

An aerial photograph showing the extensive destruction of a coastal town in Japan following the Great East Japan Earthquake. The landscape is covered in a thick layer of debris, including twisted metal, wood, and household items. Several buildings are partially collapsed or completely destroyed. A road winds through the wreckage, and a body of water is visible in the background. The overall scene is one of total devastation.

Great East Japan Earthquake

Atsushi Koresawa
Asian Disaster Reduction Center

The worst disaster in Japan



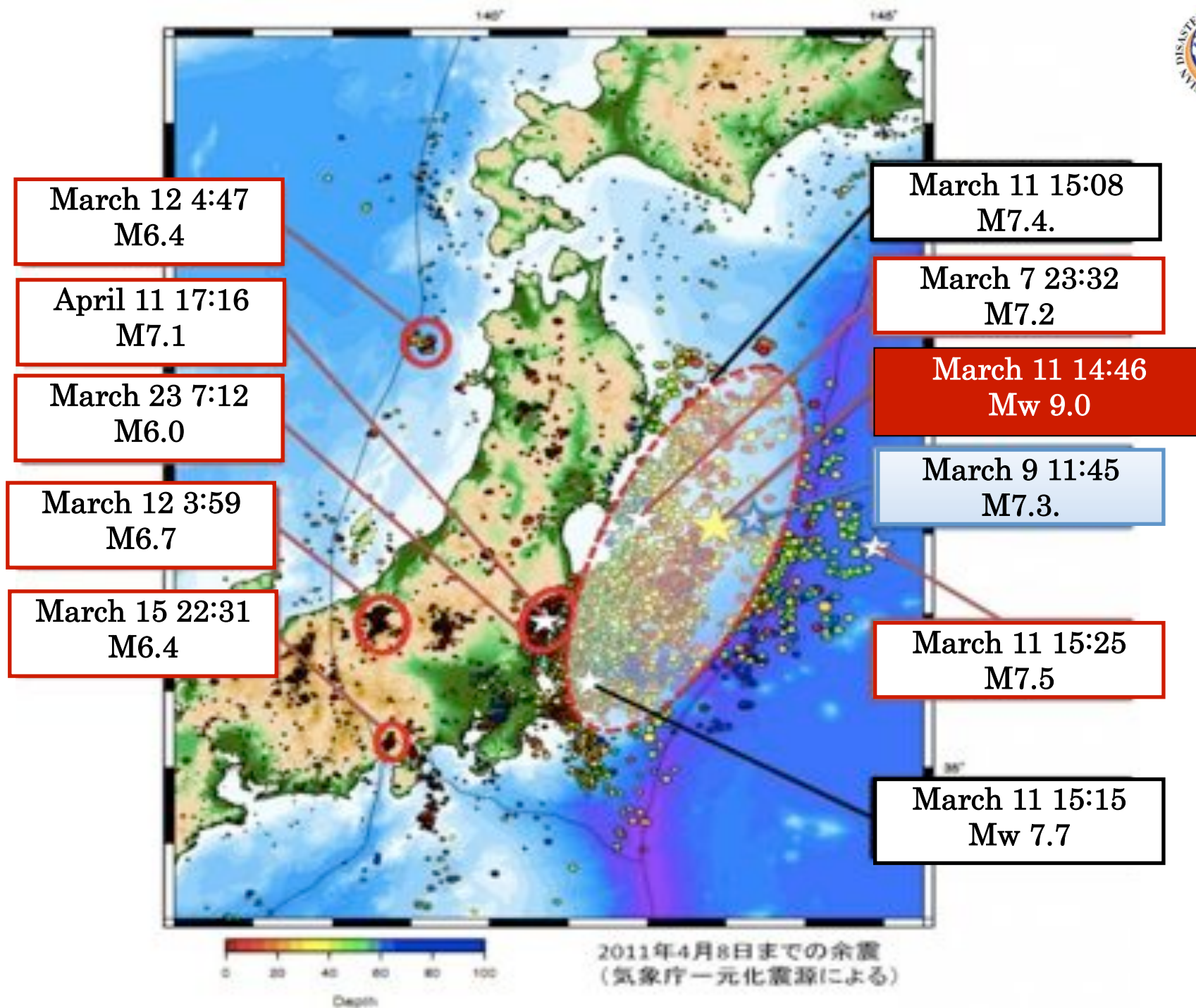
Das Bild kann nicht angezeigt werden. Dieser Computer verfügt möglicherweise über zu wenig Arbeitsspeicher, um das Bild zu öffnen, oder das Bild ist beschädigt. Starten Sie den Computer neu, und öffnen Sie dann erneut die Datei. Wenn weiterhin das rote x angezeigt wird, müssen Sie das Bild möglicherweise löschen und dann erneut einfügen.

Number of disaster victims since 1945



March 11 earthquake

- Date and Time: 11 March 2011 at 14:46 JST (5:46 UTC)
- Type of earthquake: Plate-boundary earthquake on or near the Japan Trench subduction zone between the Pacific and North America plates
- Hypocenter: 130km off the Pacific coast of the Tohoku region, 24 km deep
- Magnitude: Mw 9.0 (interim value, the fourth largest in the world since 1900 and largest in Japan since recording started 130 years ago)
- Cf. 1960 Chile Earthquake Mw9.5
1964 Alaska Earthquake Mw9.2
2004 Sumatra Earthquake Mw9.2





