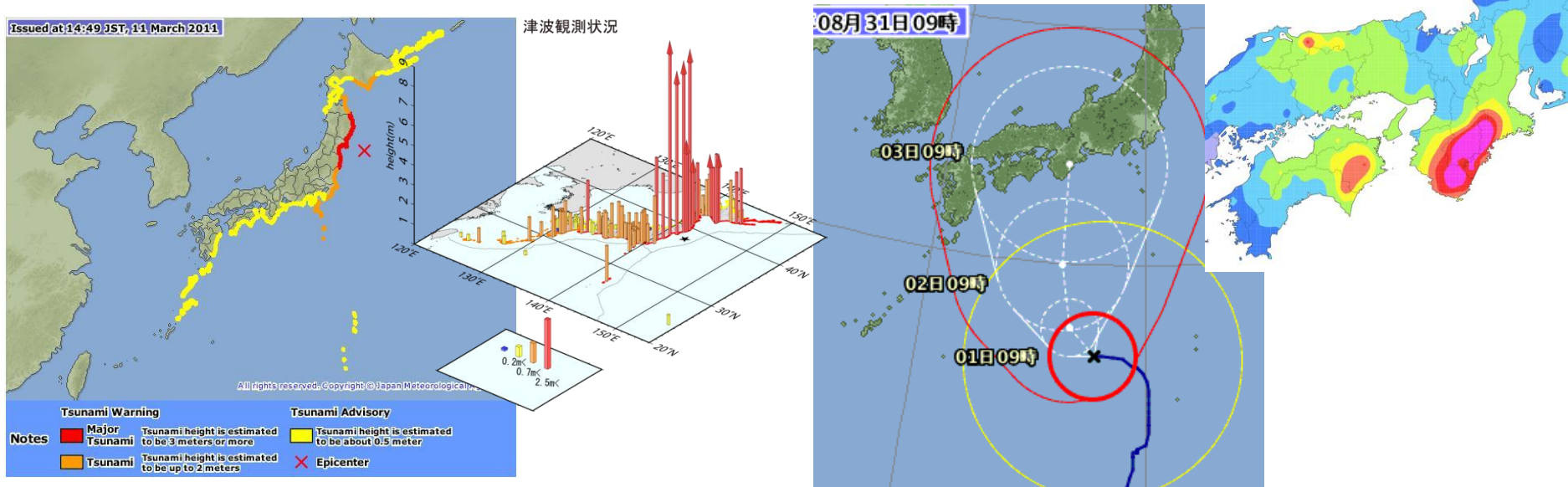
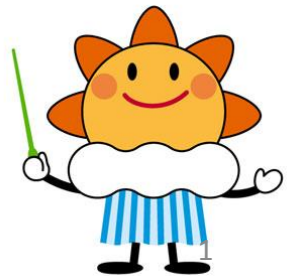


Disaster Prevention Information Provided by Japan Meteorological Agency -- Our perspective to XML and CAP --



Kenichi Kuma

Counsellor, Administration Department
Japan Meteorological Agency (JMA)



Today's presentation

- Natural disaster management in Japan
 - Japan as a disaster prone country
 - Disaster mitigation and prevention framework in Japan
 - The role of Japan Meteorological Agency
 - Legal framework
- Disaster mitigation and prevention information provided by JMA
 - Weather related disaster
 - Earthquake / Tsunami / Volcanoes
 - Our contribution to the world through the international framework
- Dissemination of information to public
 - Multiple media such as TV, radio, mobile phone
 - What we have learnt from massive disasters in 2011
 - Our activities on JMX (JMA XML) and our future approach to the global standard
- Our perspective to the global standard

Japan - disaster prone country -

Earthquakes

Volcanoes

Needs Multi-Hazard Risk Management!
JMA covers for all natural hazards

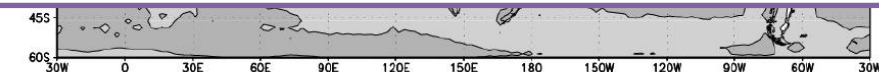
Hypocenters around Japan
135,700 quakes in 2009
(approx. 370/day)

110 volcanoes in Japan

We can contribute to world-wide communities
on disaster mitigation / prevention

11 TCs / year (approach)
3 TCs / year (landfall)

Saffir-Simpson Hurricane Scale:



Asian Monsoon :heavy rain/snow

Natural disaster management

Structural Measures



- No needs for evacuation as long as hazards do not exceed the limit
- The cost is unlimited if we consider the extremely rare cases

Combination is required for disaster management

Non-Structural Measures



- Residents need to be educated so that they can act properly.
- Coordinated action is crucial

- Two aspects of Collaboration are important for Met service
 - Collaboration among non-structural measures (media, evacuation authorities)
 - Collaboration with structural measures (river/coast/sediment control/life lines)

