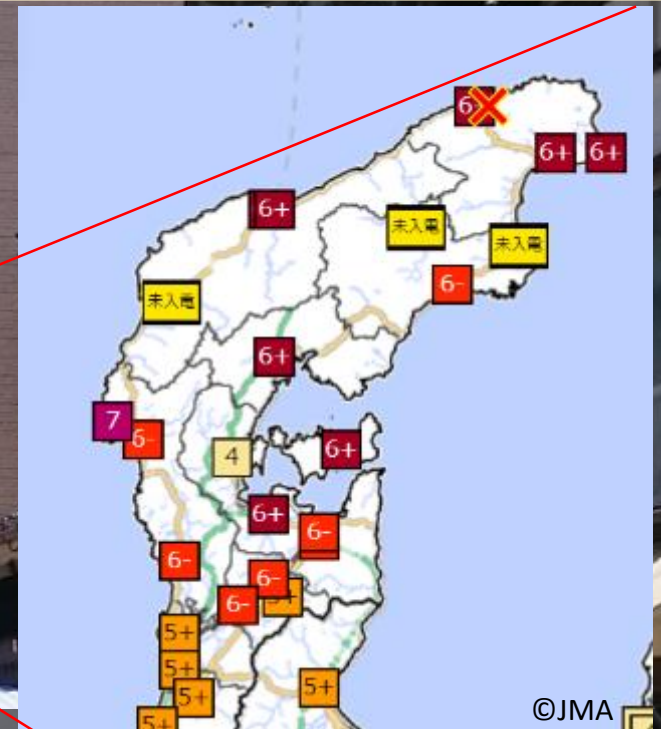
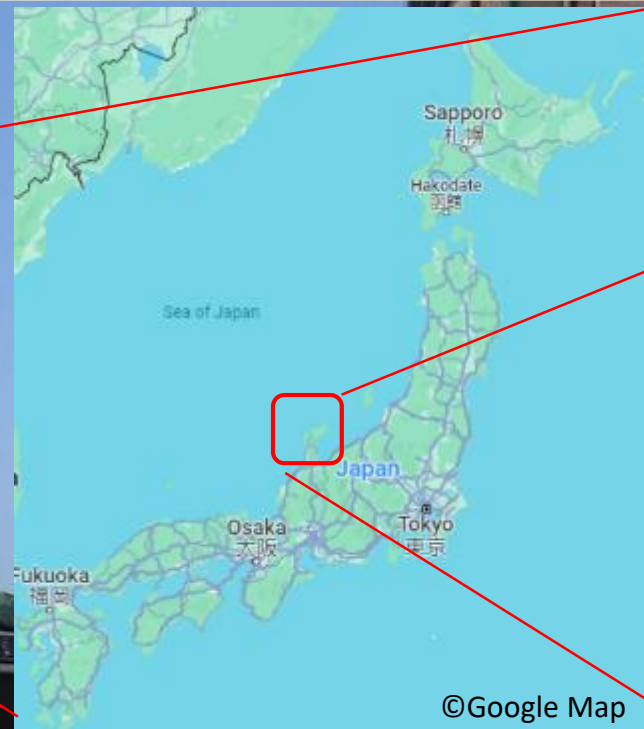
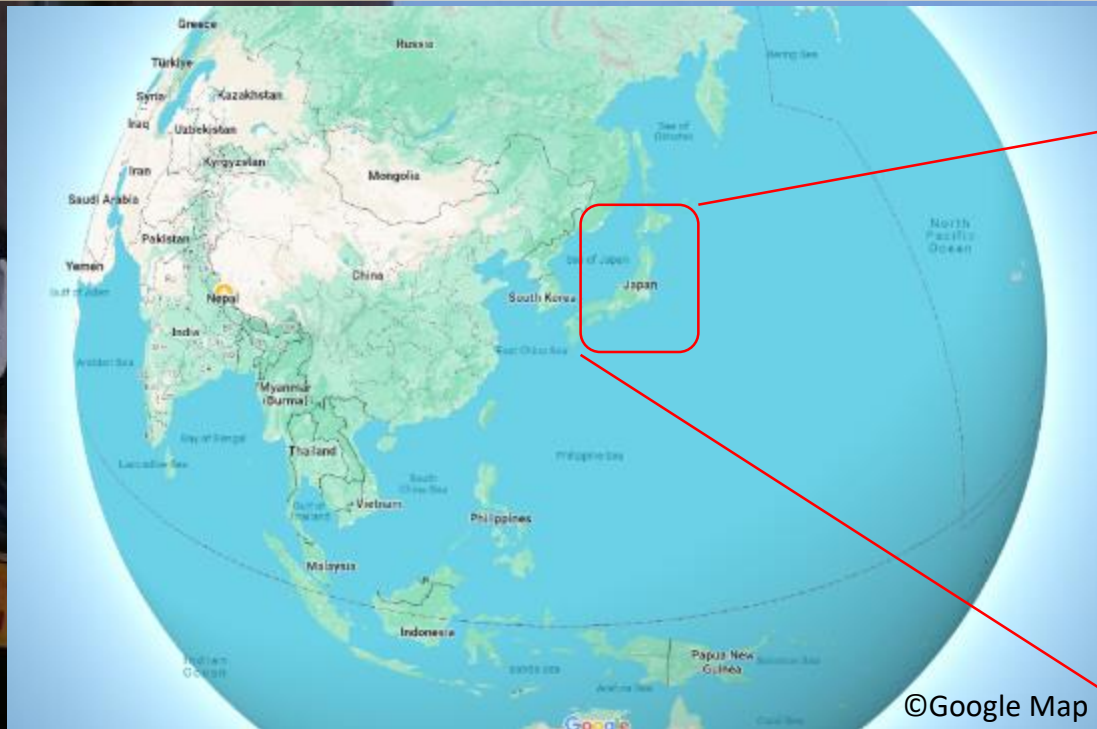


# 2024 Noto Peninsula Earthquake (Japan)

## (GLIDE No. EQ-2024-000001-JPN)



At 16:10 on 1 January 2024, an earthquake of magnitude 7.6 on the Richter scale (GLIDE No. EQ-2024-000001-JPN) centred on the Noto Peninsula, Ishikawa Prefecture, Japan, caused a temblor of an intensity of 7 (JMA) in Shika Town, and intensity of 6+ and 6- in many municipalities in the Noto Peninsula. Also, a tsunami of up to 1.2 m was observed. The earthquake caused many deaths, injuries, collapse of houses and buildings, fires and landslides. The ADRC, the secretariat of the Sentinel Asia Project for the DRR application of space technology, received request for emergency observations after the disaster and is working to assess the damage in the Noto Peninsula, the centre of the damage, and is collecting the latest information.

