

Key approaches to the Smart Service for Typhoon related Disaster Risk Reduction

~ 10-year Vision to Protect Life and Property from Tropical Cyclones ~

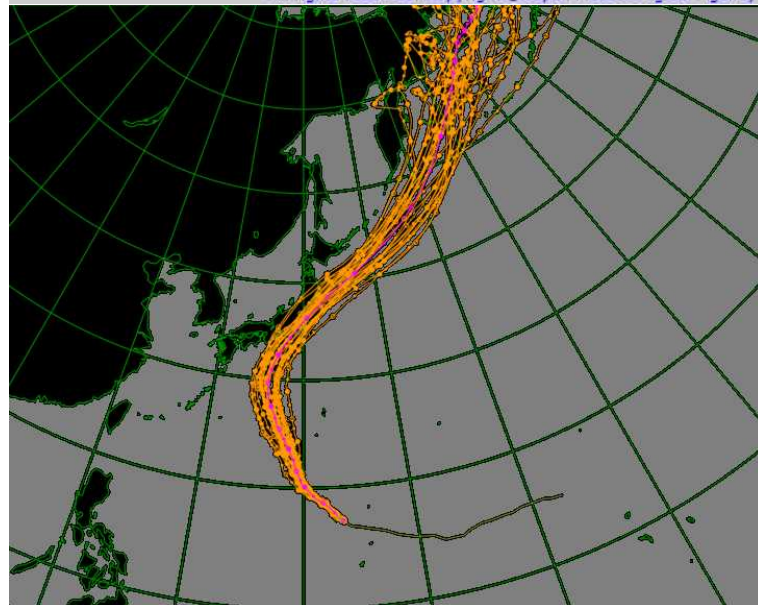
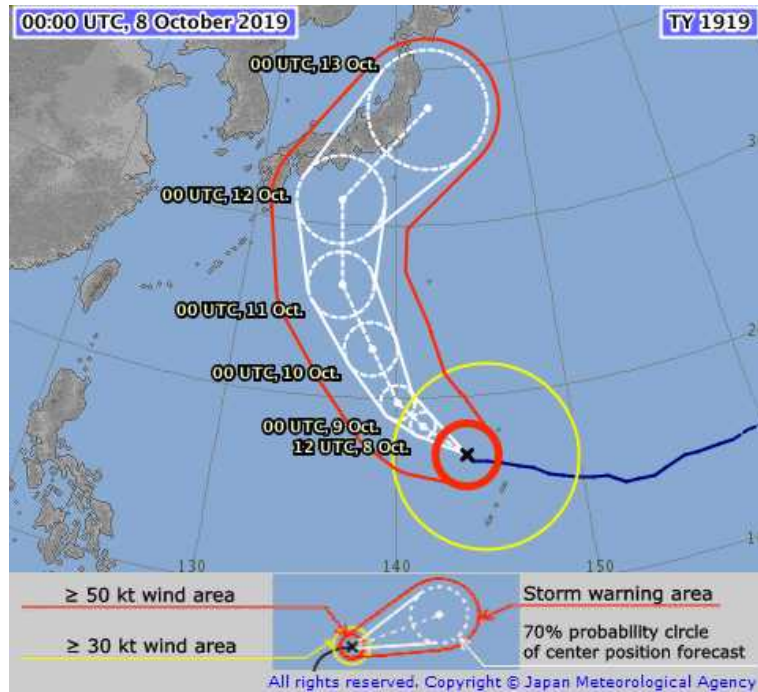


**Tokyo Typhoon Center
Japan Meteorological Agency**

Outline

- ***Hagibis (T1919) posed remaining risk of TCs***
- ***How to initiate people's action is the key for successful disaster responses***
- ***“10-year vision to protect life and property” and priority action areas for the vision were agreed in High-level Dialogues in Tokyo***