Structural measures

Collaboration

Non-structural measures

Met. service

Role of JMA in natural disaster management

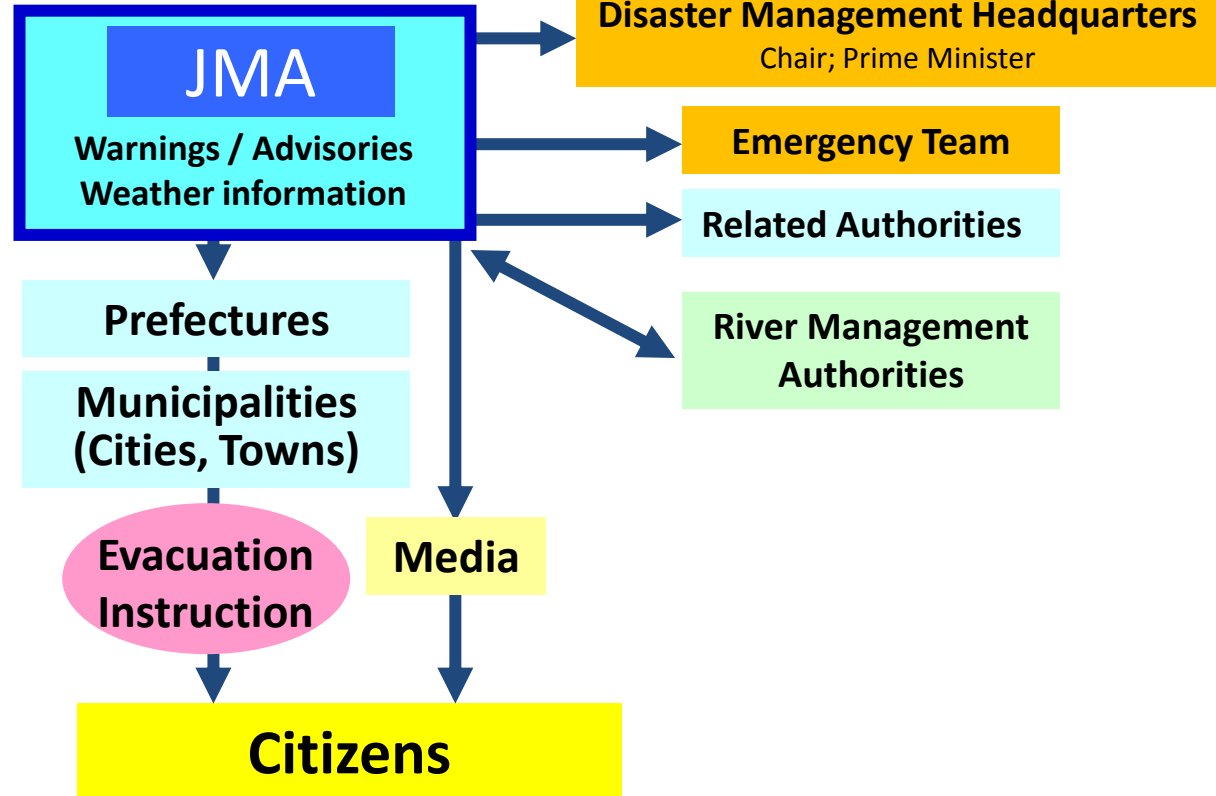
Preparing against natural disasters

- *Build robust infrastructure*
- *Increase public awareness*
- *Improve quality of information*



Natural Disasters Prevention/Mitigation

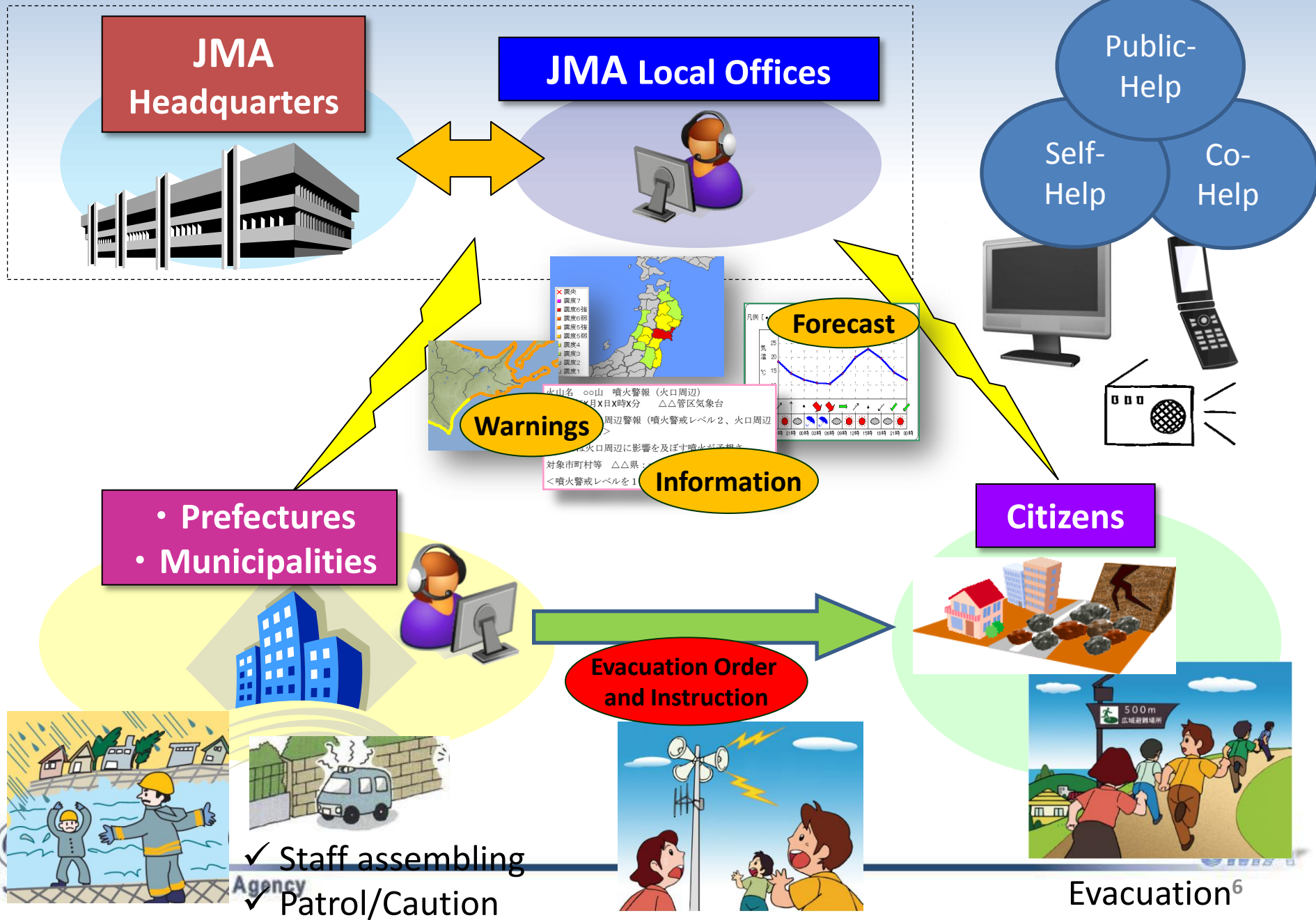
Preventive Actions



JMA's information is used as a trigger to start national disaster action

Natural Disaster Recovery

Action of local governments and citizens



The Basic Act on Disaster Control Measures (1961)

After Ise-Bay Typhoon in 1959

- Provides basis for disaster management in Japan
 - Such as “Definition of responsibilities for disaster management”
- Provides mission of both national and local governments for disaster management
- Description related with JMA responsibility
 - To observe and to forecast meteorological, terrestrial, and oceanographic phenomena.
 - To improve forecast and warning against disaster.
 - To cooperate internationally to enhance global observation system.

The Meteorological Service Act (1952)

- JMA's mission
 - To contribute to extend public welfare
 - Prevention and mitigation of natural disasters
 - Safety of transportation
 - Development and prosperity of industry ...
 - To cooperate internationally
- Provides duties and services of JMA
 - Observations (Meteorology, Seismology, Volcanoes)
 - Framework for warnings and information on natural disasters
 - Including tsunami and storm surge
 - Promotion of private weather businesses
 - Duties for issue and dissemination of warnings
 - Asks relevant parties to re-distribute warnings
(National authorities, Local authorities, TV, T&T etc.)

