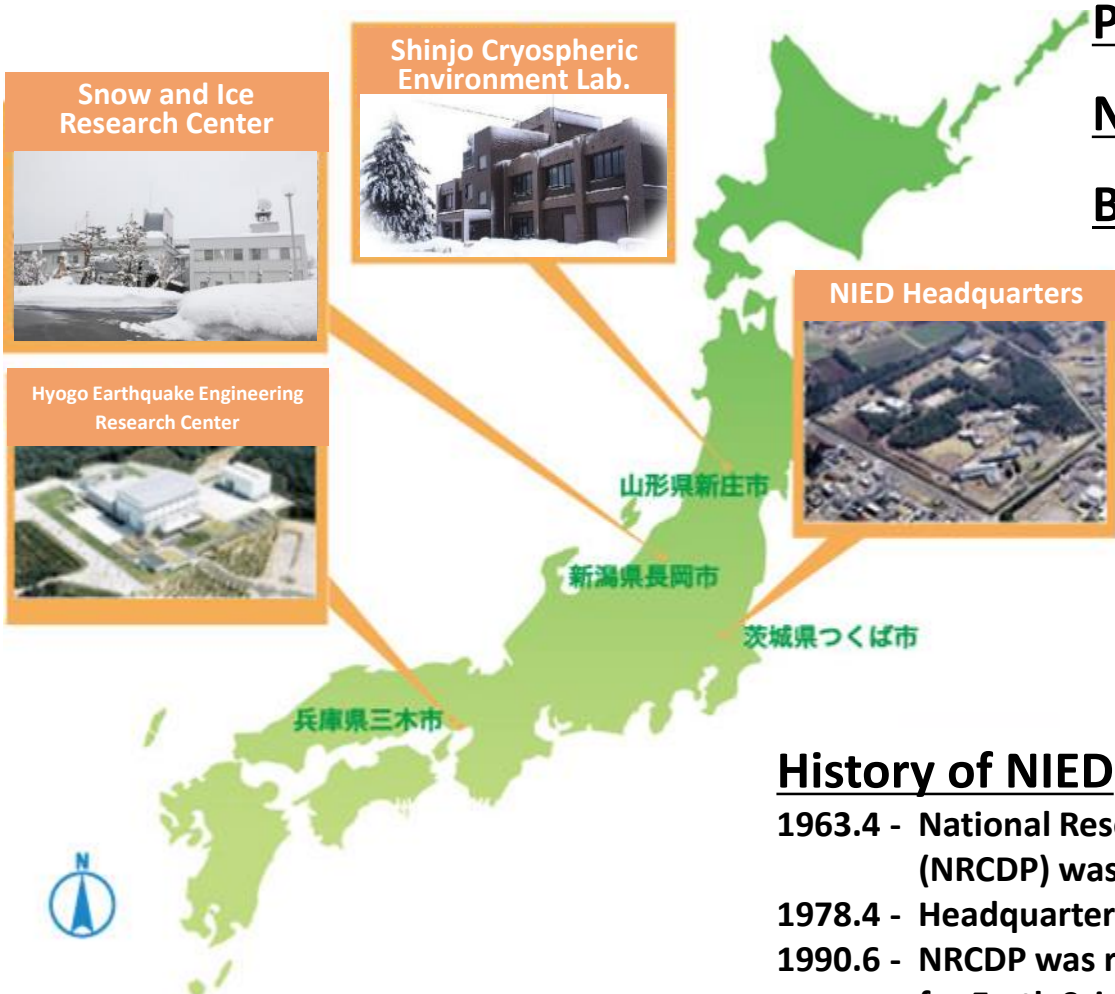


Introduction of NIED and Disaster Responses in 2018

National Research **I**nstitute for
Earth Science and **D**isaster Resilience (NIED)

Hitoshi Taguchi

Nov 1st, 2018



PRESIDENT : Dr. Haruo Hayashi

Number of Staff : 249 (As of 2016.4.1)

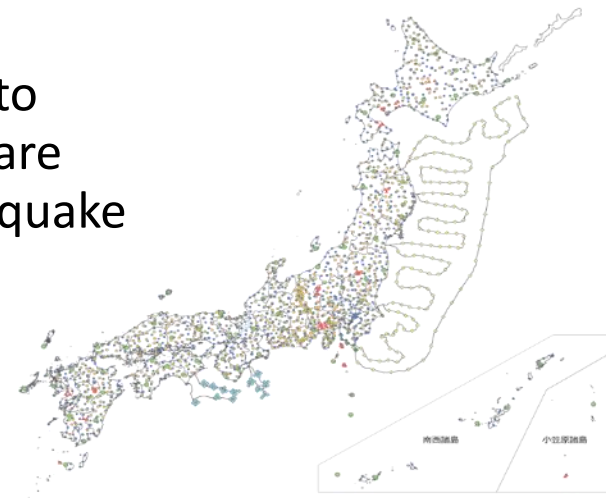
Budget : 9.2 billion yen

History of NIED

- 1963.4 - National Research Center for Disaster Prevention (NRCDP) was established at Tokyo.
- 1978.4 - Headquarters moved from Tokyo to Tsukuba.
- 1990.6 - NRCDP was re-organized as National Research Institute for Earth Science and Disaster Prevention (NIED).
- 2016.4 - NIED was re-organized and re-named as National Research Institute for Earth Science and Disaster Resilience.