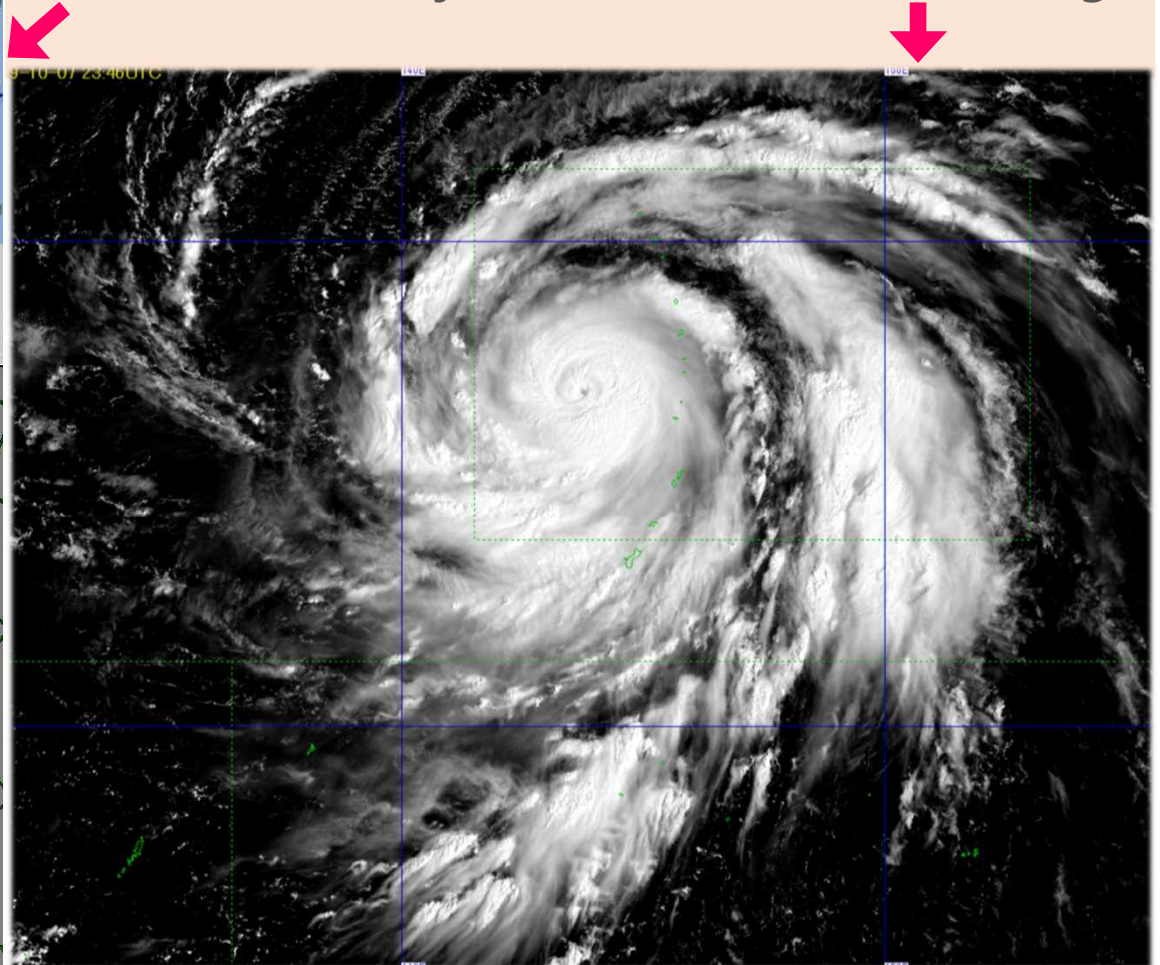
TY Hagibis (T1919)



TY Hagibis (T1919)