# Basic Information



Major cities in the Noto Peninsula region (Source: Google Map)

<https://www.google.com/maps/@37.2313295,137.0111647,10z>

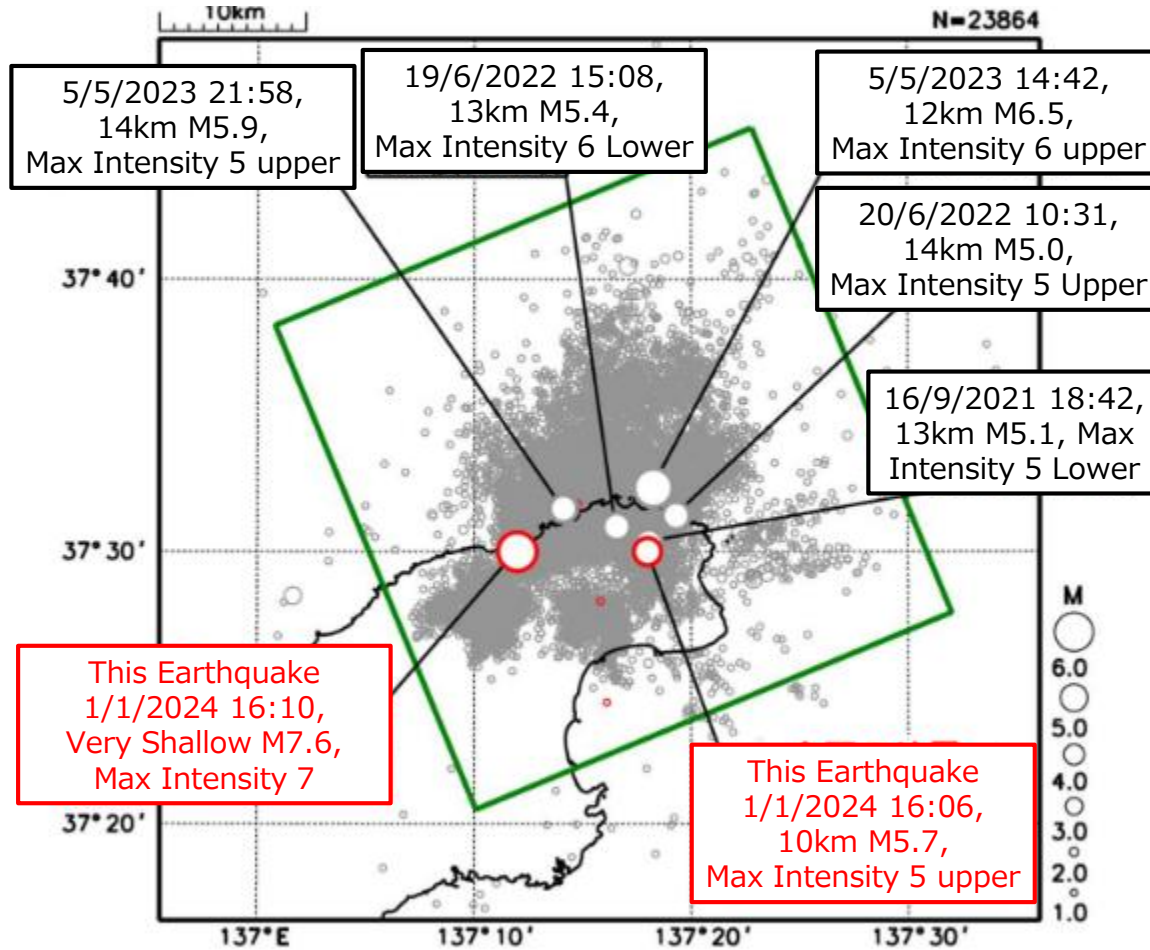
Source: MLIT [https://www.hrr.mlit.go.jp/ekijoka/ishikawa/pamphlet/ishikawa\\_map4.pdf](https://www.hrr.mlit.go.jp/ekijoka/ishikawa/pamphlet/ishikawa_map4.pdf), and Ishikawa prefecture [https://www.pref.ishikawa.lg.jp/sichousien/documents/r5\\_11jukijinko.pdf](https://www.pref.ishikawa.lg.jp/sichousien/documents/r5_11jukijinko.pdf)

- The Noto Peninsula is located in northern Ishikawa Prefecture, Japan, and its major cities and populations (as of 1 December 2023) are Nanao (48,352), Wajima (23,192), Shika (18,267), Noto (15,224), Suzu (12,610), and Anamizu (7,360).
- Seven damaging earthquakes have been recorded since 1700, with a maximum intensity of 6+ on 25 March 2007, resulting in one death, 338 injured and 684 houses completely destroyed.
- A M5.4 earthquake with a maximum intensity of 6 on 19 June 2022 and a M6.5 earthquake with a maximum intensity of 6+ on 5 May 2023 were recorded, both resulting in human losses and house damages.
- Seismic activity has increased on the Noto Peninsula since December 2020, however, the JMA states that the relationship between the previous earthquake swarms and the current earthquake is unknown.



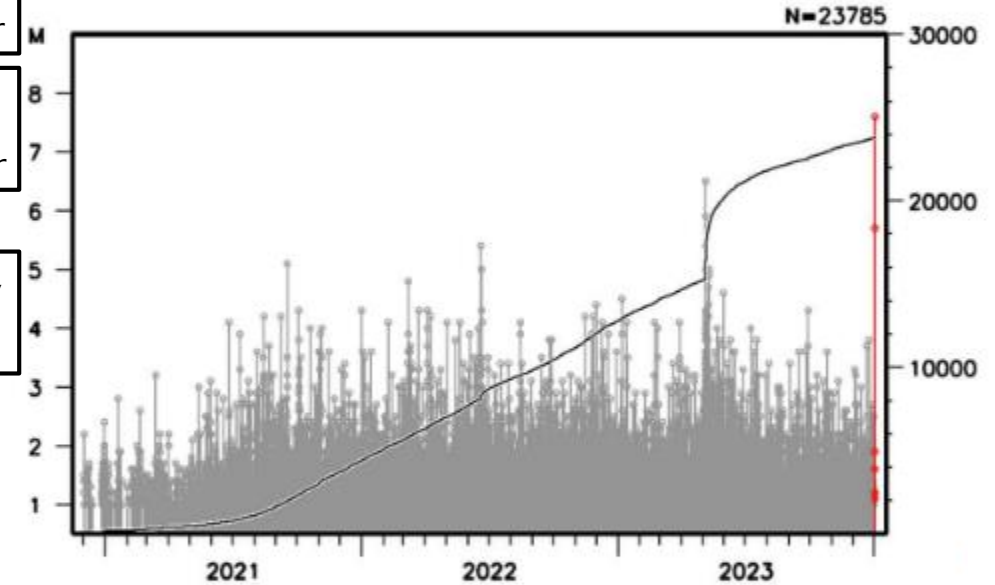
# Epicentre Distribution and Seismic Activities

Epicentre distribution map  
(1/1/2020-1/1/2024, depth 0-25km, >M1.0)



The size of the circle indicates the magnitude.  
Epicenters shown include preliminary values.

Seismic activity progression chart and  
frequency accumulation chart within the  
rectangular area shown on the left



The horizontal axis is time, the left vertical axis is magnitude, and the right is the accumulated number of earthquakes. The line graph shows the number of earthquakes added up, and the circles with vertical bars indicate the time of earthquake occurrence and magnitude.

©JMA

# Situation of Earthquakes and Tsunami

At 16:06 on 1 January 2024, a M5.7 earthquake with a maximum intensity of 5+ occurred with its epicentre on the Noto Peninsula, Ishikawa Prefecture.