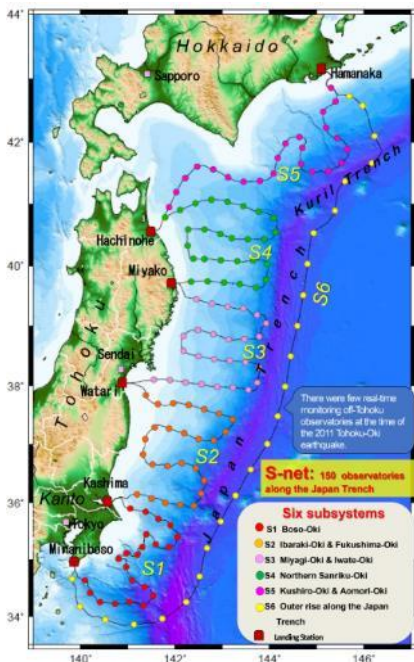
- Earthquake observation networks**

NIED's seismograph networks cover the entire Japan to monitor all types of earthquakes. The observed data are shared with JMA in real time to be used for the earthquake early warning.



- S-net**

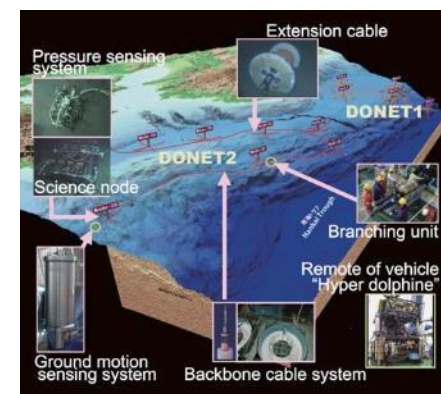
The network composed of 150 observation units, each of which contains a seismograph and a tsunami sensor, is installed at the deep ocean bottom along the Japan Trench off Tohoku, observes earthquake and tsunami that occur in the area.



S-net (seafloor observation network for earthquakes and tsunamis along the Japan Trench)

- DONET (Dense Ocean Floor Network System)**

DONET monitors earthquake and tsunami that could occur at the Nankai Trough earthquake rupture zones.



DONET



E-Defense

- **E-Defense**

The world's largest 3-D shaking table of E-defense (20m × 15m) is used to verify the seismic performance of a life-size structures.

- **Large-scale Earthquake Simulator**



Large-scale Earthquake Simulator

It enables large-scale earthquake-proof experiments with the second largest shaking table of the world (14.5m × 15m).

- **Large-scale Rainfall Simulator**

The facility can simulate near natural rainfalls (15mm-300mm) to study the water disasters caused by the heavy rainfalls



Large-scale Rainfall Simulator

- **Cryospheric Environment Simulator (CES)**

CES can create natural cryospheric environment by simulating near natural snowfall.



Artificial snowfall simulated at CES



X-Band Multi-Parameter Radar

- **X-Band Multi-Parameter Radar System (MP Radar)**

MP Radar enables accurate rainfall estimate from raindrop shape and their drop-size distribution.

- **Volcanic activity monitoring**

NIED observes volcanic activities accurately with Volcanic observation network (V-net). The data recorded by V-net are used for estimating the behavior of magma and the eruption.



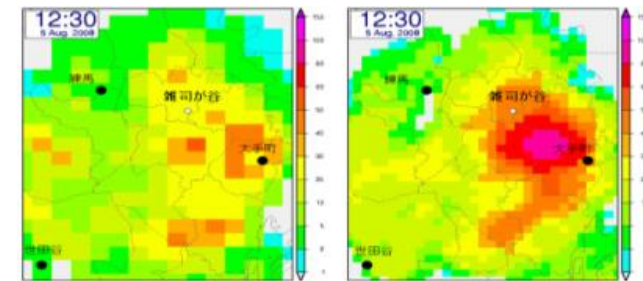
NIED implement its research outcomes in society.