March 11 at Kamaishi City in Iwate Prefecture

Photos provided by Mr. Kozo Sawada

March 11 15:21 at Kamaishi City, photo by Mr. Kozo Sawada



March 11 15:21



March 11 15:21



March 1115:21



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March 11 15:21



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March 11 15:32



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March 11 15:21



March 11 15:32



March 11 16:05



March 11 16:11

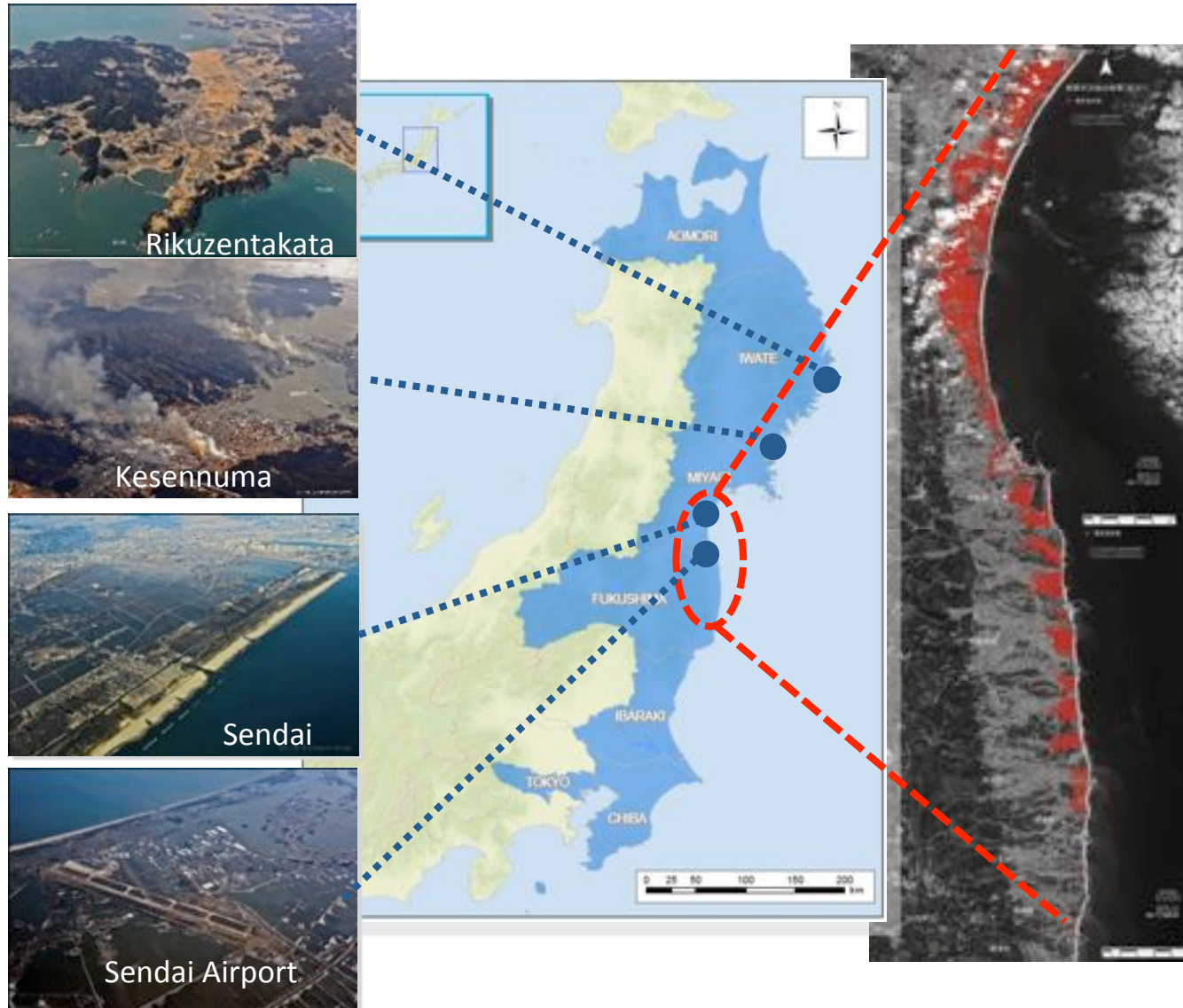




March 22 8:11



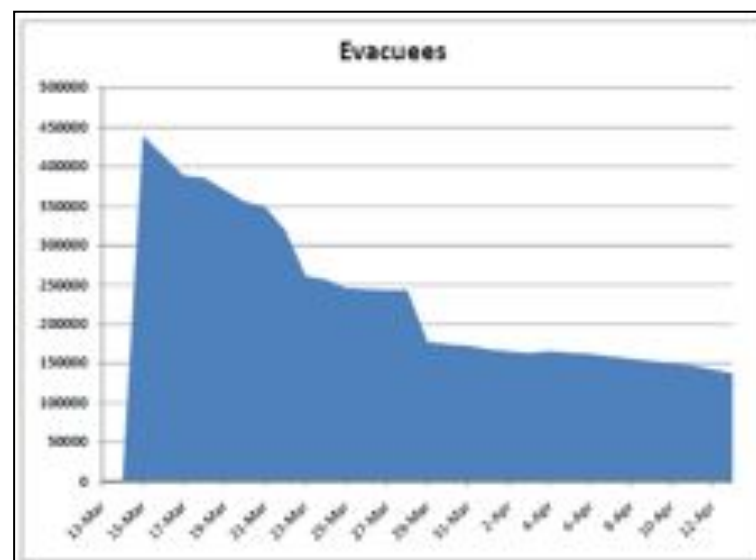
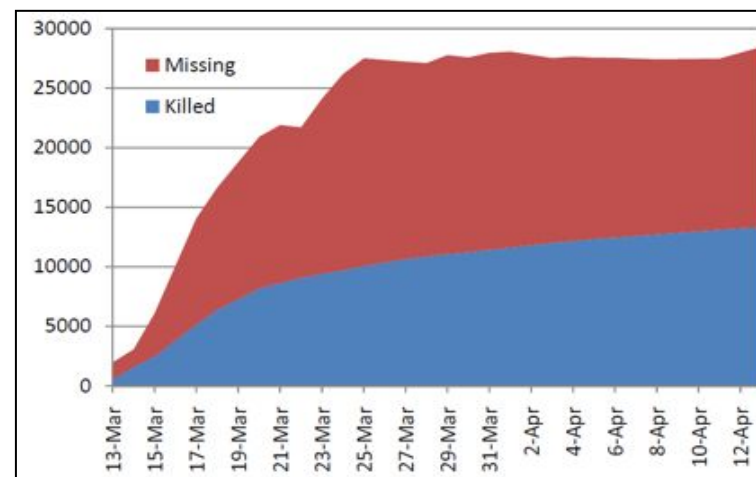
Tsunami affected coastal areas