Immediately afterwards at 16:10, a M7.6 earthquake of maximum intensity 7 occurred, and a tsunami warning was issued. At 16:21, a tsunami of up to 1.2 m was observed in Wajima Port.

The research team of the University of Tokyo reported that the estimated tsunami run-up height was 4.2 m at Akasaki port.

1 JAN	Major Earthquakes and Tsunami/ Response
16:06	M5.7, Max. Intensity 5+(JMA), VII(MMI)
16:10	<b>M7.6, Max. Intensity 7(JMA), IX(MMI)</b>
16:10	Initial Tsunami arrival at Wajima Port
16:13	JMA issued Tsunami Warning for a wide area of Sea of Japan coast
16:18	M6.1, Max. Intensity 5+(JMA), VII(MMI)
16:21	PTWC issued Tsunami Threat within 300km of epicentre along the coasts of Japan
16:21	<b>1.2m Maximum Tsunami was observed at Wajima Port</b>
16:22	JMA issued Major Tsunami Warning for Noto, and Tsunami Warning for a wide area of Sea of Japan coast
16:33	0.8m Maximum Tsunami was observed at Toyama
16:52	GLIDE (EQ-2024-000001-JPN) is issued by ADRC
19:09	0.9m Maximum Tsunami was observed at Kanazawa
2 JAN	
2:30	Tsunami Warning was changed to Tsunami Advisory
10:00	Tsunami Advisory was changed to Tsunami Forecast
12:10	Sentinel Asia activated at the request of the Ministry of Land, Infrastructure, Transport and Tourism (by JAXA as proxy).

Source: Japan Meteorological Agency (JMA), <https://www.jma.go.jp/bosai/map.html#5/39.096/136.846/&contents=tsunami&elem=hist&lang=en> and Earthquake Institute, University of Tokyo, <https://www.eri.u-tokyo.ac.jp/en/news/5994/>

# Damage Situation (as of 9:00 on 24 January 2024)

*Summary of Prefectures of Ishikawa, Toyama, Niigata, Fukui, Nagano, Gifu, Aichi, Osaka, and Hyogo  
(Note: Overall situation has not been confirmed yet, especially in Wajima and Suzu cities.)*

	From Official Report	Ishikawa Prefecture	Reference Information from Media
<b>Killed</b>	233	233	
<b>Missing</b>	0	19 (status unknown)	
<b>Injured</b>	Seriously injured: 318	311	
	Slightly injured: 966	864	
<b>Evacuee</b>	15,341 (in 456 shelters)	10,530 in 294 shelters	
<b>House/ Building</b>	Totally collapsed: 94	40,572 192 Official building were damaged.	<ul style="list-style-type: none"> <li>7-storey building overturned in Wajima city</li> <li>Many block walls collapsed.</li> </ul>
	Half collapsed: 1,390		
	Partially collapsed: 13,799		
<b>Fire</b>	17 areas		<ul style="list-style-type: none"> <li>More than 200 houses were destroyed in Wajima city.</li> <li>20 houses were burned in Noto town</li> </ul>
<b>Road</b>	1 section of 1 highway closed 1 section of 1 national road (No.8) closed 19 sections of 3 sub-national roads closed	4 villages are in a condition that makes outside access difficult or impossible.	
<b>Lifeline</b>	Water is cut off to 46,100 households	45,380	
	Power outage in 4,600 One nuclear power plant and one thermal power plant are shut down.		
<b>Port</b>	9 quays in 4 ports are available in Noto.		<ul style="list-style-type: none"> <li>The coastline receded due to land uplift.</li> </ul>
<b>Airport</b>	Runway closed in Noto Airport (Only available for relief operation)		<ul style="list-style-type: none"> <li>Commercial aircraft operations are scheduled to resume on 1/27</li> </ul>


# Useful Links

Situation Report (in Japanese)	
Headquarters for Major Disaster Management	<a href="https://www.bousai.go.jp/updates/r60101notojishin/r60101notojishin/">https://www.bousai.go.jp/updates/r60101notojishin/r60101notojishin/</a>
Fire and Disaster Management Agency (FDMA)	<a href="https://www.fdma.go.jp/disaster/#anchor--01">https://www.fdma.go.jp/disaster/#anchor--01</a>
Ministry of Land, Infrastructure, Transport and Tourism (MLIT)	<a href="https://www.mlit.go.jp/saigai/saigai_240101.html#n0">https://www.mlit.go.jp/saigai/saigai_240101.html#n0</a>
Ishikawa Prefecture	<a href="https://www.pref.ishikawa.lg.jp/saigai/202401jishin-taisakuhonbu.html#higai">https://www.pref.ishikawa.lg.jp/saigai/202401jishin-taisakuhonbu.html#higai</a>
Geographical Data	
Sentinel Asia: Emergency Observation	<a href="https://sentinel-asia.org/EO/2024/article20240101JP.html">https://sentinel-asia.org/EO/2024/article20240101JP.html</a>
Geospatial Information Authority of Japan (GSI) in Japanese	<a href="https://www.gsi.go.jp/BOUSAI/20240101_noto_earthquake.html">https://www.gsi.go.jp/BOUSAI/20240101_noto_earthquake.html</a>
bosaiXview, National Research Institute for Earth Science and Disaster Resilience (NIED)	<a href="https://xview.bosai.go.jp/view/index.html?appid=41a77b3dcf3846029206b86107877780">https://xview.bosai.go.jp/view/index.html?appid=41a77b3dcf3846029206b86107877780</a>
Japan Meteorological Agency (JMA)	<a href="https://www.jma.go.jp/jma/en/2024_Noto_Peninsula_Earthquake/index.html">https://www.jma.go.jp/jma/en/2024_Noto_Peninsula_Earthquake/index.html</a>
Universities, etc.	
International Research Institute of Disaster Science (IRIDeS), Tohoku University	<a href="https://irides.tohoku.ac.jp/research/prompt_investigation/2024noto-eq.html">https://irides.tohoku.ac.jp/research/prompt_investigation/2024noto-eq.html</a>
Earthquake Research Institute, The University of Tokyo	<a href="https://www.eri.u-tokyo.ac.jp/en/news/5994/">https://www.eri.u-tokyo.ac.jp/en/news/5994/</a> <a href="https://www.eri.u-tokyo.ac.jp/eq/20465/">https://www.eri.u-tokyo.ac.jp/eq/20465/</a>
Disaster Committee, Architectural Institute of Japan	<a href="http://saigai.aij.or.jp/saigai_info/20240101_noto/202340101_noto_eq.html">http://saigai.aij.or.jp/saigai_info/20240101_noto/202340101_noto_eq.html</a>



# Emergency Observation by Space Satellites

The ADRC, the Sentinel Asia Secretariat, started coordinating with relevant organisations on the same day following the earthquake and tsunami reports, and JAXA requested the activation of Sentinel Asia on behalf of the Ministry of Land, Infrastructure and Transport (MLIT) on the following day (2 Jan.). The International Disaster Charter (IDC), which covers the entire world, was likewise activated on 2 Jan.