Warning and advisory --- Weather related disasters ---

Warning

Heavy Rain (Sediment disaster, Inundation), Heavy Snow, Storm, Snow-storm, Flood, High Wave, Storm Surge,
(Tsunami, Earthquake motion, Volcanic phenomena)

Advisory

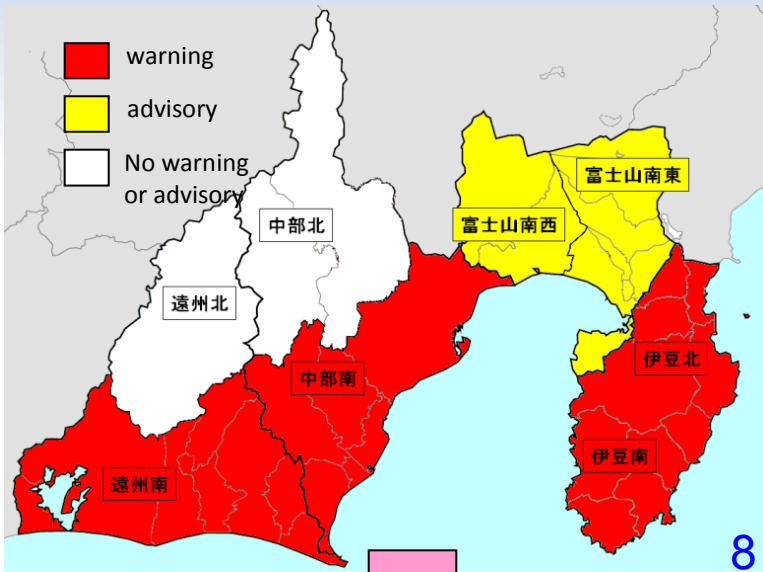
Heavy Rain (Sediment disaster, Inundation), Heavy Snow, Gale, Gale and Snow, Flood, High Wave, Storm Surge, Thunderstorm, Dense Fog, Frost, Dry Air, Avalanche, Low Temperature, Snow-melting, Ice (snow) accretion,
(Tsunami, Earthquake motion, Volcanic phenomena)

Information jointly issued

Joint **Flood Warning for designated river** with the river authority

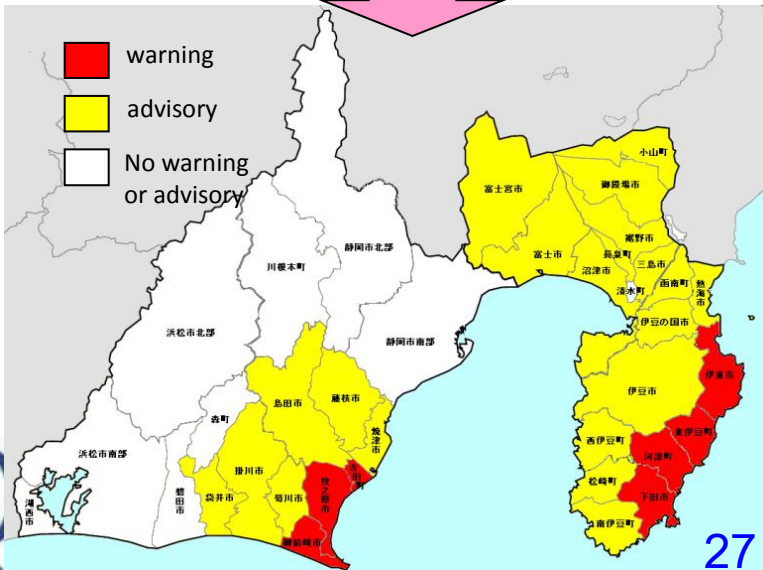
Joint **Sediment Disaster Alert** with the sediment control authority

Warning and advisory for each city



Number of subdivisions

Mar. 2001	2 2 6
Mar. 2002	2 9 4
Mar. 2003	3 5 6
Mar. 2004	3 6 2
Mar. 2005	3 6 8
Mar. 2006	3 7 0
Mar. 2007	3 7 3
Mar. 2008	3 7 4
Mar. 2010	3 7 5
May. 2010	1 7 7 7 (municipalities)



- Disaster prevention organizations and citizens to narrow down the area of required caution.
- According to “Basic Act on Disaster Control Measures”, a mayor of municipality is responsible for evacuation advisory.
- Easier to understood by public

Time Sequence of Earthquake Information and Tsunami Warning in JMA

Focus, P-wave
S-wave

Earthquake

Earthquake Early Warning

Automatic processing

Tsunami Warning

Seismic Intensity Information

Automatic processing

1.5min.

2~3min.

Tsunami Information

(Estimated Tsunami Heights and Arrival Times)

Earthquake Information

(Hypocenter and Magnitude)

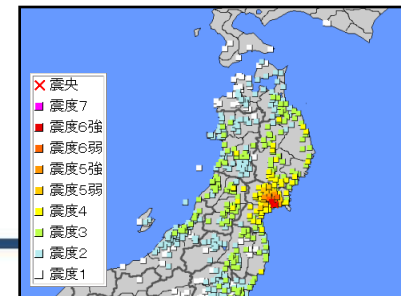
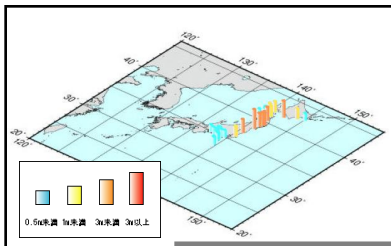
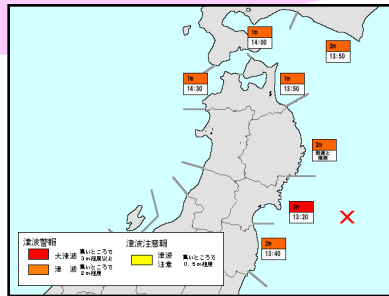
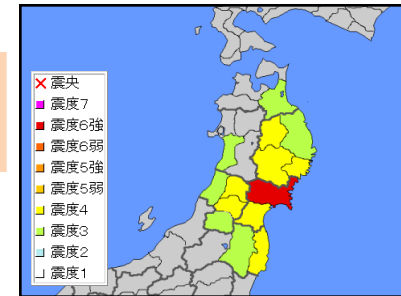
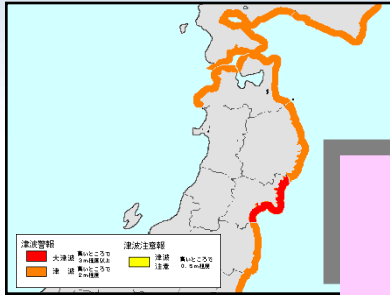
Earthquake and Seismic Intensity Information

5min.