Human casualties

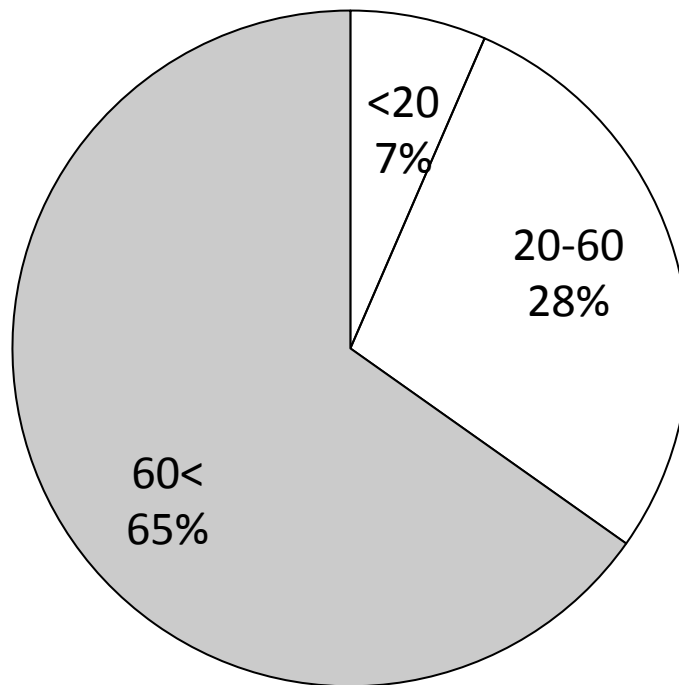
As of April 27

Prefecture	Killed	Missing	Evacuees
Iwate	4,234	3,479	41,521
Miyagi	8,745	6,694	40,701
Fukushima	1,455	1,275	26,429
Others	63	4	21,494
Total	14,508	11,452	130,145

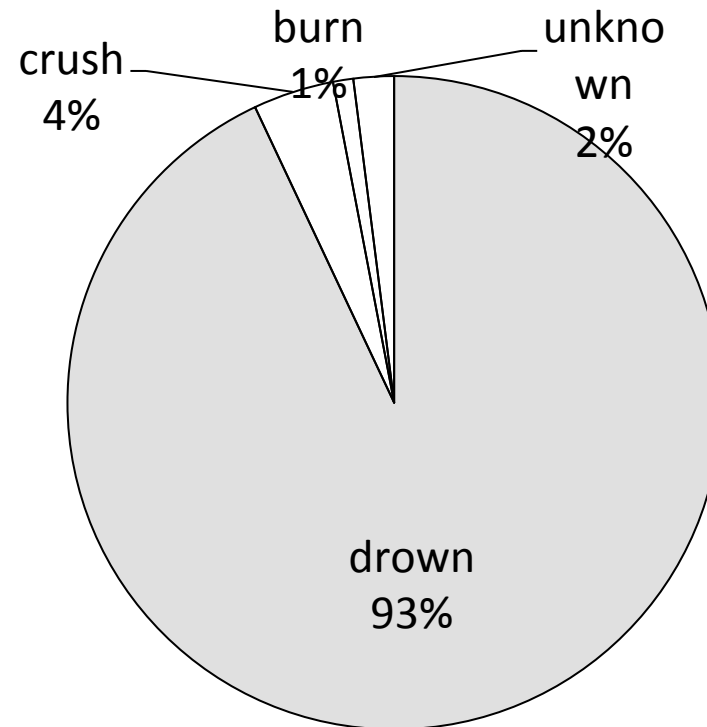


Human casualties

Casualties by age group



Casualties by cause of death





Economic damages

Cabinet Office estimate:

Damage of houses, factories and infrastructures in 7 prefectures

➔ **16 – 25 trillion JPY**

These figures do not cover the whole damage, such as damages to agricultural and fishing industries, lost profit due to disruption in supply chain, etc.

Prefecture		Damage (Billion JPY)	Damages/total assets (%)
Iwate	Inland areas	754	2.9
	Coastal areas	3,522	47.3
	Total	4,276	12.6
Miyagi	Inland areas	1,595	5.1
	Coastal areas	4,897	21.1
	Total	6,492	11.9
Fukushima	Inland areas	1,270	3.7
	Coastal areas	1,859	11.7
	Total	3,129	6.2
Ibaraki	Inland areas	993	2.1
	Coastal areas	1,483	6.8
	Total	2,476	3.6
Total	Inland areas	4,612	3.3
	Coastal areas	11,761	17.2
	Total	16,373	7.9



Typology of disaster affected areas

- Type 1:** *Functions are not severely affected.* These are cities or towns that suffered extensive damage but mostly in their coastal areas. Thus, the entire city or town can function relatively well;
- Type 2:** *Functions are partly paralyzed.* These are cities or town centers that were heavily damaged and their functions were partly paralyzed;
- Type 3:** *Functions are totally paralyzed.* These are cities or towns that were almost entirely devastated. Thus, their functions were totally paralyzed. Cities or towns of this type include those located in rather narrow land areas along sawtooth (ria) coastline.