 Sentinel Asia

Emergency Observation About Activities Meetings Interviews Communications Contact

2024-01-01

Earthquake in Japan on 01 January, 2024

Emergency Obs. Request Information



20240101-Japan-Earthquake...  
sentinel asia  
About

Disaster Type: Earthquake  
Country: Japan  
Occurrence Date (UTC): 01 January, 2024  
SA activation Date(UTC): 02 January, 2024  
Requester: Asian Disaster Reduction Center (ADRC)  
Escalation to the International Charter: Yes  
GLIDE Number: EQ-2024-000001-JPN

 Charter activations

Browse activations on map ▶

Earthquake in Japan

A magnitude 7.6 earthquake struck Japan on 1 January, leaving 48 dead and destroying hundreds of buildings.

7.6 is a major earthquake on the Richter scale, and the initial earthquake has been followed by many smaller tremors, reaching as high as 4.9 magnitude.

The earthquake occurred at 07:10 UTC, in the Kanto Peninsula of Ibaraki Prefecture. Hundreds of buildings were destroyed by the earthquake or by fires that followed. Roads and power infrastructure were also damaged, leaving over 30,000 people without power and affecting rescue efforts.

Rescue operations have continued since the earthquake, and over 57,000 people have been evacuated so far. The death toll may rise over the next few days as the search continues, but thousands of emergency responders are working through the debris to find any survivors.

The area continues to remain on alert for the impact of further tremors, which may continue for up to a week.

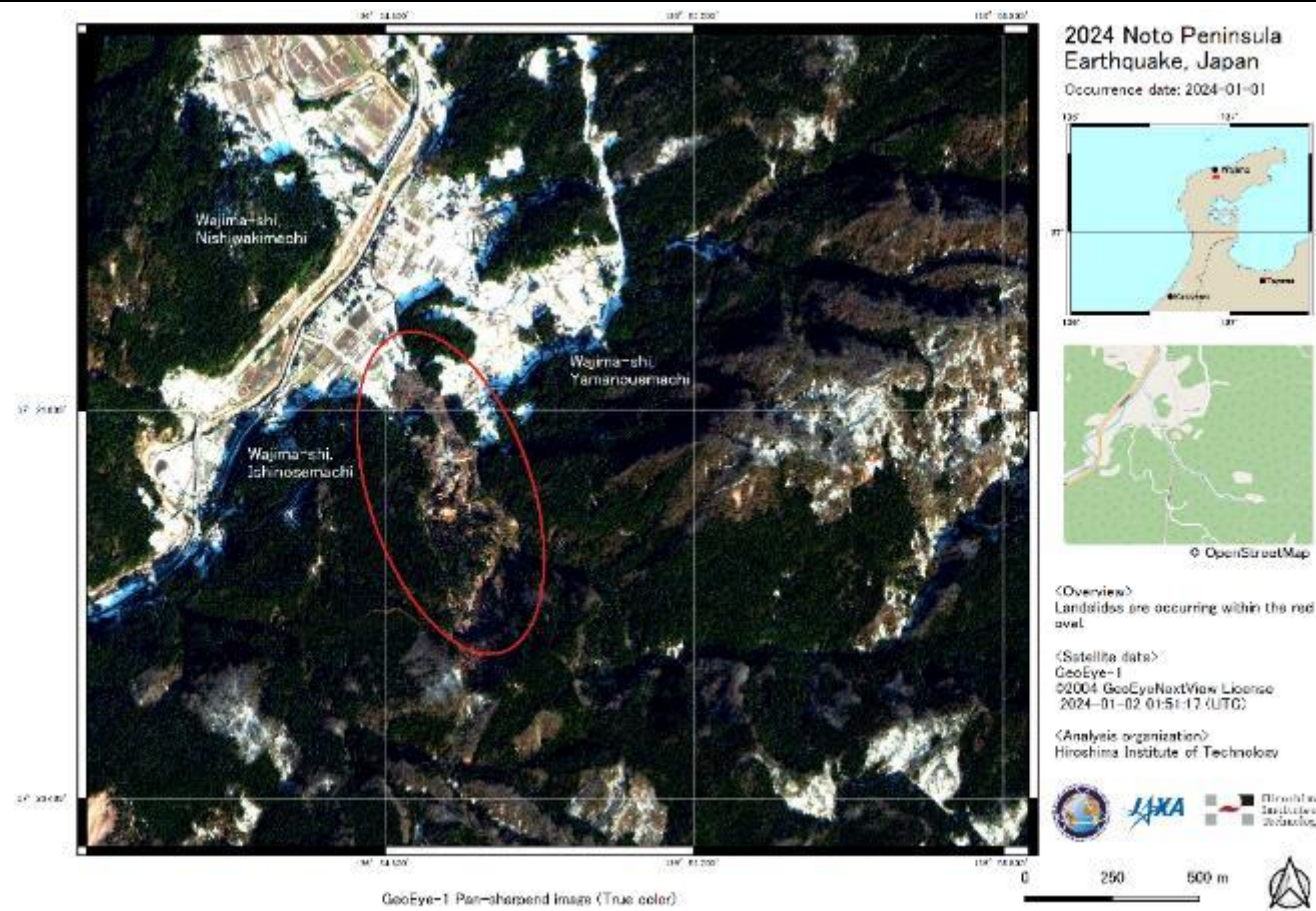
Tsunami warnings were in place following the earthquake, but have since been lifted.



Type of Event:	Earthquake
Location of Event:	Japan
Date of Charter Activation:	2024-01-02
Time of Charter Activation:	13:25
Time zone of Charter Activation:	UTC+09:00
Charter Requestor:	ADRC
Activation ID:	IS-7
Project Management:	Masahiko Nagai (Yamaguchi University) University of Tokyo, Fumio YAMAZAKI (Chiba University), Tokyo Denki University, Kohji ITOH (JAXA), Hiroshi Taguchi (National Research Institute for Earth Science and Disaster Resilience (NIED)), Hiromichi FUKUI (Chubu University), Yuzo SUGA (Hiroshima Institute of Technology)
act-value-adrc:	

# Emergency Observation by Space Satellites

This is one of the analyzed images of the damaged area published on the Disaster Charter's website. The analysis by Hiroshima Institute of Technology shows that landslides have occurred in the red oval area.