Earthquake Early Warning

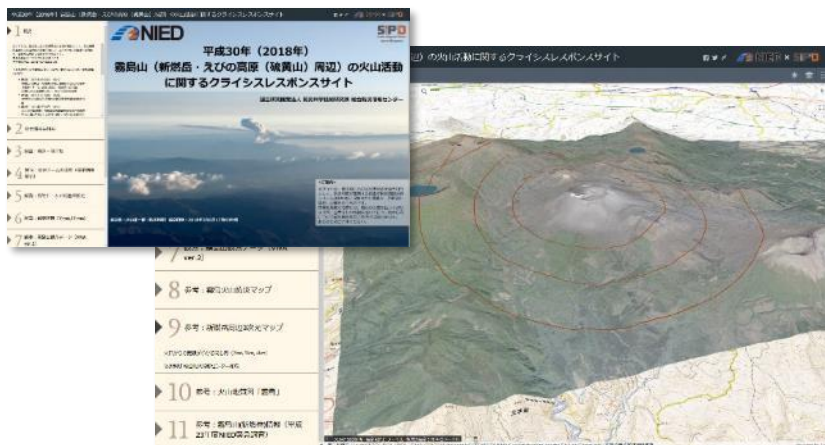
JMA and NIED jointly developed Japan's earthquake early warning system. 80% of ground motion data used for EEW are observed by NIED's seismographs.

Network for detecting heavy rain

NIED developed high-resolution X-band MP radar to detect localized and sudden heavy rain and tornado.



1 km mesh (30 min interval) 500 m mesh (5 min interval)

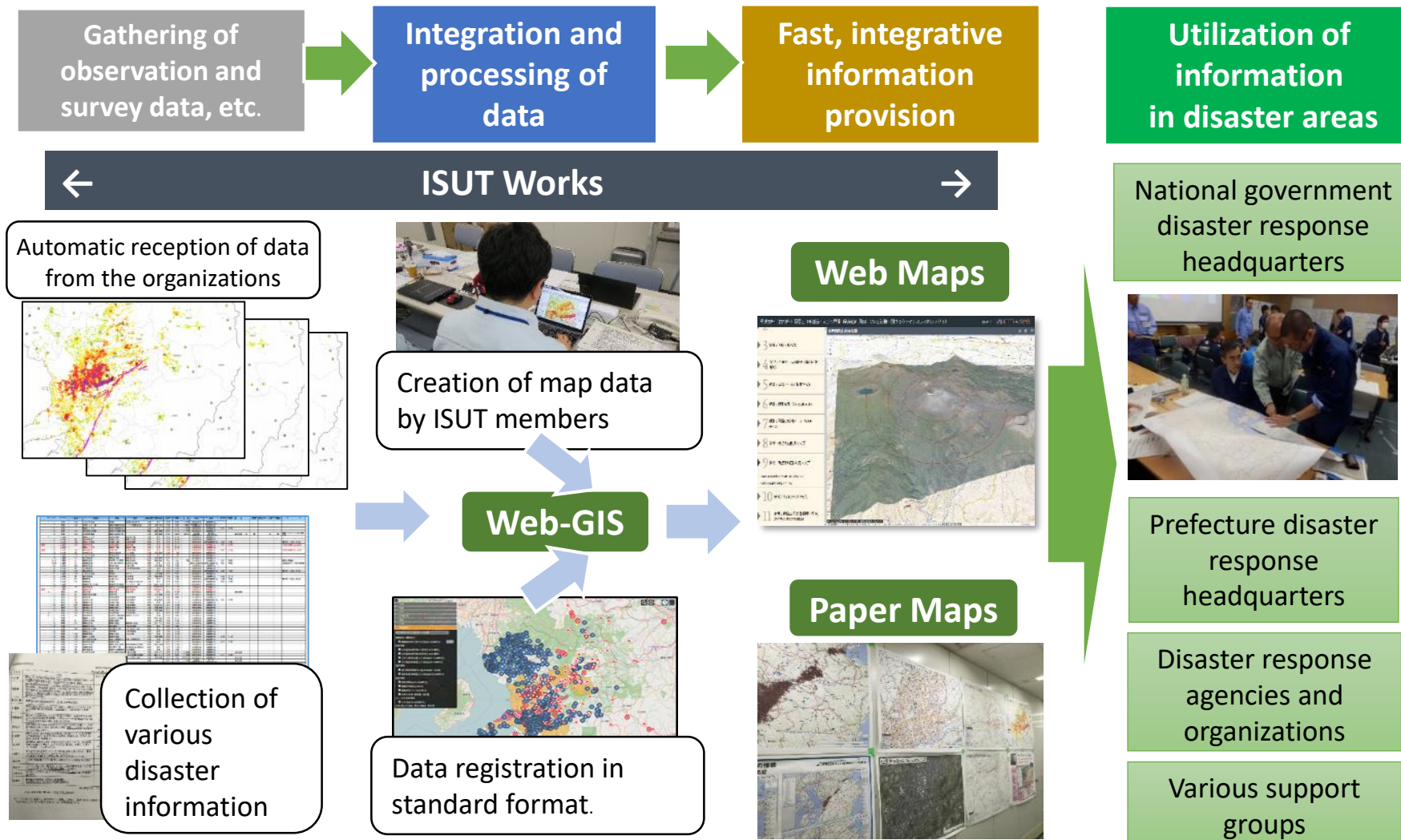


Web-based information system

NIED is developing a web-based GIS platform that can integrate various disaster information and share it with stakeholders for disaster response activities.