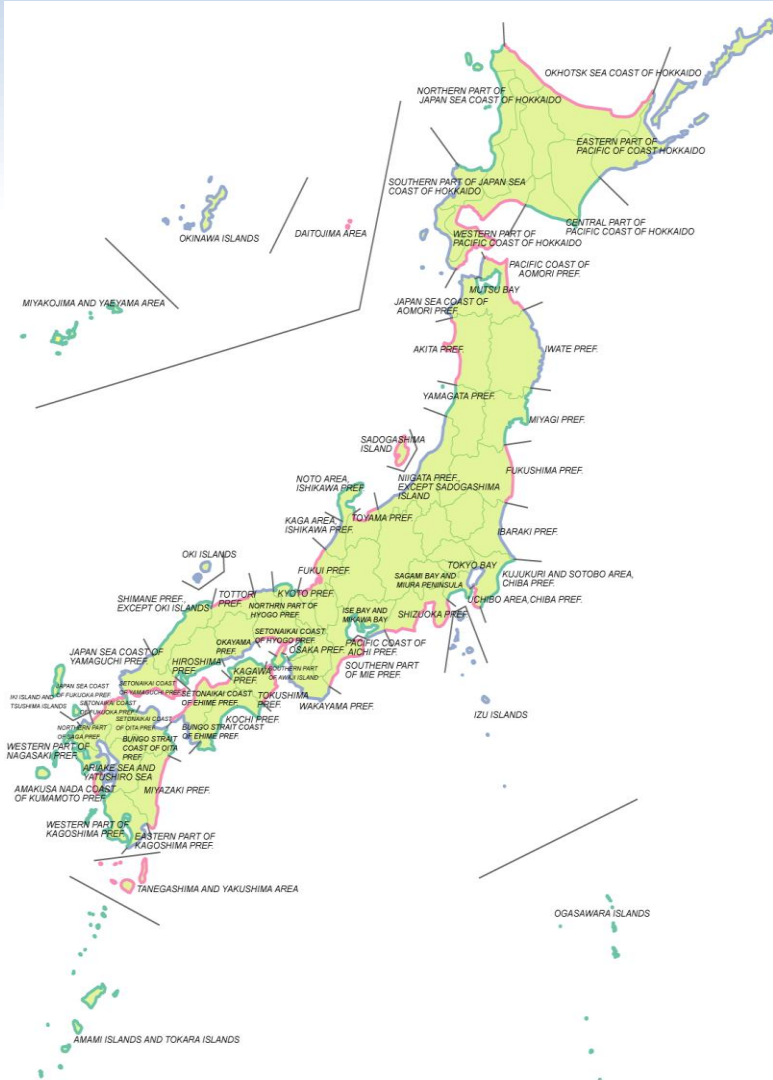
Tsunami Information

(Observed Tsunami Heights and Arrival Times)

Seismic Intensity Information at each Site



Tsunami Warning Classification



Leave coastal areas immediately and evacuate to a safe place

Type of Tsunami Bulletin	Estimated Tsunami Height
Tsunami Warning	Major Tsunami "3m", "4m", "6m", "8m", "over 10m"
	Tsunami "1m", "2m"
Tsunami Advisory	"0.5m"

Leave coastal areas and do not engage in fishing or swimming

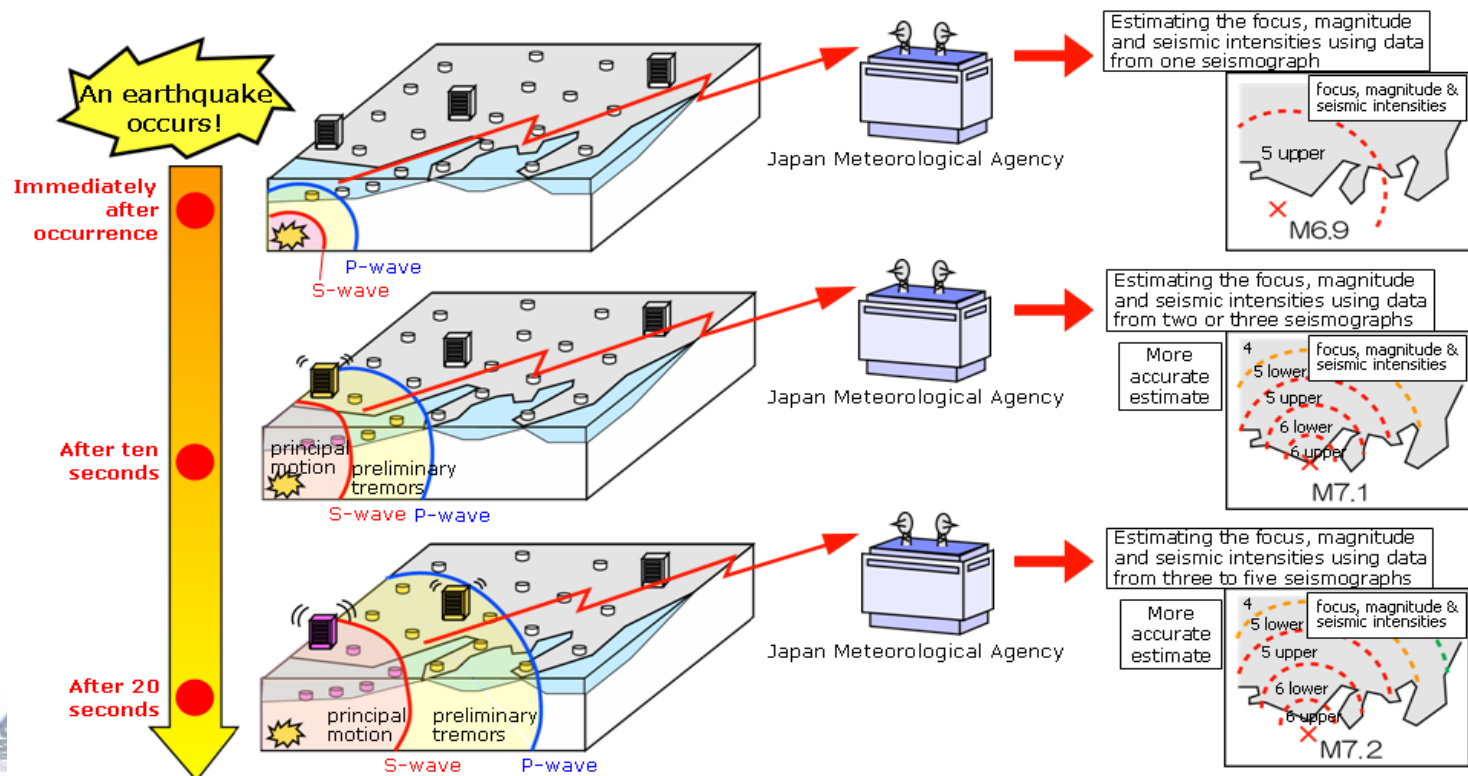
Will be updated in the near future based upon the investigation of 3.11