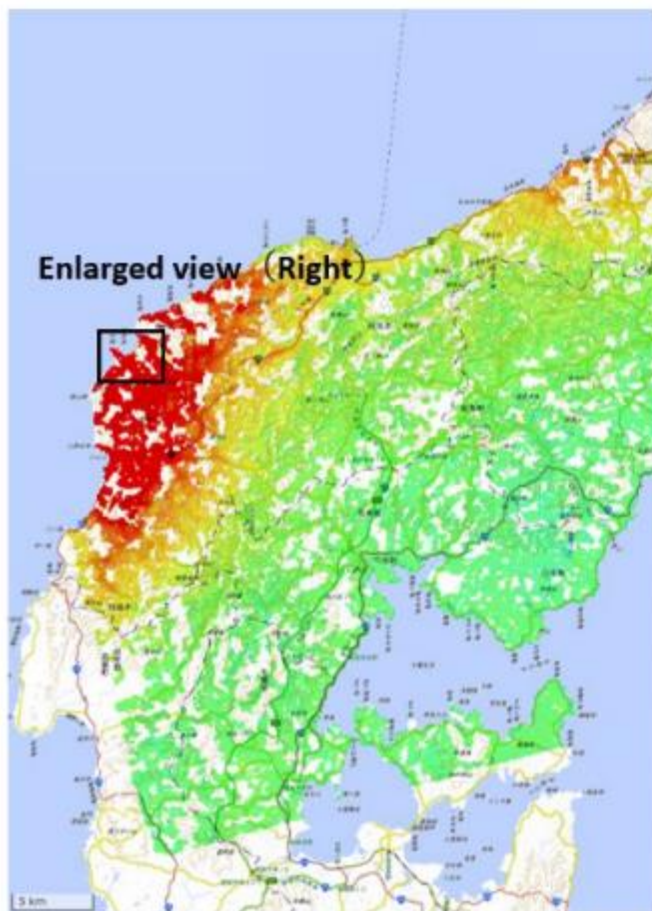


IDC [https://disasterscharter.org/image/journal/article.jpg?img\\_id=23359466&t=1704359510653](https://disasterscharter.org/image/journal/article.jpg?img_id=23359466&t=1704359510653)

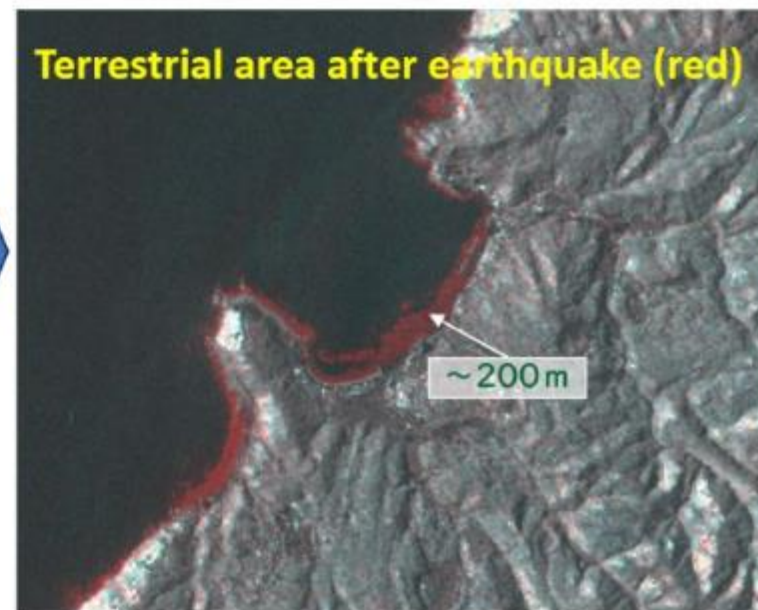


# Emergency Observation by Space Satellites

This is one of the analyzed images of the damaged area published on the Geospatial Information Authority of Japan's website. Coastline was changed caused by the Earthquake detected by ALOS-2 SAR satellite image (Jan. 4, 2024)



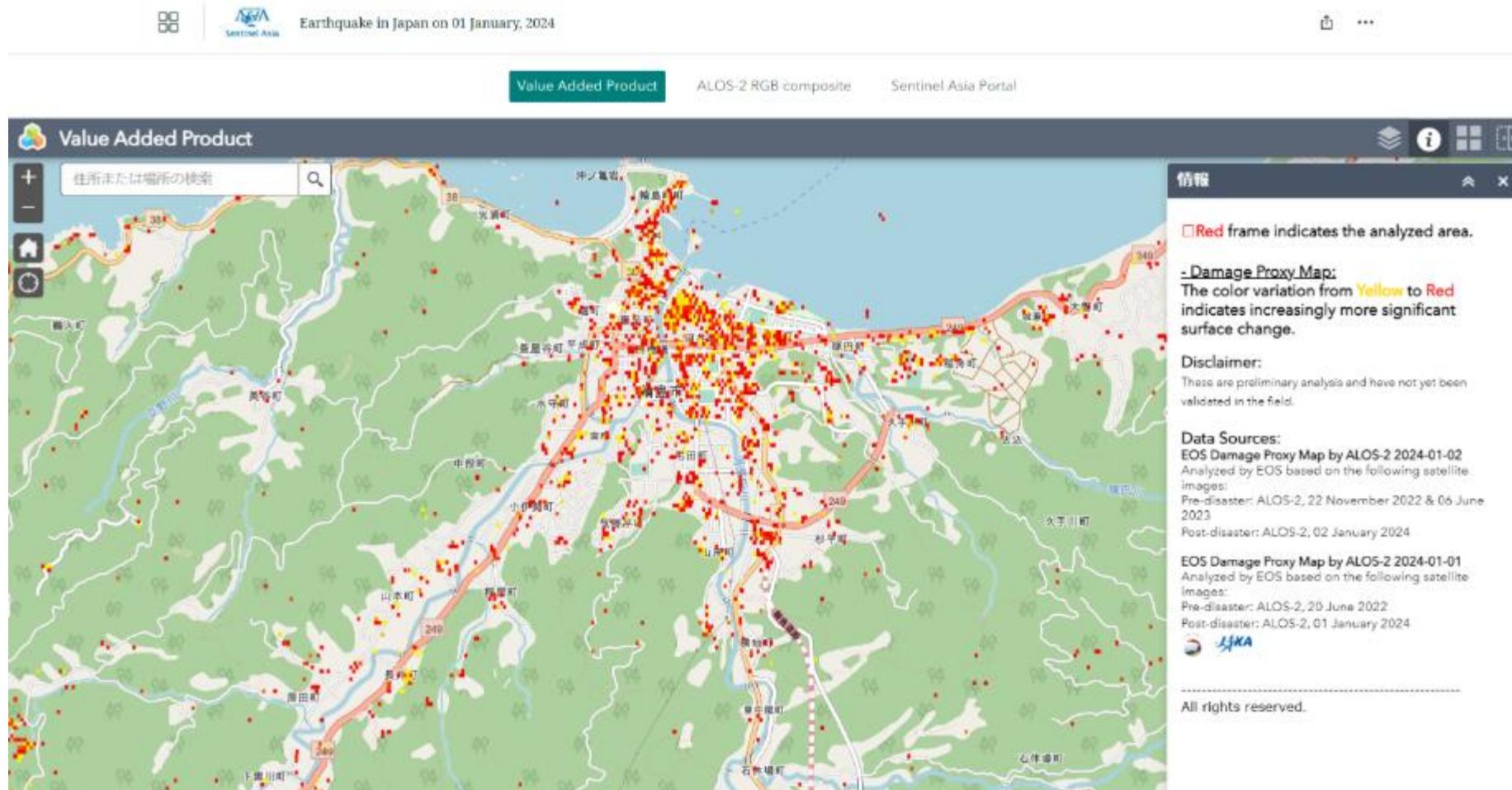
**RGB Composite image**



Geospatial Information Authority of Japan <https://www.gsi.go.jp/uchusokuchi/uchusokuchi-e31001.html>

# Emergency Observation by Space Satellites

This is Web-GIS to show the analyzed images of the damage situation. The color variation from **yellow** to **red** indicates the intensity of significance of surface change. These are preliminary analysis and have not yet been validated in the field.