Information Support Team (ISUT)

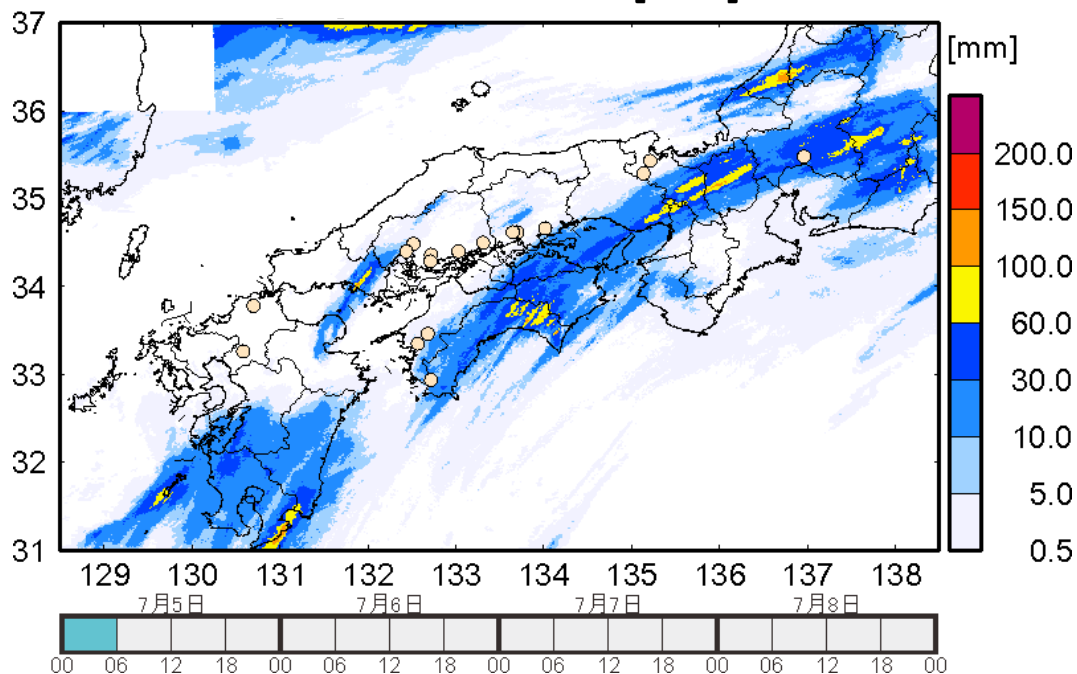
- **ISUT** was established by Disaster Management, Cabinet office. Started from Apr 2018.
- Mission is to build the common situational awareness of the disaster situation between various disaster response organizations using GIS. NIED is a main member of ISUT.



Heavy rain in July 2018

- Heavy rain occurred from 28 June to 9 July in western Japan.
- The torrential rain triggered landslides and flash flooding. 225 people died.

Rainfall amount for 6 hours [mm]



Heavy rain in July 2018

- **ISUT** member were dispatched to Hiroshima Prefectural Disaster Response Headquarters (7 Jul - 6 Aug). Shared maps to various support groups through Web-GIS and Paper maps.



Gathered and Shared Information

- Evacuation Shelter Status
- Road Closure
- Water outage area
- Blackout area
- Water supply spot
- Hospital status
- Communication possible area
- Relief Supply space
- Volunteer center status
- Disaster declaration
- Landslide Distribution

Index

平成30年7月豪雨 ISUT情報共有サイト

Shelter Status Map

凡例

愛媛県 開設中の避難所 (愛媛県, 8/3)

避難者数

- > 150 - 200
- > 100 - 150
- > 50 - 100
- > 0 - 50
- 0

広島県 開設中の避難所 (広島県, 当日取得, 21時以降取得)