Response to the earthquake

6-lower	Cabinet Secretariat → call of an urgent gathering team
5-lower	Ministry of Defense → investigation of damages Japan coast guard → investigation of damages
4	Cabinet Office → estimation of damages Metropolitan Police Department, Fire and Disaster Management Agency → investigation of damages

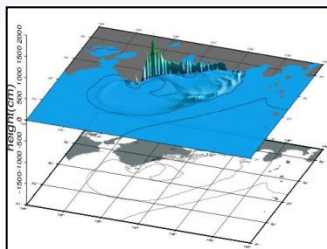
The Concept of Earthquake Early Warning (EEW)

- JMA is providing residents in Japan with **Earthquake Early Warnings**, new prompt earthquake alerts to be issued immediately after the occurrence of earthquakes, in order to secure time to protect yourself before strong tremors arrive.
- On 1 October 2007, JMA started providing Earthquake Early Warning through several media such as TV and radio.



Importance of public awareness and collaboration with our partners

Tsunami warning



Closing tide gates

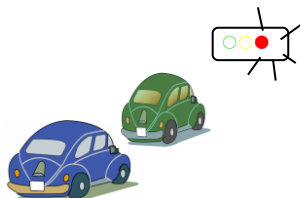
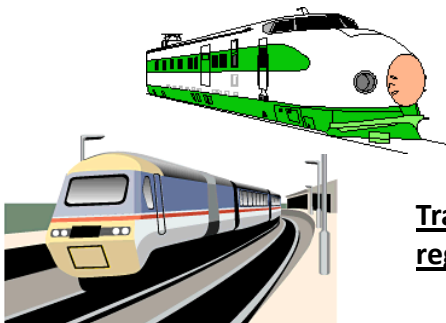
Immediate evacuation from areas of the tsunami



Precautionary measures in homes, schools, halls, shopping centers, etc..



Train control system

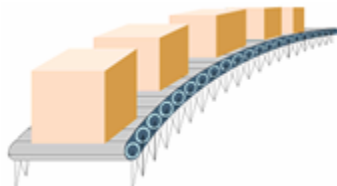


Traffic control signals, traffic regulation

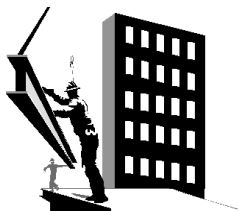
Elevator Control System



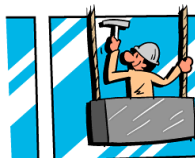
Hospitals → Prevention of errors in operations



Controlling factory lines → To mitigate damage



People in hazardous locations → Ensuring the safety













News

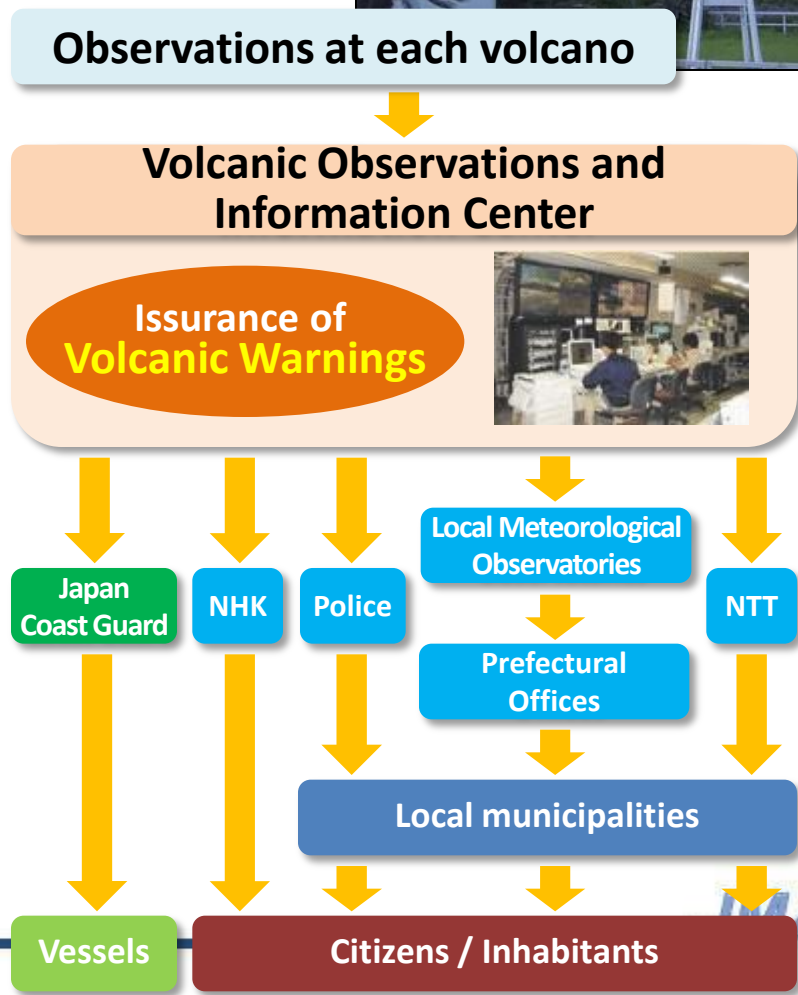


Volcanic Warning



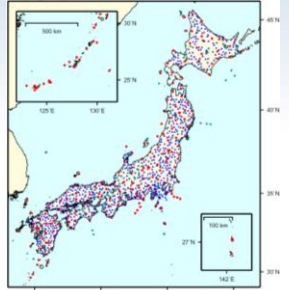
Volcano alert levels

Abbreviated Term	Target area	Levels & Keyword	
Warning	Residential areas	 Level 5 Evacuate 	
		 Level 4 Prepare to evacuate 	
Near-crater Warning	Non-residential areas near the crater	 Level 3 Do not approach the volcano 	
	Around the crater	 Level 2 Do not approach the crater 	
Forecast	Inside the crater	 Level 1 Normal 	



Provision of Tsunami Bulletins to countries around the Northwest Pacific and the Indian Ocean

Japanese Seismic Network

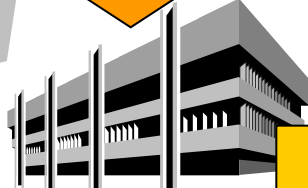


Pacific Tsunami Warning Center (PTWC)