Wakabayashi Ward, Sendai city

March 22



Ishinomaki City and Higashi-Matsushima City

March 22



Onagawa Town March 22



Minami-Sanriku Town

March 22



Kamaishi City



Provided by Prof. Takashi Onishi, University of Tokyo

Kamaishi City



Provided by Prof. Takashi Onishi, University of Tokyo

Rikuzen-Takata Town



Provided by Prof. Takashi Onishi, University of Tokyo

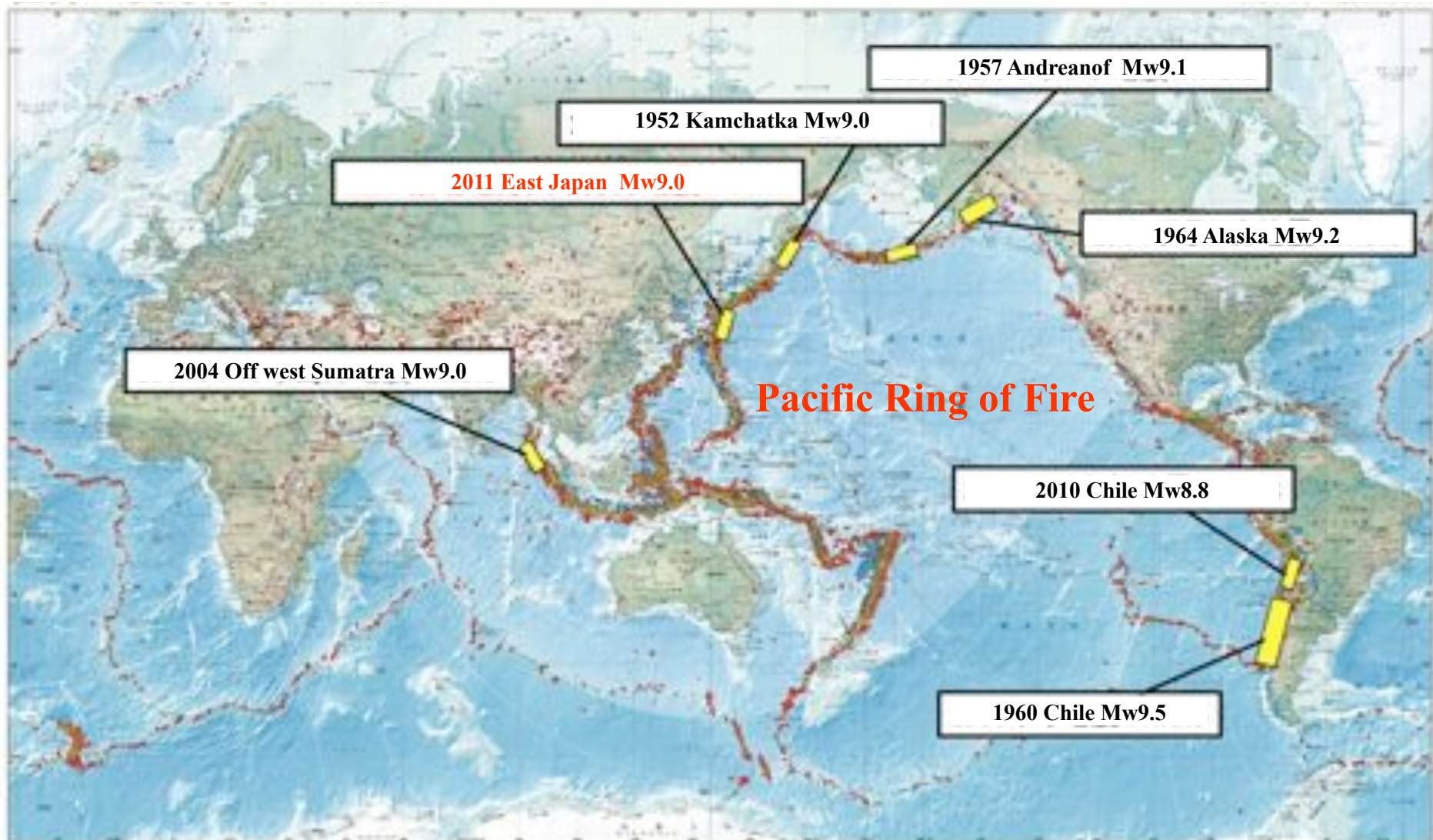


Rikuzen-Takata Town



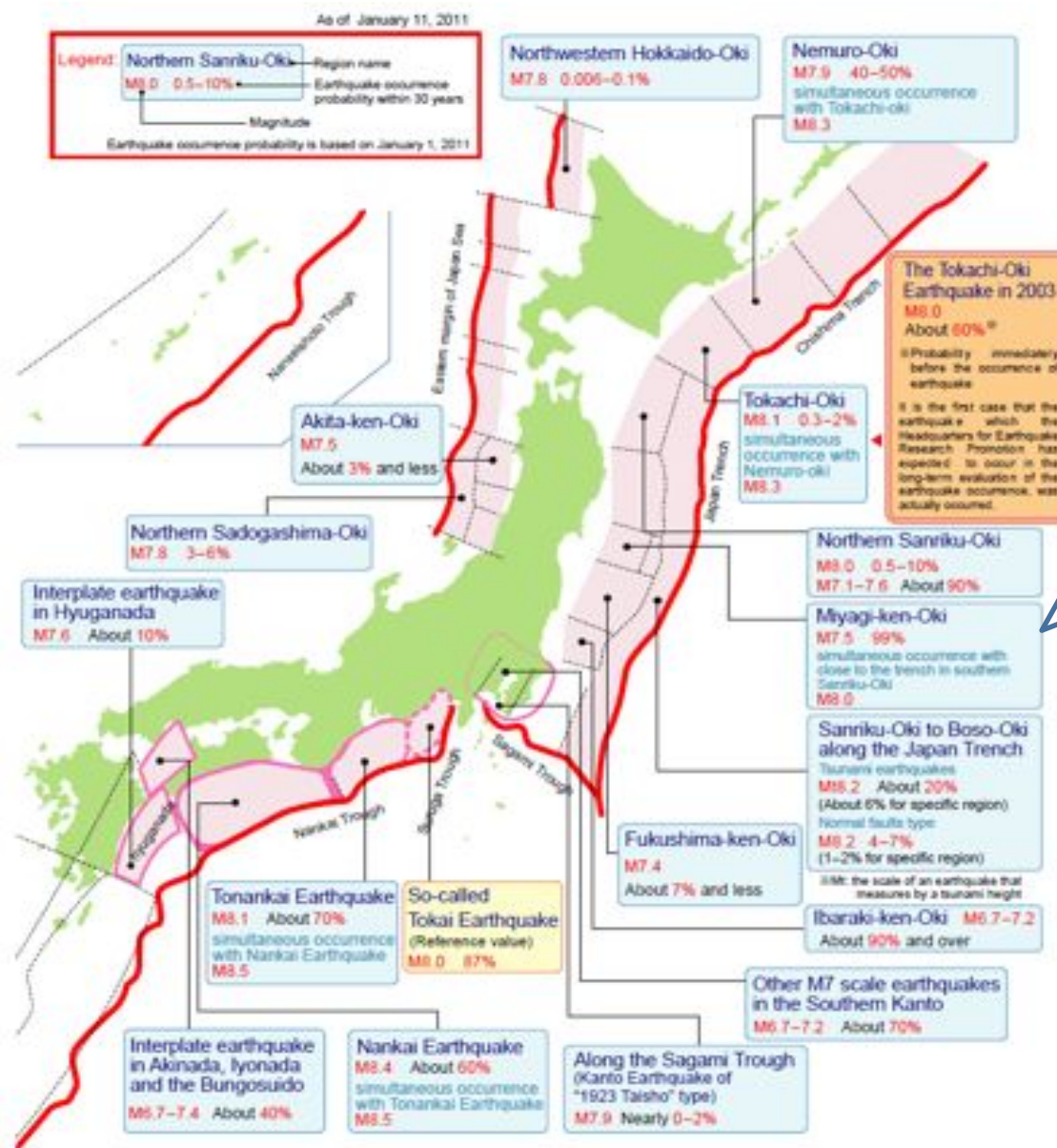
Provided by Prof. Takashi Onishi, University of Tokyo