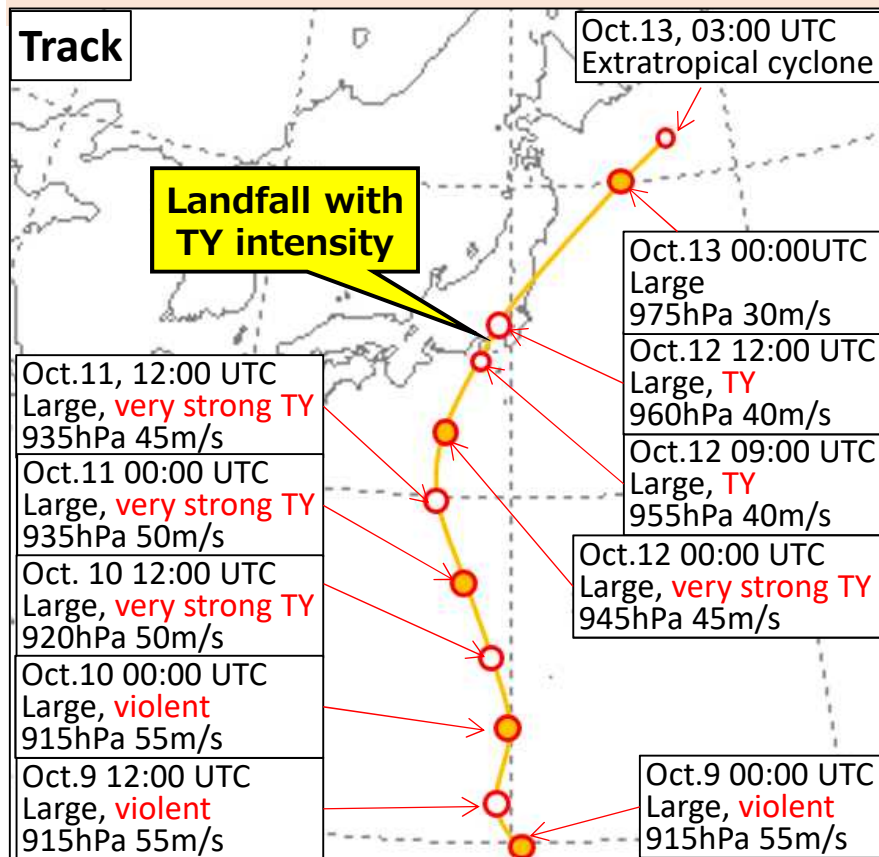
← *JMA official forecast*

JMA ensemble forecast *Himawari-8 image*



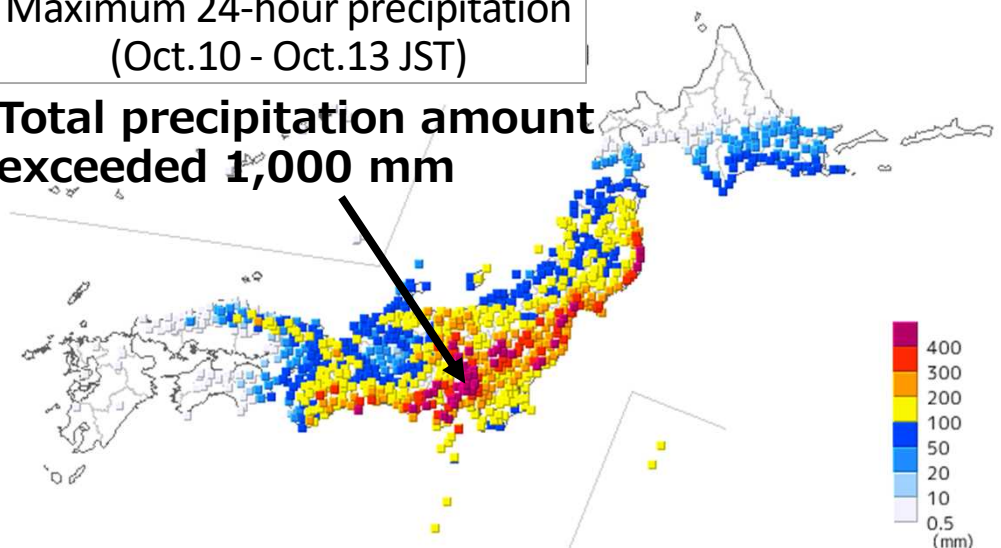
Impact of TY Hagibis (T1919)

- Record breaking **heavy rain** in large area.
- Very **strong winds** in wide area from east to northern Japan.
- Remarkable **high waves** along coasts in some prefectures.
- Flood** at various rivers in wide areas. **Landslides** and **inundation**, too.
- Planned suspension of transportation** was conducted.
- Many **people, houses and lifelines** were affected.