避難者数

Map

- ▶ 11 対応: 避難所状況

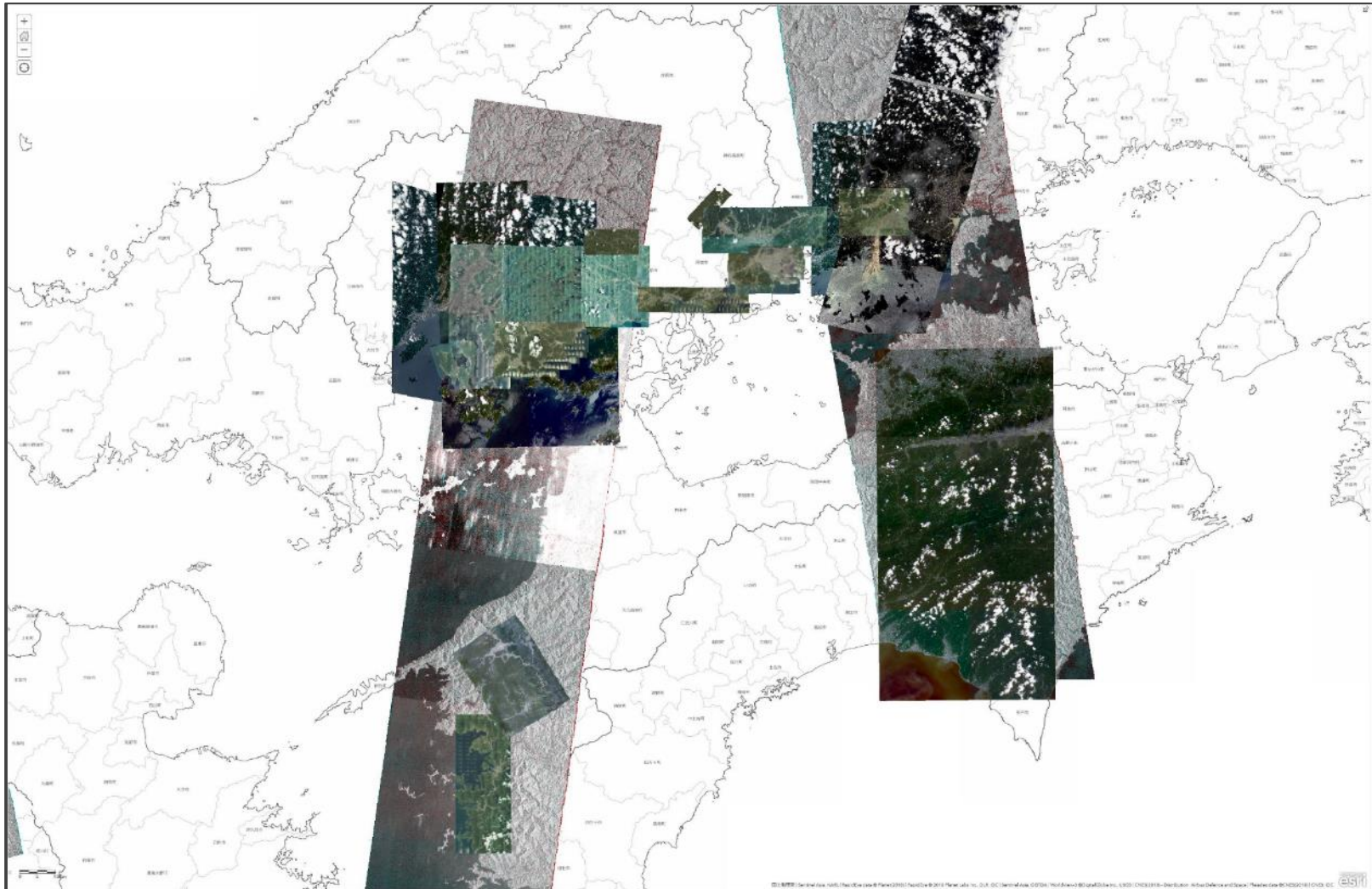
出典: 広島県, 岡山県, 愛媛県

取得日時:
 広島県 8/8 10 14:00
 岡山県 8/7 10 13:00 (更新終了)
 愛媛県 8/3 12:00 (更新終了)

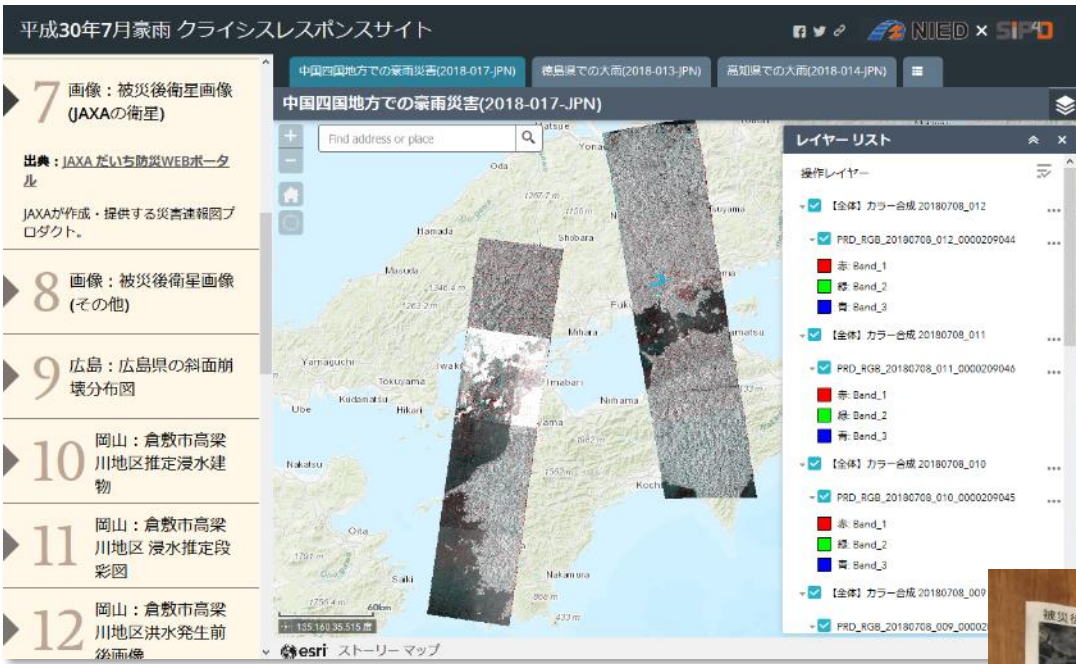
本サイトにて更新を終了しているコンテンツの最新の更新情報につきましては、出典元の情報をご確認ください。