Information Exchange

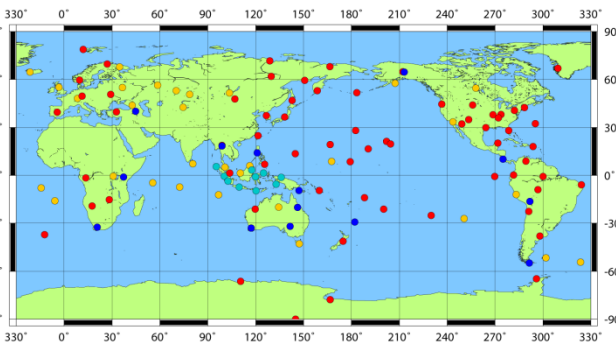
Data



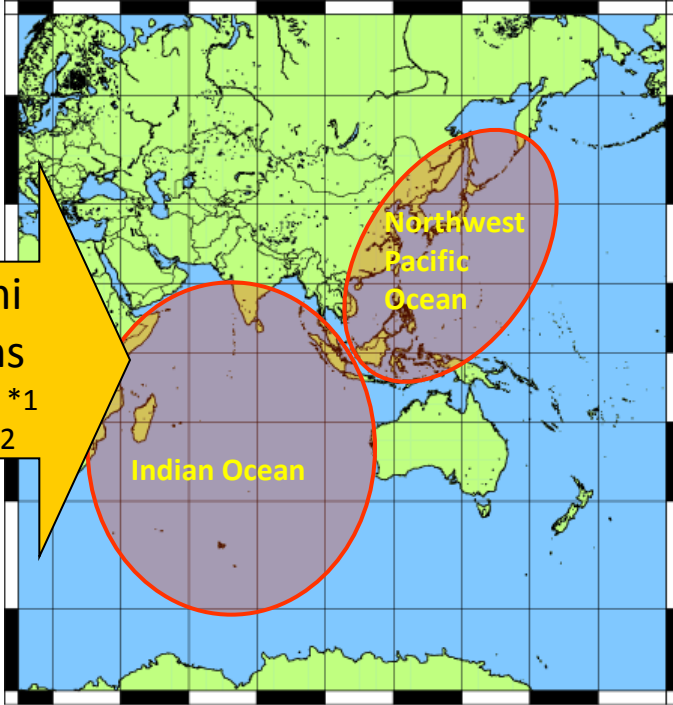
JMA

Data

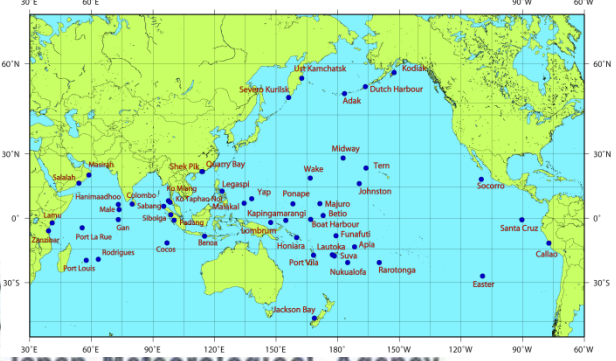
Global Seismic Network



Tsunami Bulletins
(NWPTA) *1
(TWI) *2



Sea Level Stations



Analysis

- Hypocenter
- Magnitude
- Evaluation of Tsunamigenic Potential
- Tsunami Observation etc.

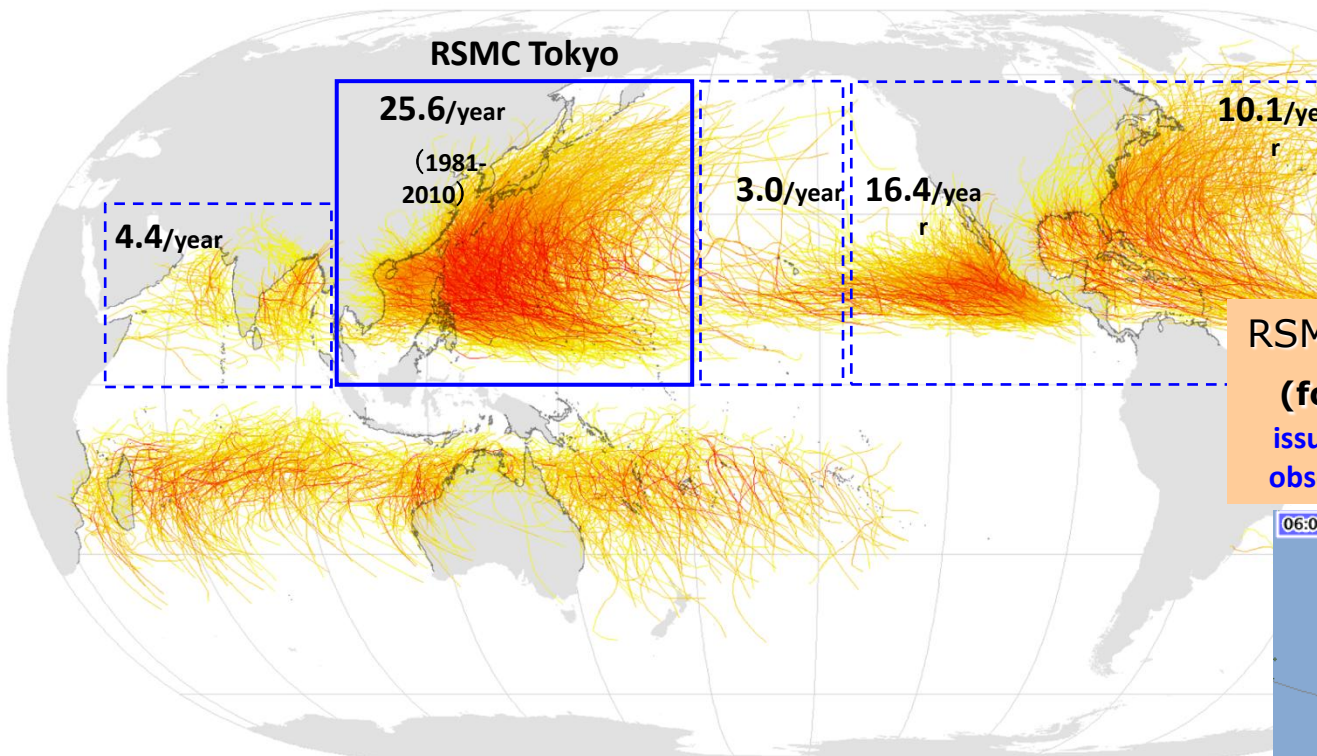
Contribute to the mitigation of tsunami disasters of countries around the Northwest Pacific and the Indian Oceans

*1) NWPTA: Northwest Pacific Tsunami Advisory

*2) TWI: Tsunami Watch Information for the Indian Ocean

TC advisory from RSMC Tokyo

Tropical Cyclones 1945 - 2006



RSMC Tokyo

25.6/year

(1981-2010)