Seismicity of the world



Source) ERI, University of Tokyo

Evaluation of subduction earthquakes



Miyagi-ken-Oki
M7.5 99%
 simultaneous
 occurrence with the
 trench in southern
 Sanriku-Oki
M8.0

Structural measures

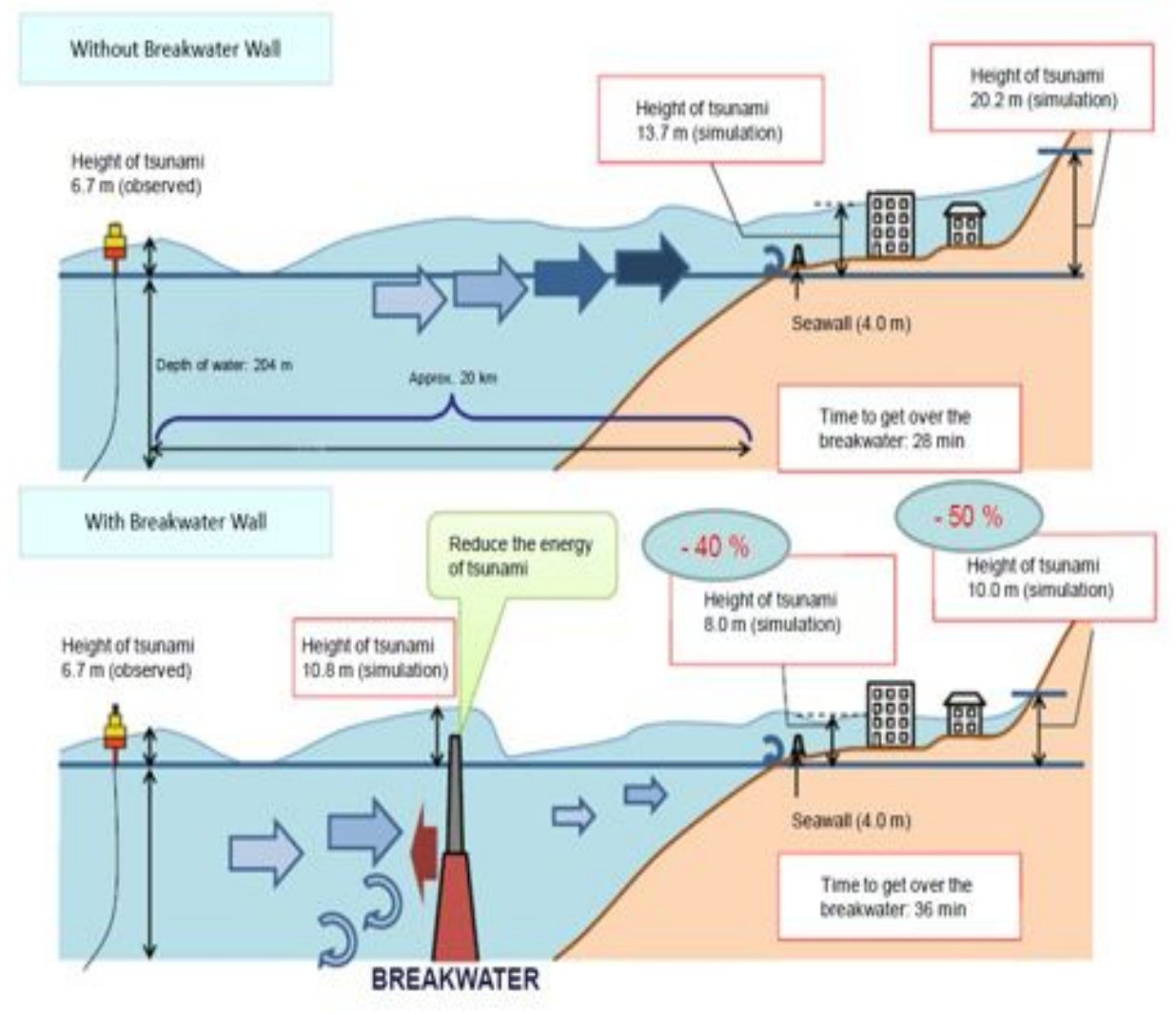
Evacuation building



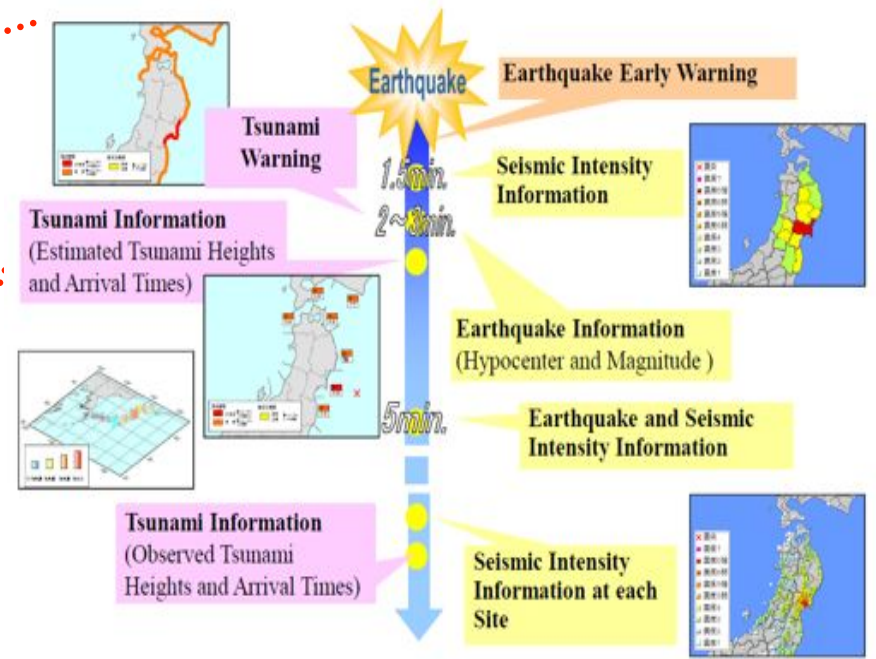
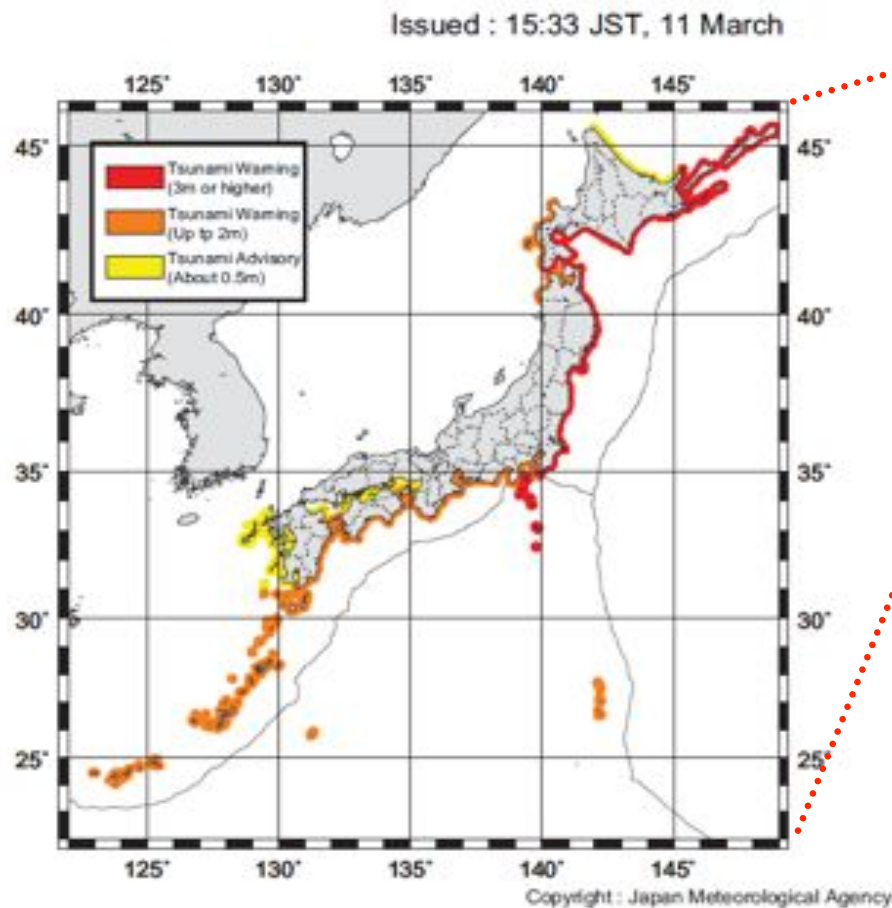
Structural measures seawall, dyke, breakwater