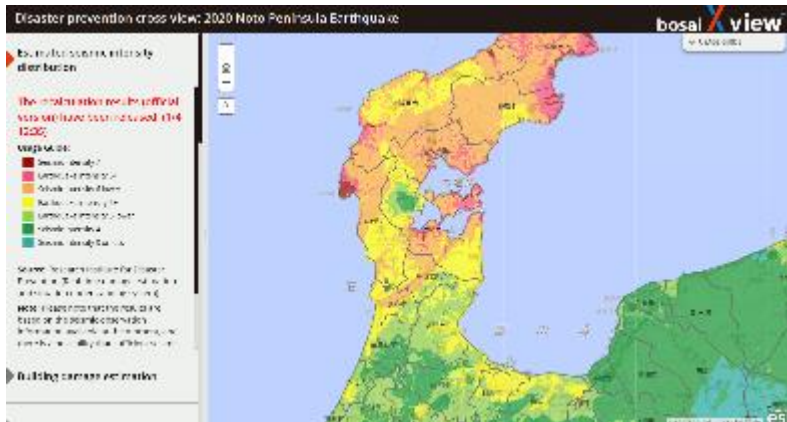


Earth Observatory of Singapore (EOS) <https://storymaps.arcgis.com/collections/a0ge7f2007f444e2919615494ee2fcd8?item=1>



# boisaiXview: Integrated Information Dissemination system

boisaiXview: A single point of access to disaster risk reduction information shared by the DRR Basic Information Distribution Network and others.



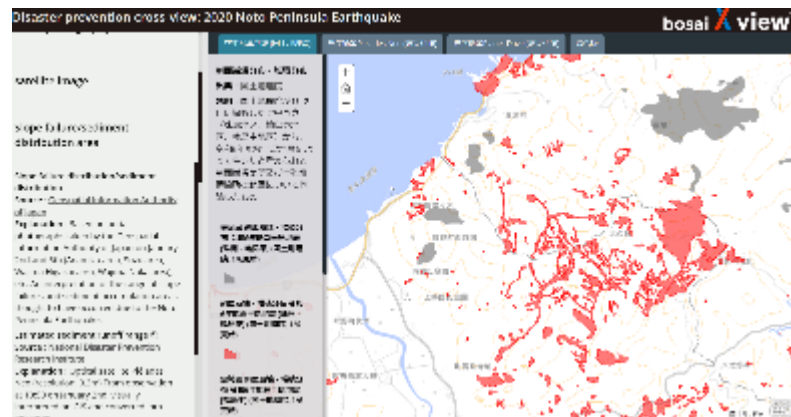
Seismic Intensity



Building damage estimation



Before and After



Slope failure/sediment disaster



Tsunami inundation



Satellite observation



# Emergency Observation by Space Satellites

This is one of the analyzed images of the damaged area published on the Disaster Charter's website. The analysis by Chiba University shows that **yellow** polygon was burned out.



**The 2014 Noto Peninsula earthquake, Japan**

**Sensors:** GeoEye-1

**Location:** Wajima City, Ishikawa Prefecture, Japan

Comparison of the pre-event optical image (Google Earth) and the post-event GeoEye-1 pansharpened image (80cm/pixel).

The region enclosed by the yellow polygon was burned out.

Mud water through Kawarada River flew into the sea.

The GeoEye-1 image is owned by DigitalGlobe, and it was provided through the International Disasters Charter.



IDC [https://disasterscharter.org/image/journal/article.jpg?img\\_id=23402331&t=1704811410297](https://disasterscharter.org/image/journal/article.jpg?img_id=23402331&t=1704811410297)

# Emergency Observation by Space Satellites

This is one of the analyzed images of the damaged area published on the Disaster Charter's website. The analysis by Chiba University shows that **yellow** circle includes two landslides, and **red** ellipsoid is flooded by tsunamis.



The 2014 Noto Peninsula earthquake, Japan

Sensors: GeoEye-1

Location: Wajima City, Ishikawa Prefecture, Japan

Comparison of the pre-event optical image (Google Earth) and the post-event GeoEye-1 pansharpened image (80cm/pixel).

The region enclosed by the yellow circle includes two landslides, which caused road impassable. The region enclosed by the red ellipsoid is flooded by the tsunamis.

The GeoEye-1 image is owned by DigitalGlobe, and it was provided through the International Disasters Charter.



IDC [https://disasterscharter.org/image/journal/article.jpg?img\\_id=23405438&t=1704897596118](https://disasterscharter.org/image/journal/article.jpg?img_id=23405438&t=1704897596118)



# Emergency Observation by Space Satellites

The Cabinet Information Research Office collects necessary information regarding the 2020 Noto Peninsula Earthquake using information gathering satellites and others. Based on the policy of releasing processed images based on information gathering satellite images in times of large-scale disasters, etc. , government of Japan releases processed images (enlarged views of some areas).



Center of Wajima City (fire area)

Cabinet Secretariat of Japan [https://www.cas.go.jp/jp/houdou/240111/kakudai\\_0105\\_e.pdf](https://www.cas.go.jp/jp/houdou/240111/kakudai_0105_e.pdf)



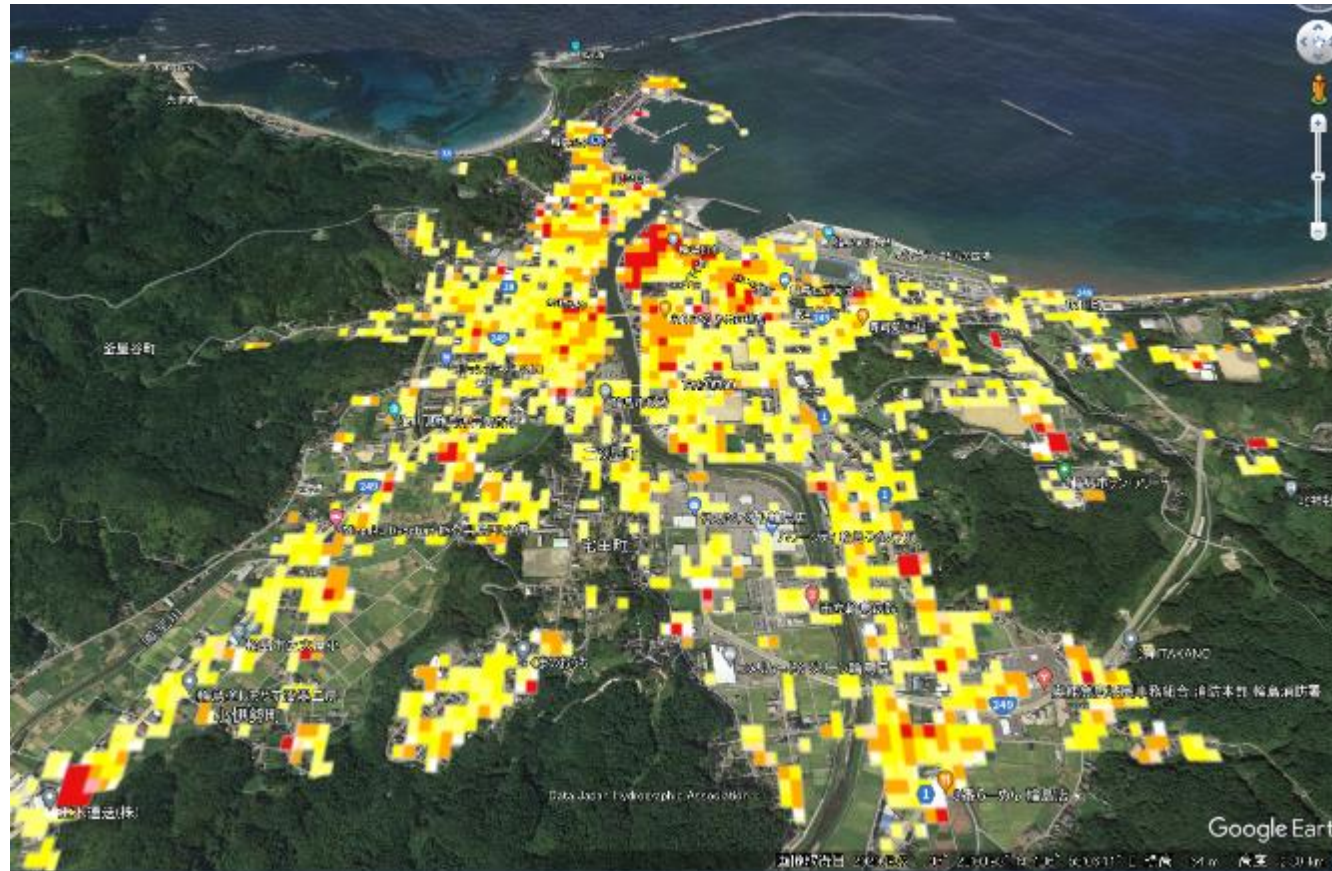
Nagahashi Fishing Port, Suzu City ( uplifted by earthquake)