掲載内容:
 避難所の場所と避難者数を示した地図。
- ▶ 12 対応: 災害ボランティア活動
- ▶ 13 対応: 災害廃棄物仮置場
- ▶ 14 対応: 災害救助法および被災者生活再建支援法適用自治体
- ▶ 15 画像: 被災後空中写真 (オルソ補正済)
- ▶ 16 画像: 被災後衛星画像 (海外)

- Satellite imageries were provided from JAXA and Sentinel Asia.
- Aerial ortho photos were provided from GSI (Geospatial Information Authority of Japan)

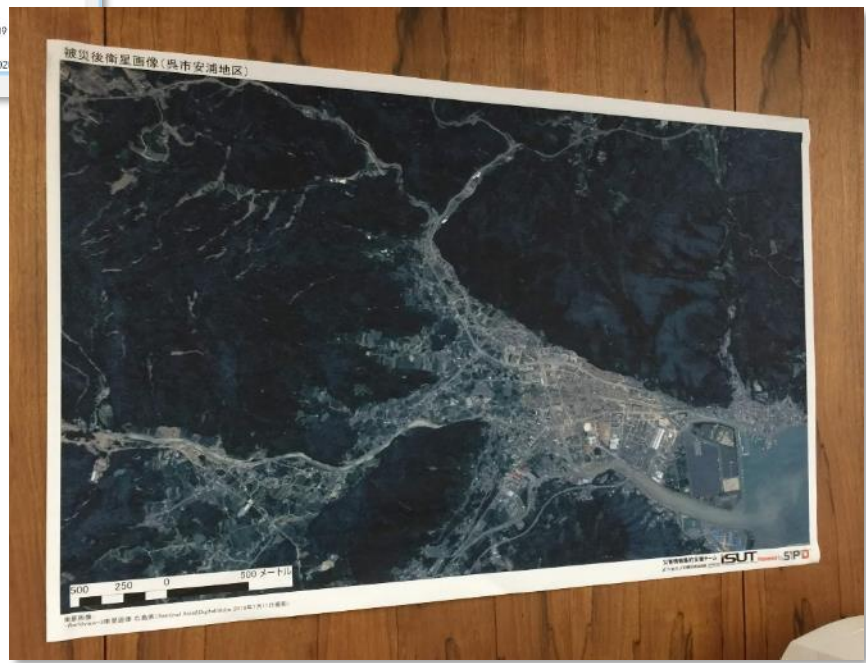


Satellite Images and Aerial Ortho Photos

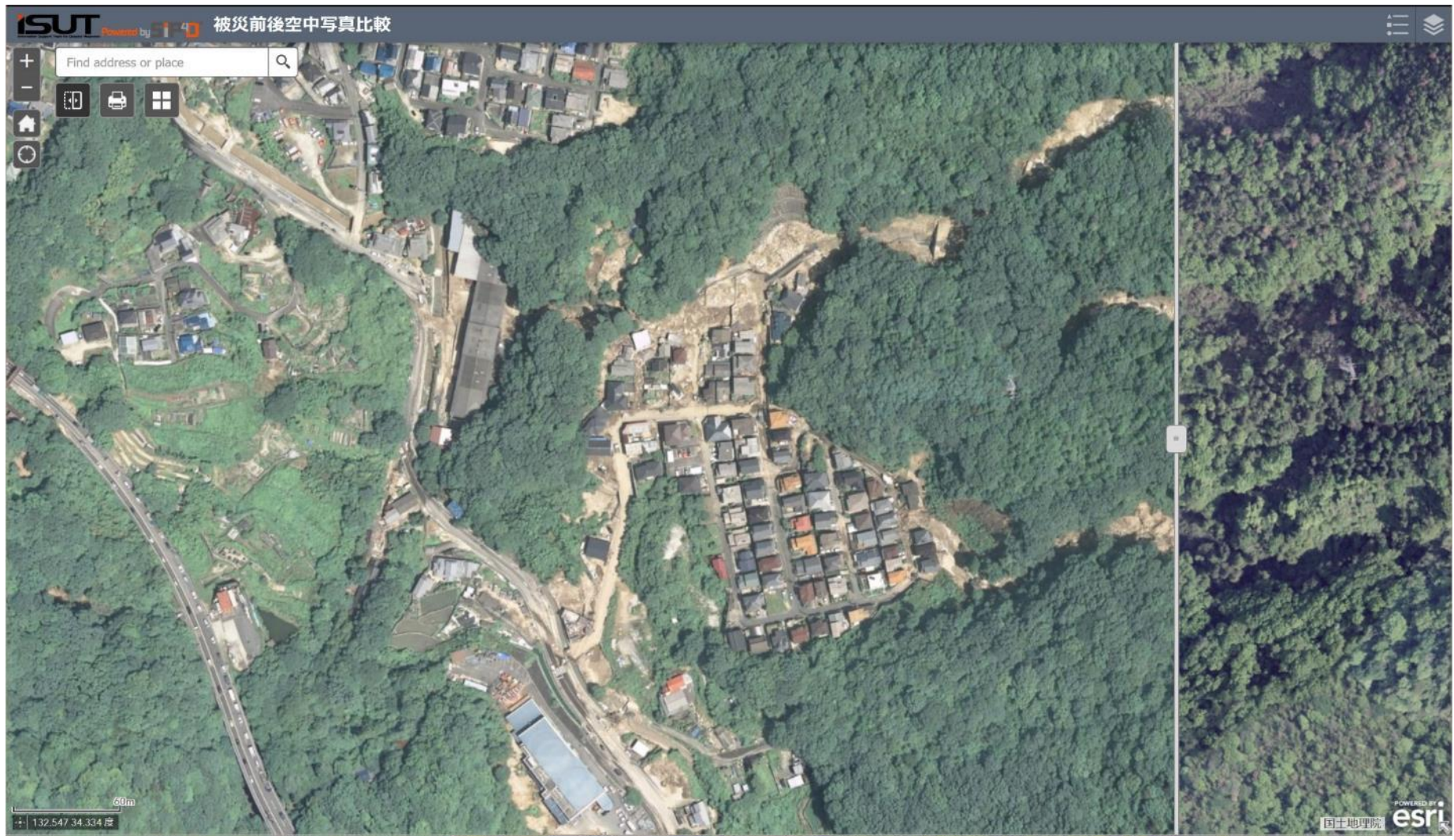


- Satellite images and orthophotos are shared from web maps.

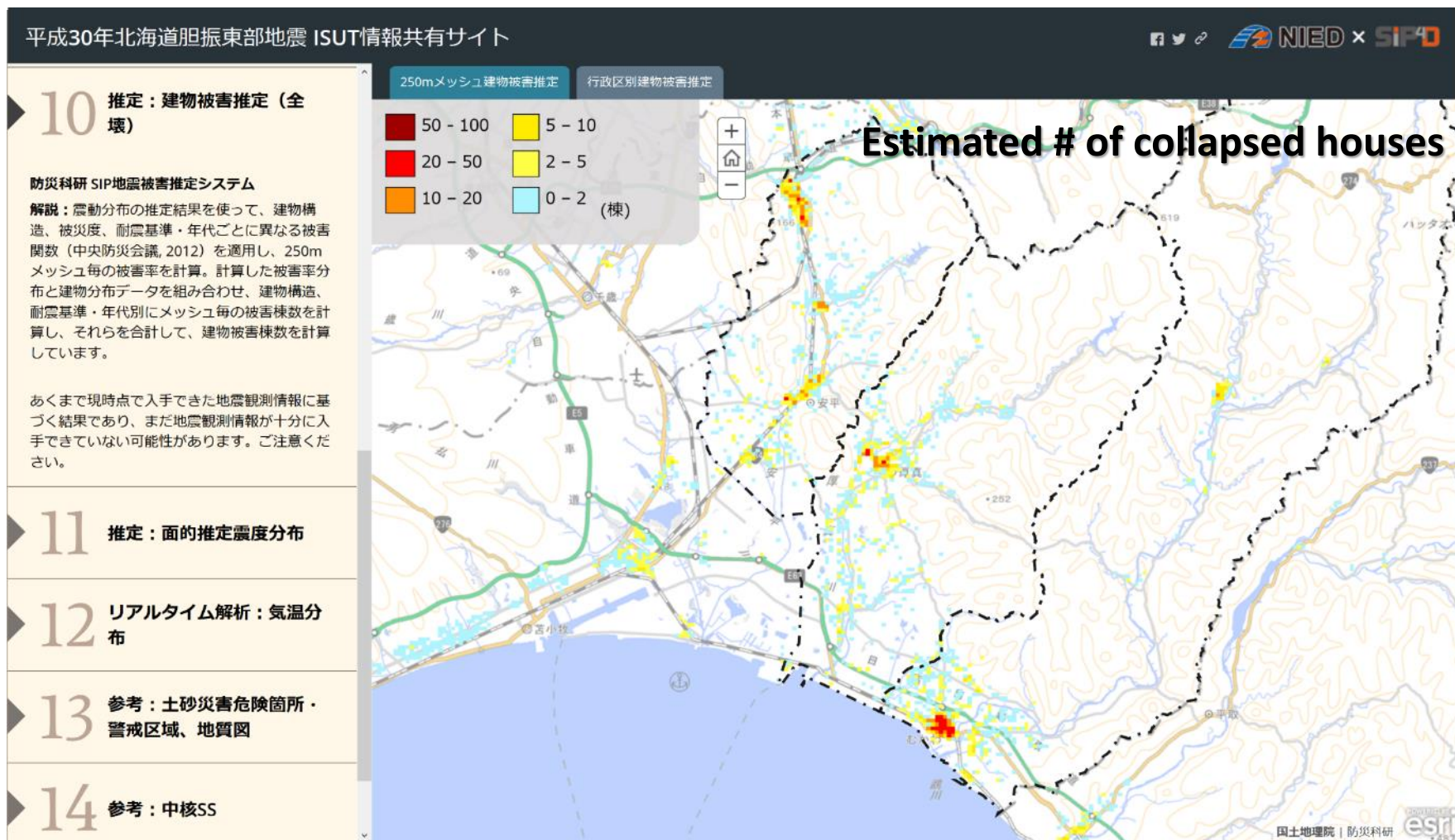
- Printed maps are shared to disaster response headquarters.