10.1/year

3.0/year

16.4/year

4.4/year

Saffir-Simpson Hurricane Scale:

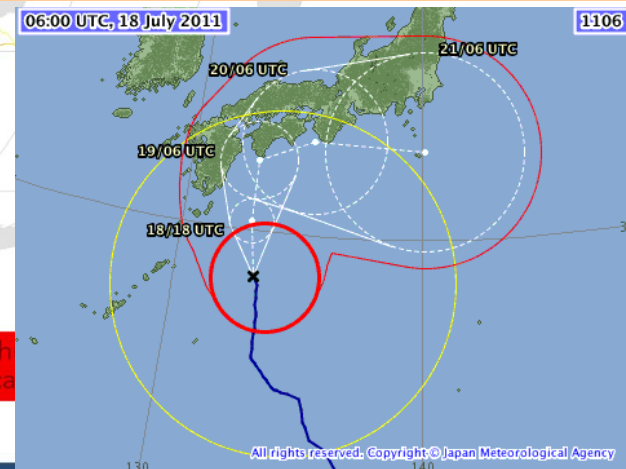


WTPQ20 RJTD 180600
 RSMC TROPICAL CYCLONE ADVISORY
 NAME TY 1106 MA-ON (1106)
 ANALYSIS
 PSTN 180600UTC 28.4N 133.2E GOOD
 MOVE N 14KT
 PRES 945HPA
 MXWD 085KT
 GUST 120KT
 50KT 140NM EAST 90NM WEST
 30KT 425NM EAST 300NM WEST
 FORECAST
 24HF 190600UTC 32.6N 132.8E 85NM 70%
 MOVE N 10KT
 PRES 950HPA
 MXWD 080KT
 GUST 115KT
 48HF 200600UTC 33.5N 135.2E 160NM 70%
 MOVE ENE 06KT
 PRES 960HPA
 MXWD 075KT
 GUST 105KT
 72HF 210600UTC 33.3N 140.1E 220NM 70%
 MOVE E 10KT
 PRES 975HPA

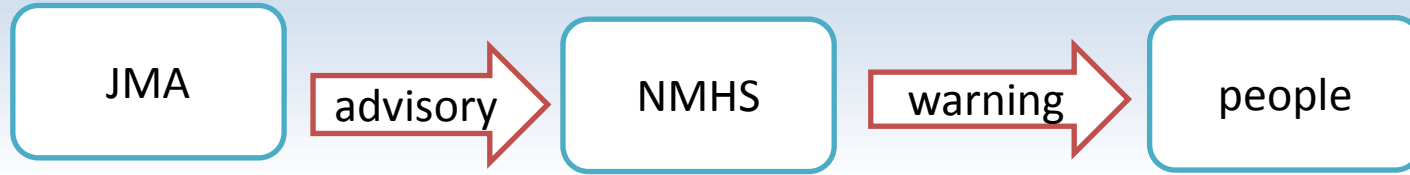
RSMC TC advisory (WTPQ20-25)

(for 3-day forecast)

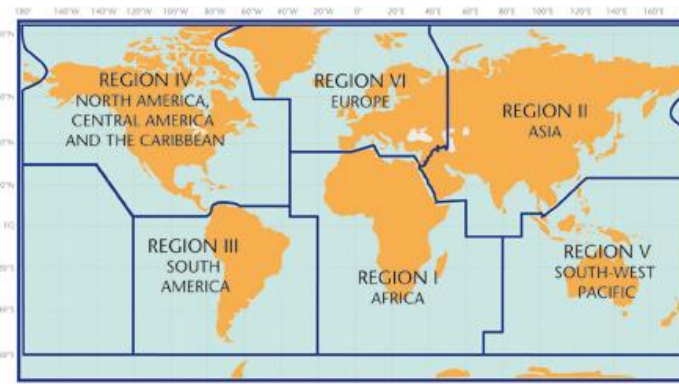
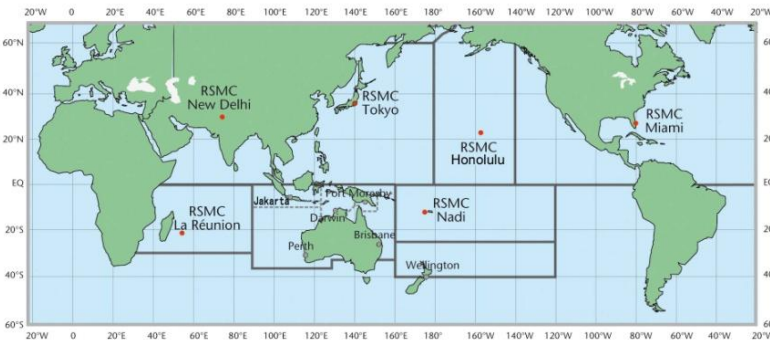
issued within 50 minutes from observation times at 00, 06, 12, 18 UTC



JMA's international mission



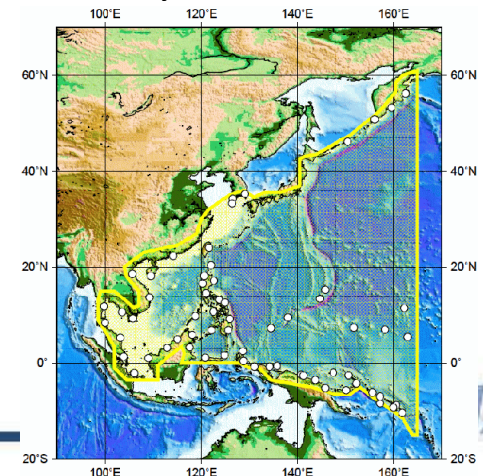
Tropical Cyclone Warning Centres



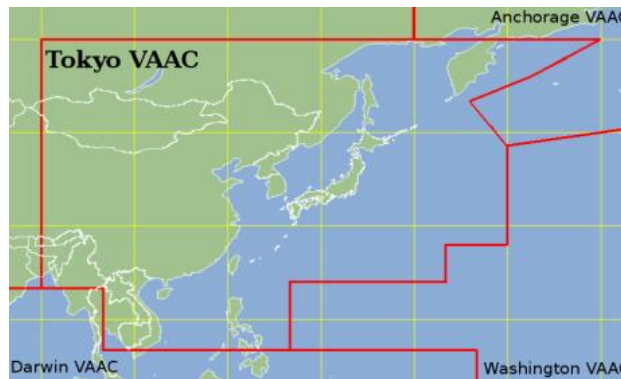
WMO region

Telecommunication,
Environmental
Emergency Response,
etc.