Maximum 24-hour precipitation
(Oct.10 - Oct.13 JST)

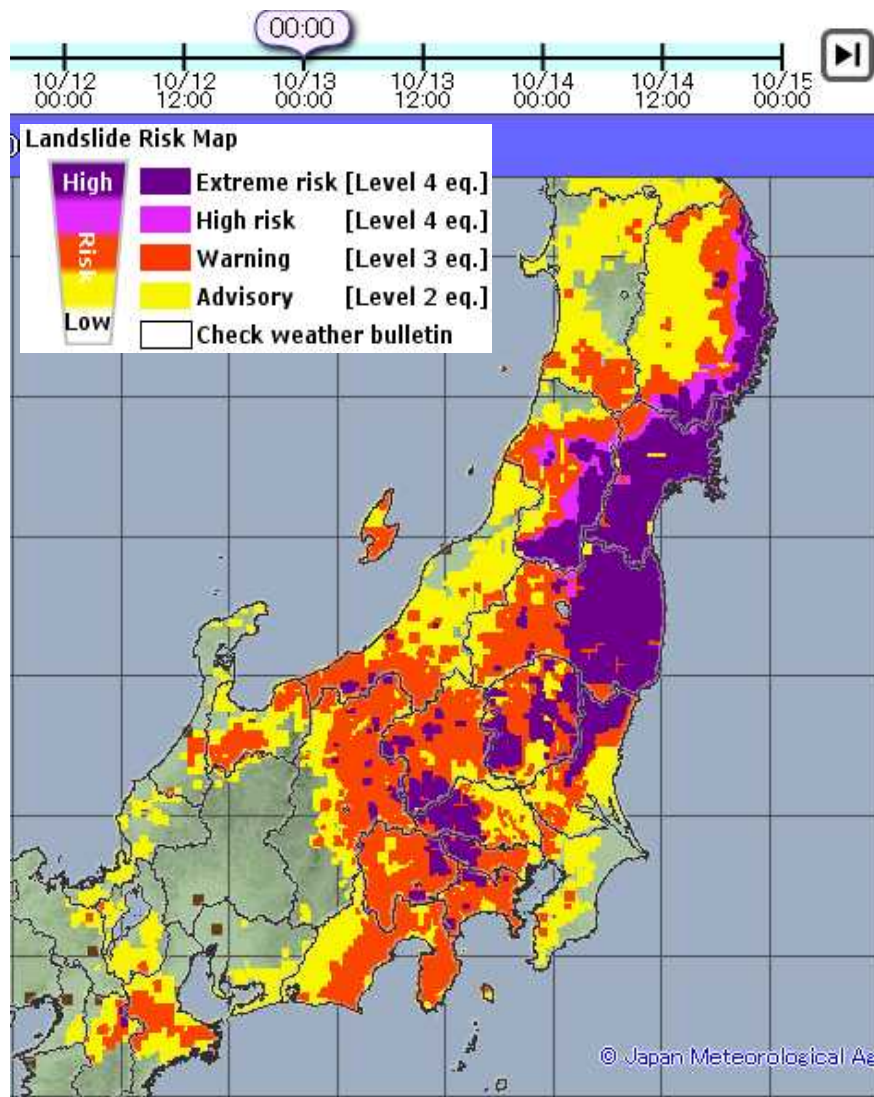
**Total precipitation amount
exceeded 1,000 mm**