Comparing pre / post aerial photos



- Heavy earthquake (Mj 6.7 / Mw 6.6) occurred on 6th September in Hokkaido (Northern Japan). Due to landslide and collapse of houses, 41 people died.



Earthquake in Hokkaido, Eastern Iburi

- **ISUT** member were dispatched to Hokkaido Prefectural Disaster Response Headquarters (6 Sep – 31 Sep). Shared maps to various support groups through Web-GIS and Paper maps.



平成30年北海道胆振東部地震 ISUT情報共有サイト

国土地理院空中写真+JAXAだいち2号 FORMOSAT5衛星画像 情報収集衛星

被災状況画像 (JAXA衛星画像/斜め空撮写真/国土地理院空中写真)

7 画像：被災状況画像 (衛星画像/斜め空撮写真/空中写真)

閲覧方法：中央のスライドバーを左右に動かすことで被災前と被災後の写真を比較することができます。また、航空機から撮影した斜め撮影写真（提供：株式会社パスコ、国際航業株式会社）をご覧いただくことができます。

国土地理院空中写真+JAXAだいち2号
出典：国土地理院, 宇宙航空研究開発機構 (JAXA だいち防災WEBポータル)

FORMOSAT5衛星画像
提供：NARL, Sentinel Asia
協力：宇宙航空研究開発機構

情報収集衛星
出典：内閣情報調査室

8 映像：被災後ドローン映像

9 判読：被災建物・崩壊地等・土砂崩落判読情報

10 推定：建物被害推定 (全壊)

Find address or place

0.4km
141.937 42.778 度

POWERED BY esri

平成30年北海道胆振東部地震 ISUT情報共有サイト

国土地理院空中写真+JAXAだいち2号 FORMOSATS5衛星画像 情報収集衛星

被災状況画像 (JAXA衛星画像/斜め空撮写真/国土地理院空中写真)

Find address or place

7 画像：被災状況画像 (衛星画像/斜め空撮写真/空中写真)

閲覧方法：中央のスライドバーを左右に動かすことで被災前と被災後の写真を比較することができます。また、航空機から撮影した斜め撮影写真（提供：株式会社バスコ、国際航業株式会社）をご覧くださいことができます。

国土地理院空中写真+JAXAだいち2号
出典：国土地理院, 宇宙航空研究開発機構 (JAXA だいち防災WEBポータル)

FORMOSATS5衛星画像
提供：NARL, Sentinel Asia
協力：宇宙航空研究開発機構

情報収集衛星
出典：内閣情報調査室

8 映像：被災後ドローン映像

9 判読：被災建物・崩壊地等・土砂崩落判読情報

10 推定：建物被害推定 (全壊)

0.4m

141.917 42.775 度

国土地理院 | 国土地理院 © Esri Japan esri

- **NIED** mission is to conduct the comprehensive basic study and comprehensive research & development to increase the level of science and technology for disaster risk reduction and resilience.
- **NIED** contribute to disaster management of national and local government using Geographic Information System (GIS) and Remote Sensing Technology.
- **NIED** plan to conduct new research using remote sensing data.
 - Goal is to observe damaged area correctly and share remote sensing data & analyzed data rapidly to the various support group such as government and company.
- Satellite images from Sentinel Asia are essential data for disaster response in Japan to grasp damaged area widely.