Northwest Pacific Tsunami
Advisory center



Volcanic Ash Advisory Center



The Global Maritime Distress and
Safety System (GMDSS) Services

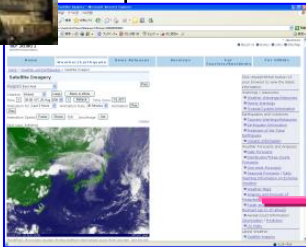


Dissemination of Information

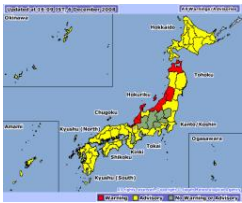
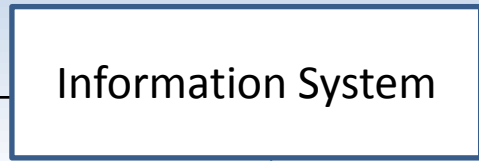
Official Single Voice



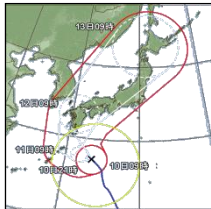
JMA



JMA website



Weather Warning



Typhoon information



Volcanic Warning

- >Rapid progress in ICT
- >Each media has its own advantage
- >International visitors in Japan

3.11

<<Inundated Area>>
Population: 16,640
Death and Missing: 2,170



Photo by JMA from the helicopter of JSDF
As of 12 March

What we have learnt from 3.11

- Information should be linked to disasters so that the people can understand what they act
 - ✓ Tide level, precipitation forecast map, inundation forecast map, tide level calendars etc.
- Appropriate information dissemination system should be established.
 - ✓ Use of portal site and mobile phones
 - ✓ Ensure several routes of communications
- Appropriate support to citizens and disaster management agencies (including municipalities) is important.
 - ✓ To enhance public awareness including children
 - ✓ To provide best suitable products

JMX (Japan disaster prevention information XML)

- Our concept
 - Profitableness to users:
 - adaptability to users' system and working.
 - cost-effective system in the long run
 - Unified Format:
 - from various forms of conventional texts to a unified and comprehensive format.
 - Consolidated description:
 - Multiple information in one single bulletin; from observations to forecasts
 - Flexible format:
 - Format allowing new elements to be added for future services
- Project collaborators
 - Technical support from the XML Consortium on XML standardization
 - Coordination with governmental organizations and the mass media

```
<Control>
-Title
-Datetime
- ...
```

```
<Head>
-Headline
-TargetArea
- ...
```

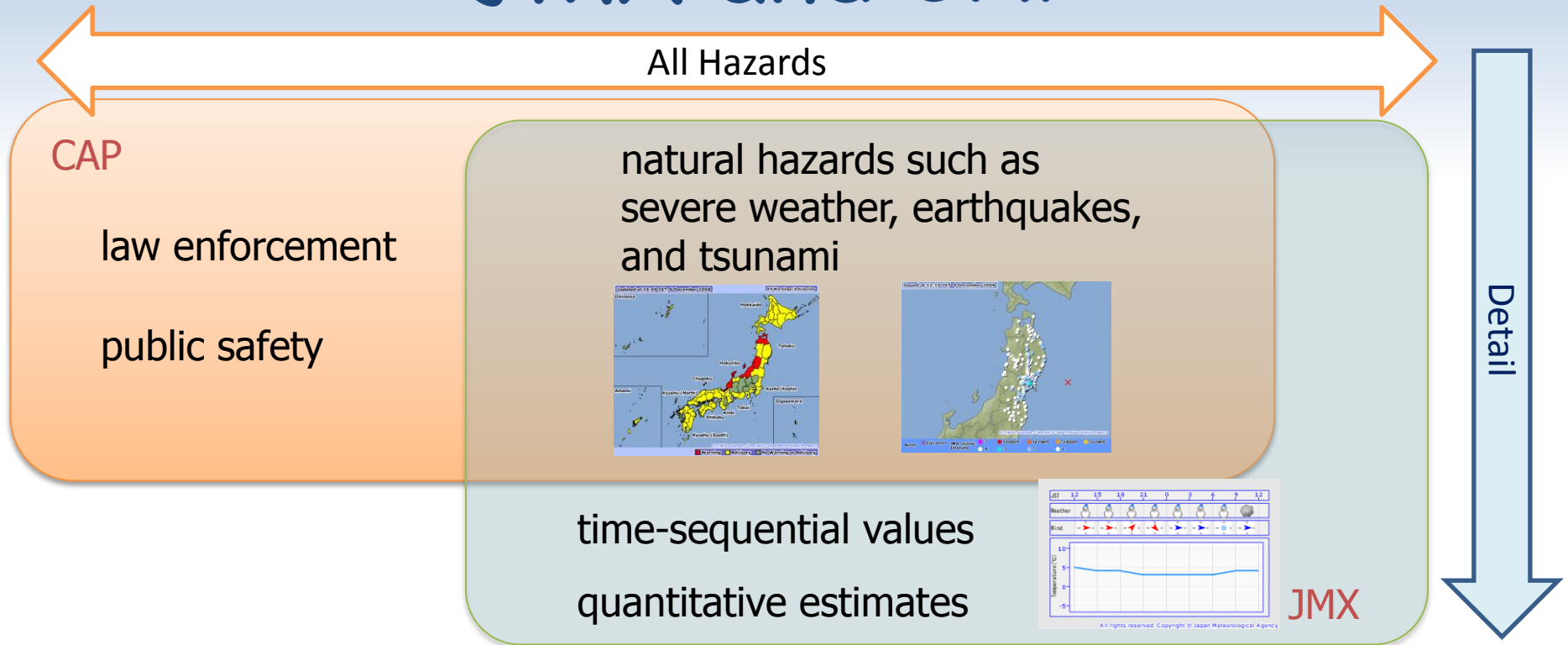
```
<Body>
*meteorology
*seismology
*volcanology
```

Basic elements
<Pressure>, <WindSpeed>
<Magunitude>, <Tsunami>
..

Ref.



JMX and CAP



- CAP can be generated from JMX
 - JMX to domestic users
 - CAP to international users (outside or inside Japan)
 - Typhoon information will be served in CAP as a trial this year through internet

Our perspective to the global standard

- It is reasonable to optimize the emergency alerts considering the domestic requirements.
 - Natural features, government, law, culture, history, etc.
- Emergency alerts must be reached to everyone who needs
 - After the huge disaster, ways of dissemination are limited due to various reasons
 - Disseminate the information to people who cannot understand Japanese
- Standardization may help the various media to deliver the information
 - Multiple ways of dissemination from a single authentic voice
 - May support the people in the country lacking proper alert information
- Tasks to be solved in future
 - How to inform the meaning and the required action of the alert
 - Which is the most important aspect for saving the lives!
 - National authority International authority
 - National standard International standard