Breakwater

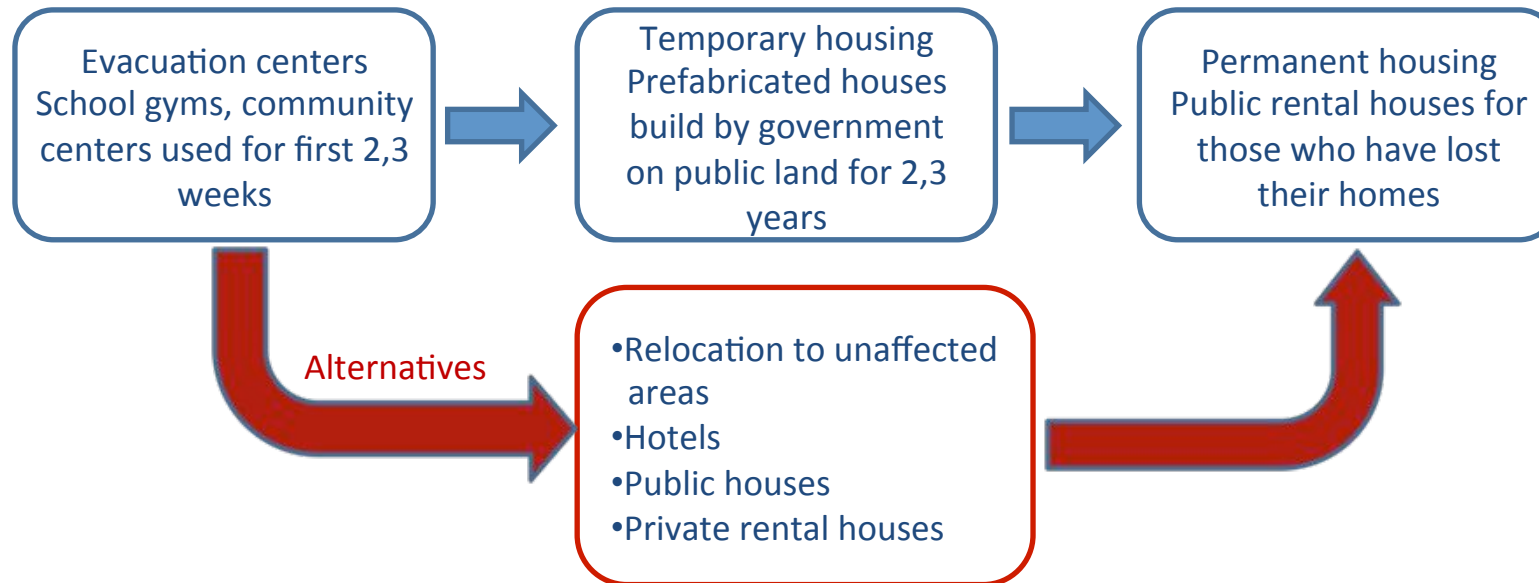


Non-structural measures warning



Provided by Mr. Takeshi Koizumi, JMA

Recovery and reconstruction



Response to Great East Japan Earthquake



- The Parliament passed the first supplementary budget proposal of some 4 trillion JPY to the Diet on May 2.
- Prime Minister posted his message on newspapers overseas