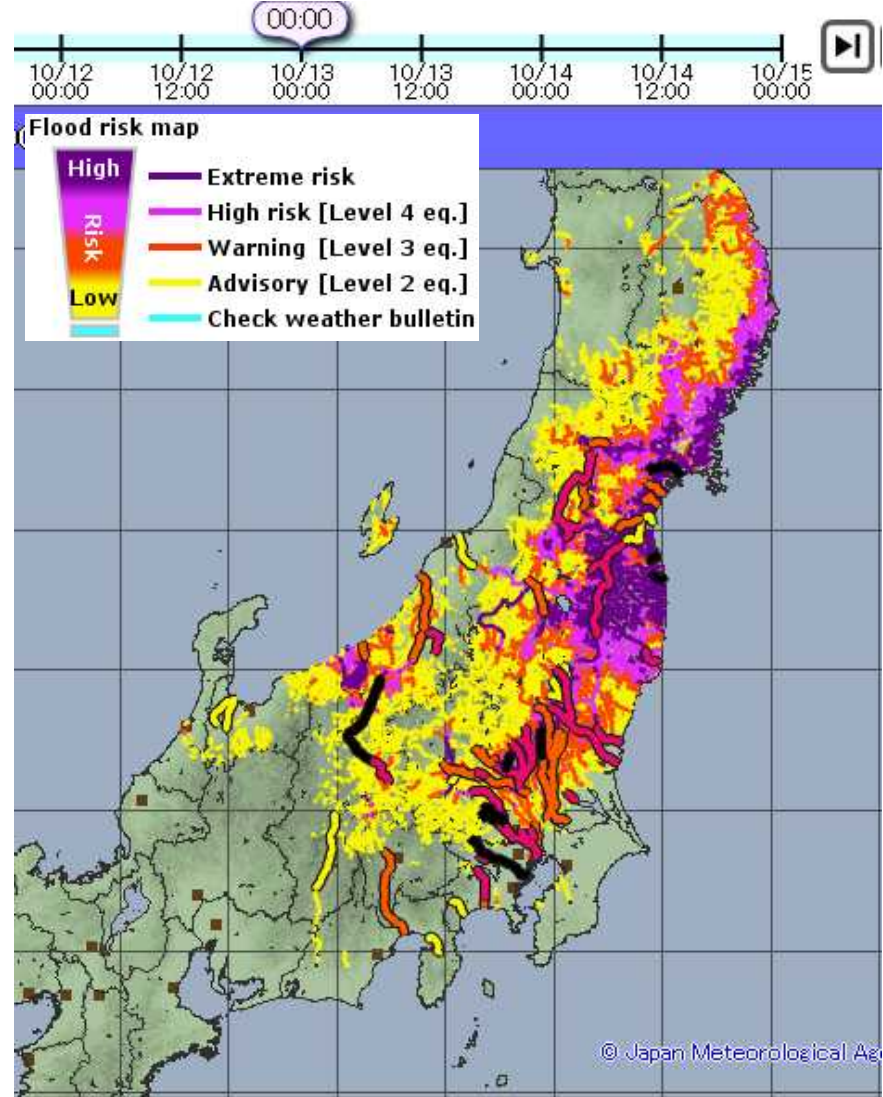
rank	prefecture	city/town/village	observation point	maximum during the period (mm)
1	Kanagawa	Ashigara-shimogun, Hakonemachi	Hakone	1001.5
2	Shizuoka	Izu City	Yugashima	760.0
3	Saitama	Chichibu City	Urayama	687.0
4	Tokyo	Nishi-tamagun, Hinohara Village	Ozawa	649.0
5	Shizuoka	Shizuoka City, Aoi Ward	Umegashima	631.5
6	Kanagawa	Sagamihara City, Midori Ward	Sagamiko	631.0
7	Miyagi	Nishi-tamagun, Okutamamachi	Ogouchi	610.5
8	Saitama	Igugun, Marumirimachi	Hippo	607.5
9	Tokyo	Hikigun, Tokigawamachi	Tokigawa	604.5
10	Saitama	Chichibu City	Mitsumine	593.5

Impact of TY Hagibis (T1919)

Real-time risk map for landslide
00 JST, Oct.13



Real-time risk map for flood
00 JST, Oct.13



Challenges to overcome

main topics of the High-level Dialogues

How to initiate people's action

with meteorological information reaching people's mind

- sense of risk
- understanding of meaning and usage of information
- sense of ownership

Necessary to strengthen social scientific approaches

The below two themes were discussed in the Dialogues

- Information design and delivery
- Public awareness and education campaign

What are necessary to NMSs?