Cabinet Secretariat of Japan [https://www.cas.go.jp/jp/houdou/240111/kakudai\\_0105\\_b.pdf](https://www.cas.go.jp/jp/houdou/240111/kakudai_0105_b.pdf)



# Estimation of building damage by coherence analysis of images by Space Satellite

Sadra Karimzadeh (Tabriz Univ.) and Masashi Matsuoka (Tokyo Tech) utilized the PALSAR-2 data to analysis building damages. White means Negligible damage (change) possibility, Yellow - Slight/moderate damage (change) possibility, Orange - High damage (change) possibility, Red - Very high damage (change) possibility



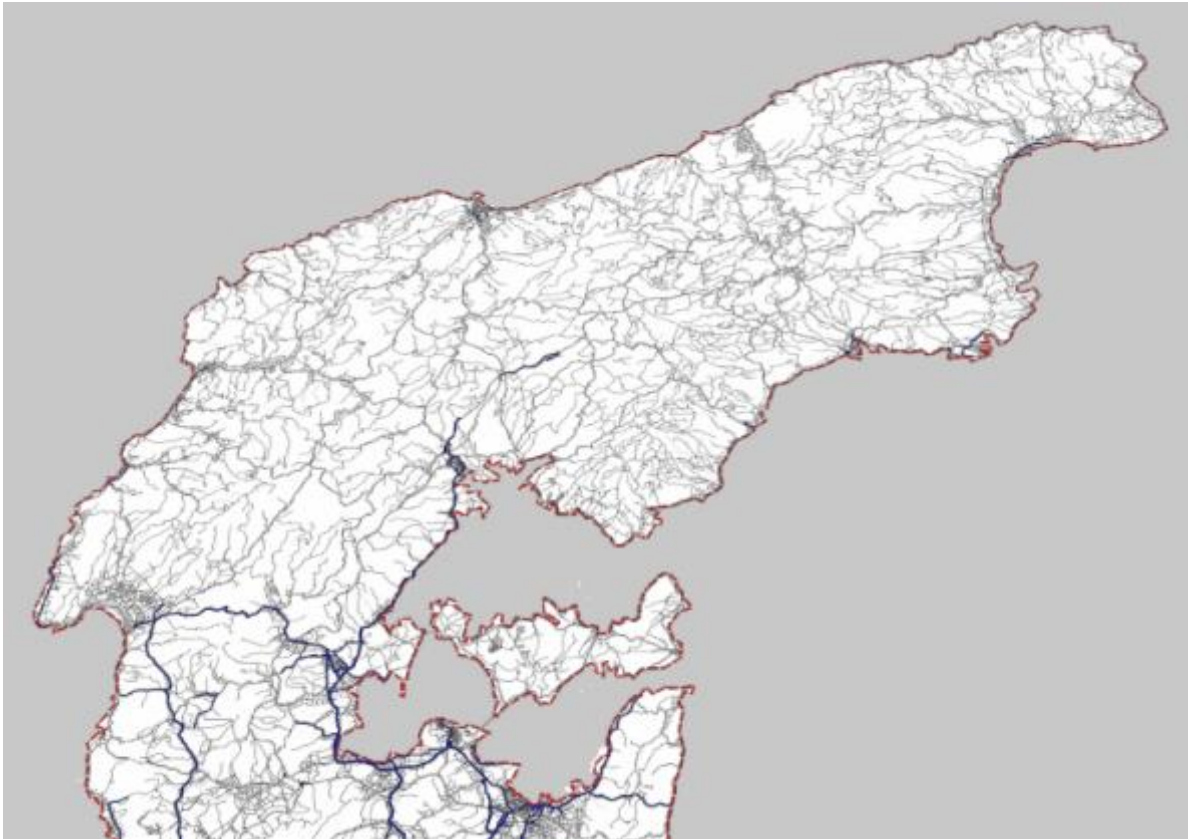
Wajima City

Matsuoka Laboratory (Tokyo Institute of Technology)