“The government will dedicate itself to demonstrating to the world its ability to establish the most sophisticated reconstruction plans for East Japan, based on three principles: first, create a regional society that is highly resistant to natural disasters; second, establish a social system that allows people to live in harmony with the global environment; and third, build a compassionate society that cares about people, in particular, the vulnerable.”

Response to Great East Japan Earthquake



The Extreme Disaster Management Headquarters established at 15:14 on March 11

The Nuclear Disaster Management Headquarters established on March 11

The Reconstruction Design Council was established to “**deliver a blueprint for the reconstruction plan around the time of June**” established on April 11

The Headquarters for Earthquake Research Promotion at MEXT (the Ministry of Education, Culture, Sports, Science and Technology)

To **promote research** into earthquakes with the goal of strengthening disaster prevention measures, particularly for the reduction of damage and casualties from earthquakes .

The Central Disaster Management Council at Cabinet Office

To **promote comprehensive disaster countermeasures** including deliberating important issues on disaster reduction according to requests from the Prime Minister or Minister for Disaster Management

Extreme Disaster Management Headquarters



Issues to be dealt with

- ✓ Measures to assist the lives of disaster victims
- ✓ Recovery in the affected areas;
- ✓ The legal aspects regarding disaster waste disposal;
- ✓ Facilitation of disaster waste disposal
- ✓ The promotion of employment and job creation for disaster victims
- ✓ The promotion of supplying houses for disaster victims

平成23年宮城県沖を震源とする地震緊急災害対策本部



平成24年4月14日

宮城県庁会議室にて、被災地支援本部の第1回定例会を開催し、関係機関との連携を図る。出席者は、関係機関の代表者ら。



The Headquarters for Earthquake Research Promotion



地震調査研究推進本部
The Headquarters for Earthquake Research Promotion

[Go to Japanese Page](#)

March 11, 2011
Earthquake Research Committee,
Headquarters for Earthquake Research Promotion

The 2011 off the Pacific Coast of Tohoku Earthquake

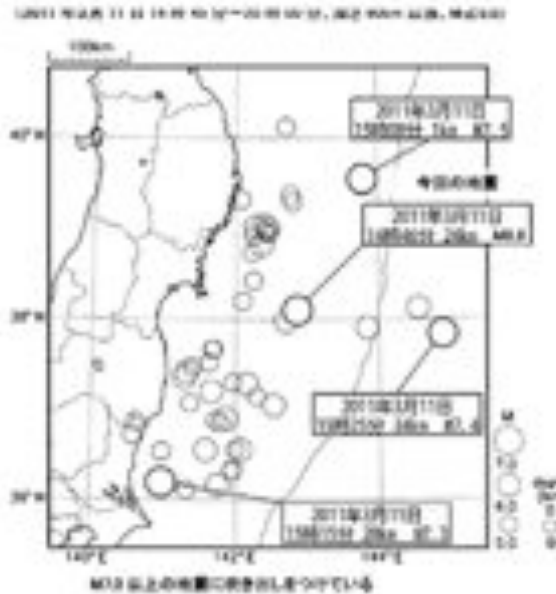
- On March 11 at 14:46 (JST), there was a M9.0 (preliminary) earthquake at a depth of approximately 25km, off-shore of Sanriku. This event had a maximum seismic intensity 7 observed in Miyagi prefecture. This earthquake caused large tsunamis on the Pacific coast from the Hokkaido, Tohoku and Kanto regions, with tsunami heights over 7.3m in Soma, of 4.2m in Oarai, and over 4.1m in Kamaiishi.
- The focal mechanism showed a reverse fault with a compression axis in a WNW-ESE direction. This event occurred on the boundary between the Pacific and the continental plates.
- The maximum aftershock was a M7.5 (preliminary) one that occurred at 15:08 on March 11, as of 18:08 on March 11. There were three earthquakes of M7.0 or over, off-shore of the Pacific coast from Iwate through Ibaraki prefectures.
- According to the GPS data, crustal movements associated with this event were observed and there were movements of approximately 4m toward the east-southeast at the Kahoku observation point (Miyagi prefecture).
- The magnitude of the main shock, M9.0, is the largest in Japan. There is fear that large aftershocks will hereafter occur.
- It is thought that the hypocenter area extends widely from the region off-shore of Iwate to Ibaraki prefectures. The Earthquake Research Committee evaluated earthquake motion and tsunami for the individual region off-shore of Miyagi prefecture, to the east off-shore south of Sanriku along the trench, and to the south off-shore of Ibaraki prefecture, but occurrence of the earthquake that is linked to all of these regions is out of hypothesis.