Technical functions

- Improvement of accuracy in observation and forecasting
- Improvement of presenting uncertainty
- International cooperation to achieve the above improvements

Link to disaster response

*based on the recognition that NMS is a **trigger** of a series of disaster response*

- Information provision considering the related organizations' and people's responses and actions
- Mutual understanding for successful disaster responses
- Being flexible for user feedback, lessons learned from disasters and changing circumstances

Priority action areas

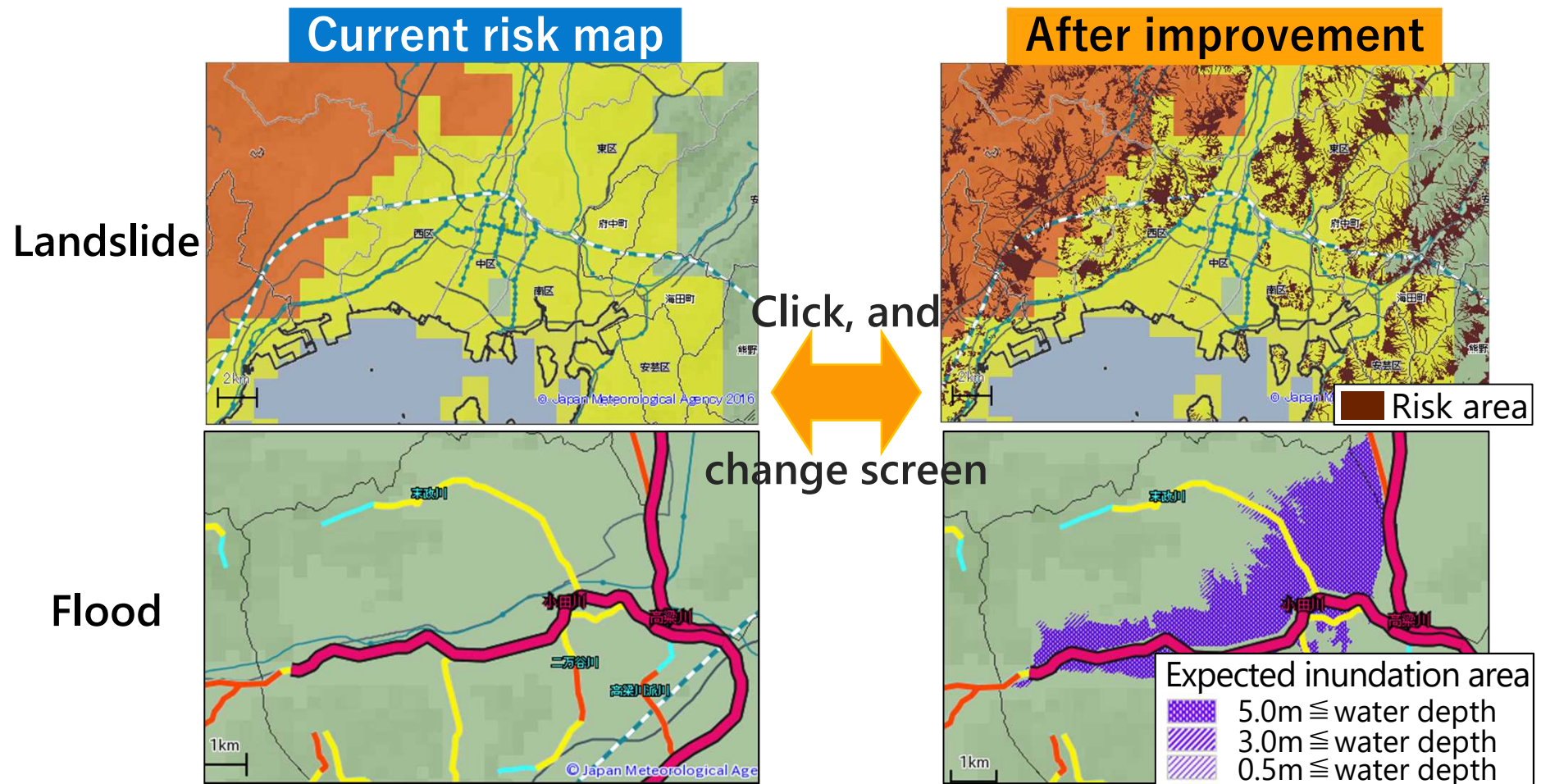
Information design and delivery

- risk-based information provision
- provision in appropriate amount and time
- delivery in steady and various methods
- contribution to news reports