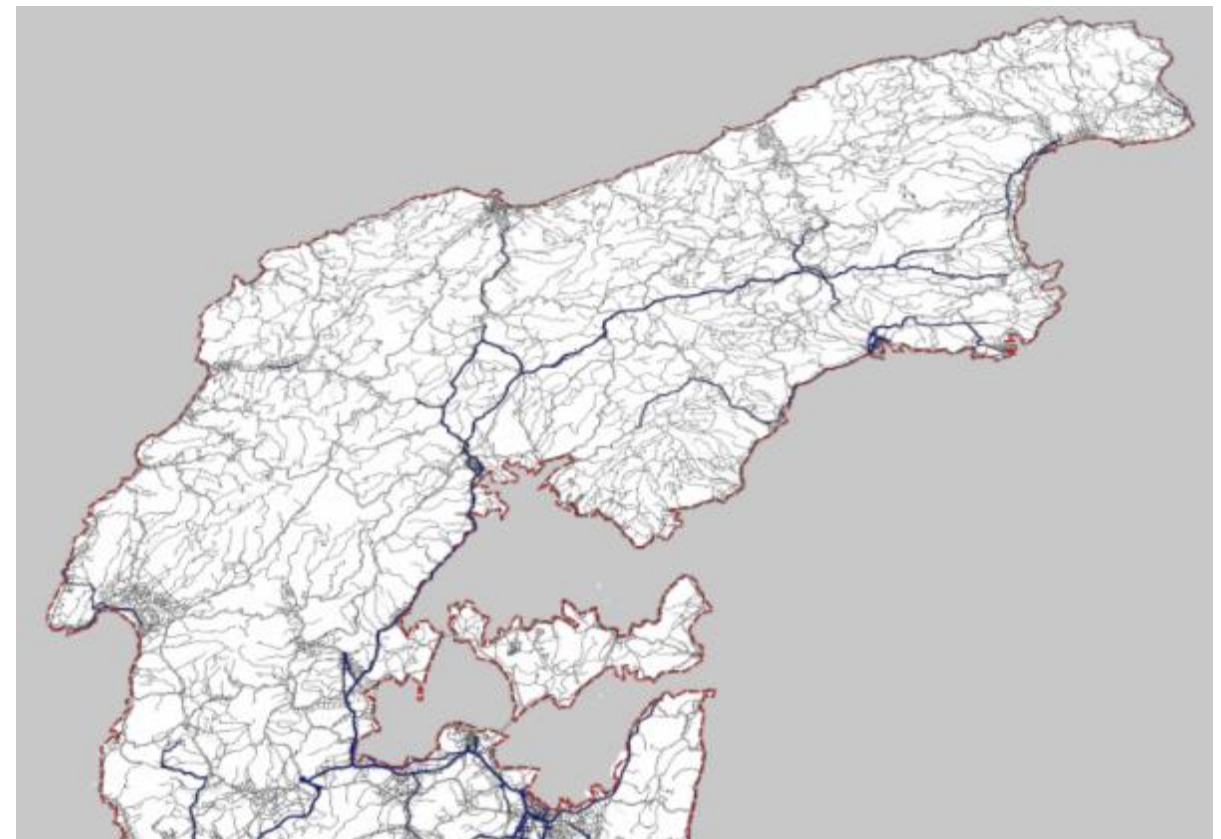
<https://sites.google.com/view/matsuokamtokyotech/response?authuser=o>

# Real-time disaster information

Geospatial Information Center (GsC): A single point of access to disaster risk reduction information sharing such as aerial photo, hazard maps, traffic record map on each day, and so on.



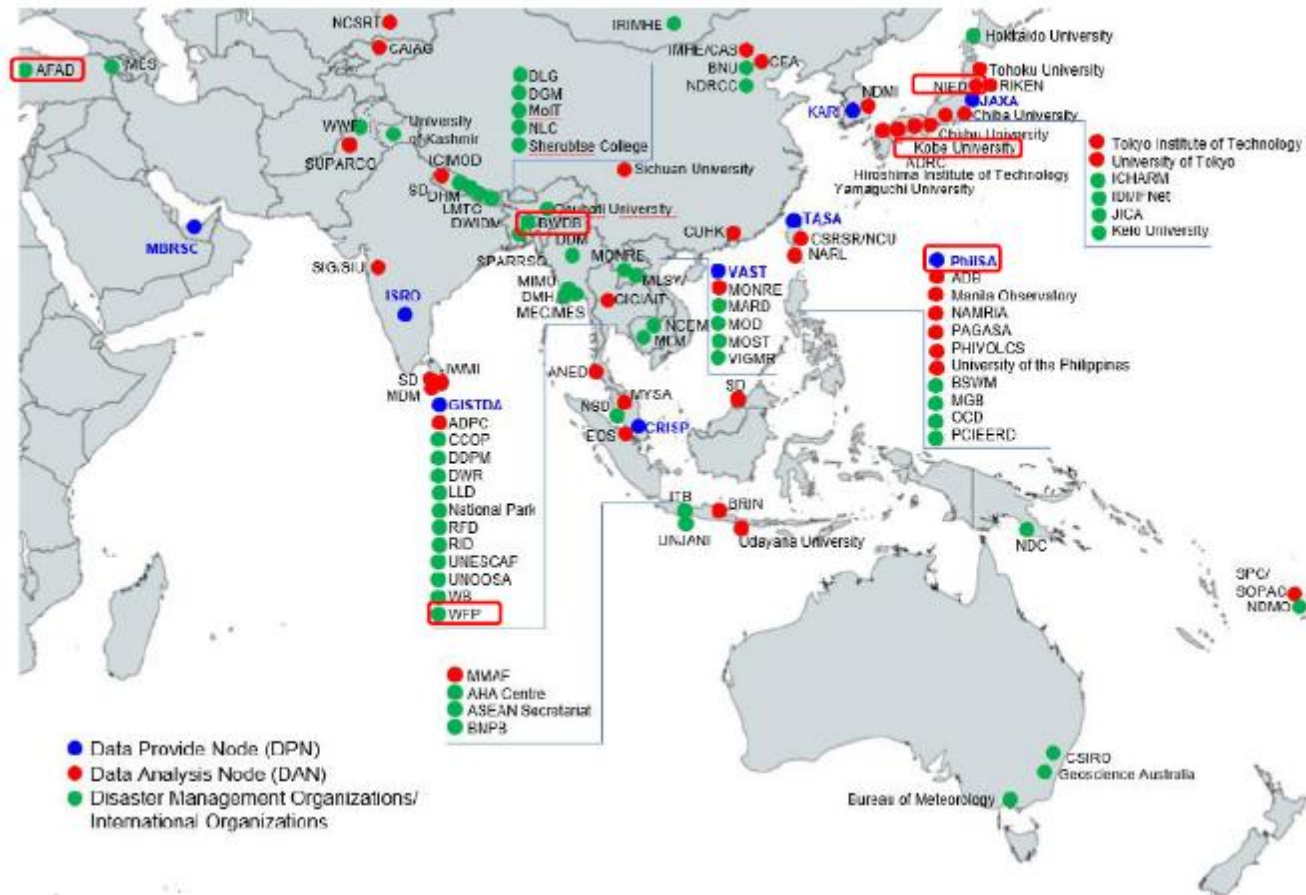
Traffic record map on 02 Jan. 2024



Traffic record map on 15 Jan. 2024



# [Ref.] Sentinel Asia project



Currently Sentinel Asia has 114 Joint Project Team (JPT) members.  
( 97 organizations from 29 countries/regions and 17 international organizations )

- In the event of a disaster, it is important to be able to quickly assess the disaster area for emergency response. Earth observation satellites effectively serve this purpose by analysing the disaster area and providing those data to the local community.
- ADRC continues to participate in the Sentinel Asia project, which was launched in 2006 with an objective of establishing a disaster risk management system in Asia utilizing the satellite images. ADRC functions as the focal point to receive emergency observation request in the framework of the Sentinel Asia.
- Upon receiving a request, ADRC decides whether the request is appropriate and whether the emergency observation should be implemented mainly by assessing the damages and casualties.
- Based on its own judgement, ADRC will forward the request to space agencies that participate in the Sentinel Asia Project, namely: CRISP (Singapore), GISTDA (Thailand), ISRO (India), JAXA (Japan), KARI (Korea), MBRSC (United Arab Emirates), PhilSA (Philippines), TASA (Taiwan), and VAST (Vietnam).