- [Aftershock Distribution](#)
- [Seismic Intensity](#)
- [Distribution of Tsunami Heights](#)
- [The Focal Mechanism \(CMT solution\) for the 2011 off the Pacific Coast of Tohoku Earthquake](#)
- [Deformation Vectors \(Horizontal Components\)](#)
- [Deformation Vectors \(Horizontal Components\)](#)
- [Deformation Vectors \(Vertical Components\)](#)
- [Deformation Vectors \(Vertical Components\)](#)
- [Regions Off-shore North of Sanriku to Off-shore of Boso Peninsula Associated with Evaluation for the Earthquake Research Committee](#)

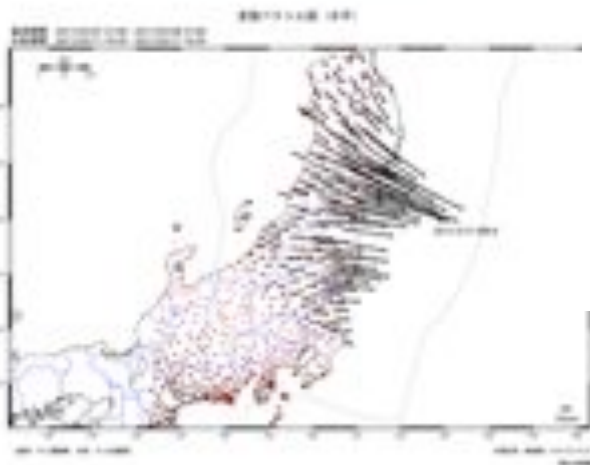
The Headquarters for Earthquake Research Promotion



Aftershock Distribution

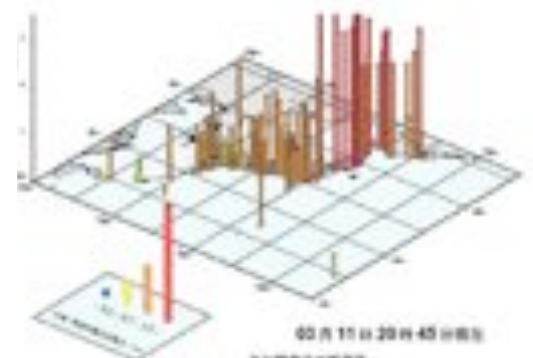
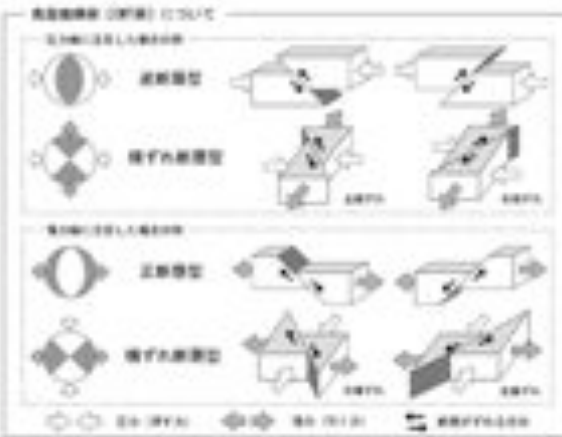
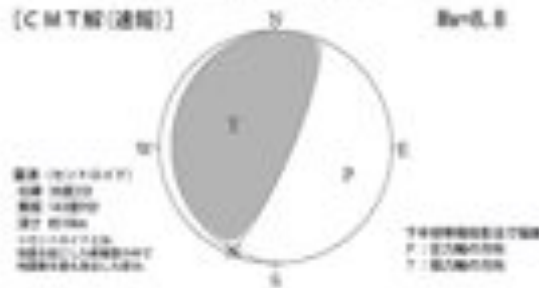


Seismicity Pattern (Seismicity Diagram)



The Focal Mechanism (CMT solution) for the 2011 off the Pacific Coast of Tohoku Earthquake

「平成23年（2011年）東北地方太平洋沖地震」
2011年03月11日14時46分頃の地震の発震機構解（CMT解）過程
西北西-東南東方向に圧力軸を持つ逆断層型



03月11日 20時45分頃
各断層面のずれ量

断層	最大値		平均値	
	長さ	断層面	長さ	断層面
断層1	110 100 100	0.5	110 100 100	0.2
断層2	110 100 100	0.5	110 100 100	0.2
断層3	110 100 100	0.5	110 100 100	0.2
断層4	110 100 100	0.5	110 100 100	0.2
断層5	110 100 100	0.5	110 100 100	0.2
断層6	110 100 100	0.5	110 100 100	0.2
断層7	110 100 100	0.5	110 100 100	0.2
断層8	110 100 100	0.5	110 100 100	0.2
断層9	110 100 100	0.5	110 100 100	0.2
断層10	110 100 100	0.5	110 100 100	0.2

The Central Disaster Management Council



- A meeting was held on 27 April and Decided to establish a committee for technical investigation:
- ✓ to analyze the mechanism of the March 11 earthquake and resultant tsunami, and its impact;
 - ✓ to investigate necessary measures for future mega disasters, in particular, (1) methods to estimate seismic activities, and: (2) methods to assess damages.

The result of investigation will be used to improve government's DM plans and policies



Reconstruction Image

presented by Prof. Yoshiaki Kawata, member of the Council

(1) TSUNAMI - Free Sustainable City



Reconstruction Image

presented by Prof. Yoshiaki Kawata, member of the Council



Reconstruction Image

presented by Prof. Yoshiaki Kawata, member of the Council





Way forward

- ✓ Provision of relief goods to the evacuees (e.g. food, clothing, toilets, medical treatment, bathing, etc.)
- ✓ To restore basic infrastructure and public services (e.g. local transport network, schools, electricity, fuel, etc.);
- ✓ Shelter, Jobs security and cash income
- ✓ Rebuilding disaster stricken areas and regeneration of indigenous industries and regional economy
- ✓ What worked and what did not, why?
- ✓ To prepare for the next, “unexpected” event

ADRC and IRP in cooperation with UN and other partners will organize an expert group meeting in Tokyo on May 30-31 back to back with a field visit on May 29



Thank you for your attention

For more details, please visit Japan booth
at the Market Place

Also, a brief report is available
at ADRC's web-site

<http://www.adrc.asia/index.php>



Asian Disaster Reduction Center (ADRC) - windows Internet Explorer

http://www.adrc.asia/index.php

Also, a brief report is available at ADRC's web-site <http://www.adrc.asia/index.php>

The screenshot shows the ADRC website interface. The main content area features a 'The Latest Disaster Information' section with several news items. One item, dated 2011/05/10, is titled 'ADRC Report '2011 Great East Japan Earthquake'' and is circled in red with an arrow pointing to it from the text on the left. Other news items include reports on heavy floods in South Sumatra, Indonesia, and tropical storms in the Philippines.