Example

Efforts on information design and delivery in Japan

Visibility and accessibility improvement for easier use
→ overlay with vulnerability data (e.g. hazard map)

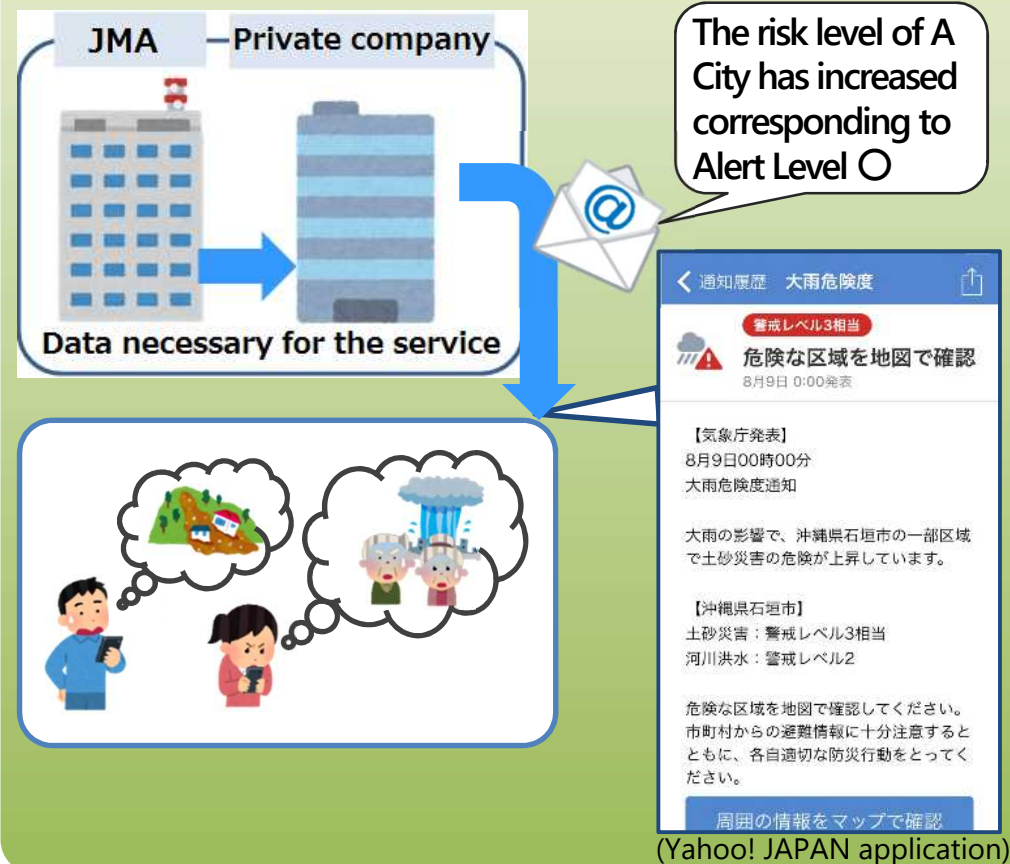


Example

Efforts on information design and delivery in Japan

Notification service

Notification service via e-mail or mobile application has started **in cooperation with private companies** so that people can be aware of the change in risk levels.



- Change in risk levels is “push” notification.
- People who receive the notification visit website and “pull” further information.
- This service is conducted in cooperation with private companies.

The service has started in July 2019.

Example

Efforts on information design and delivery in Japan

[National design] Alert levels

Set by the Cabinet Office to be easy to take evacuation actions. Information is issued with corresponding levels and keywords, in cooperation with related organizations.

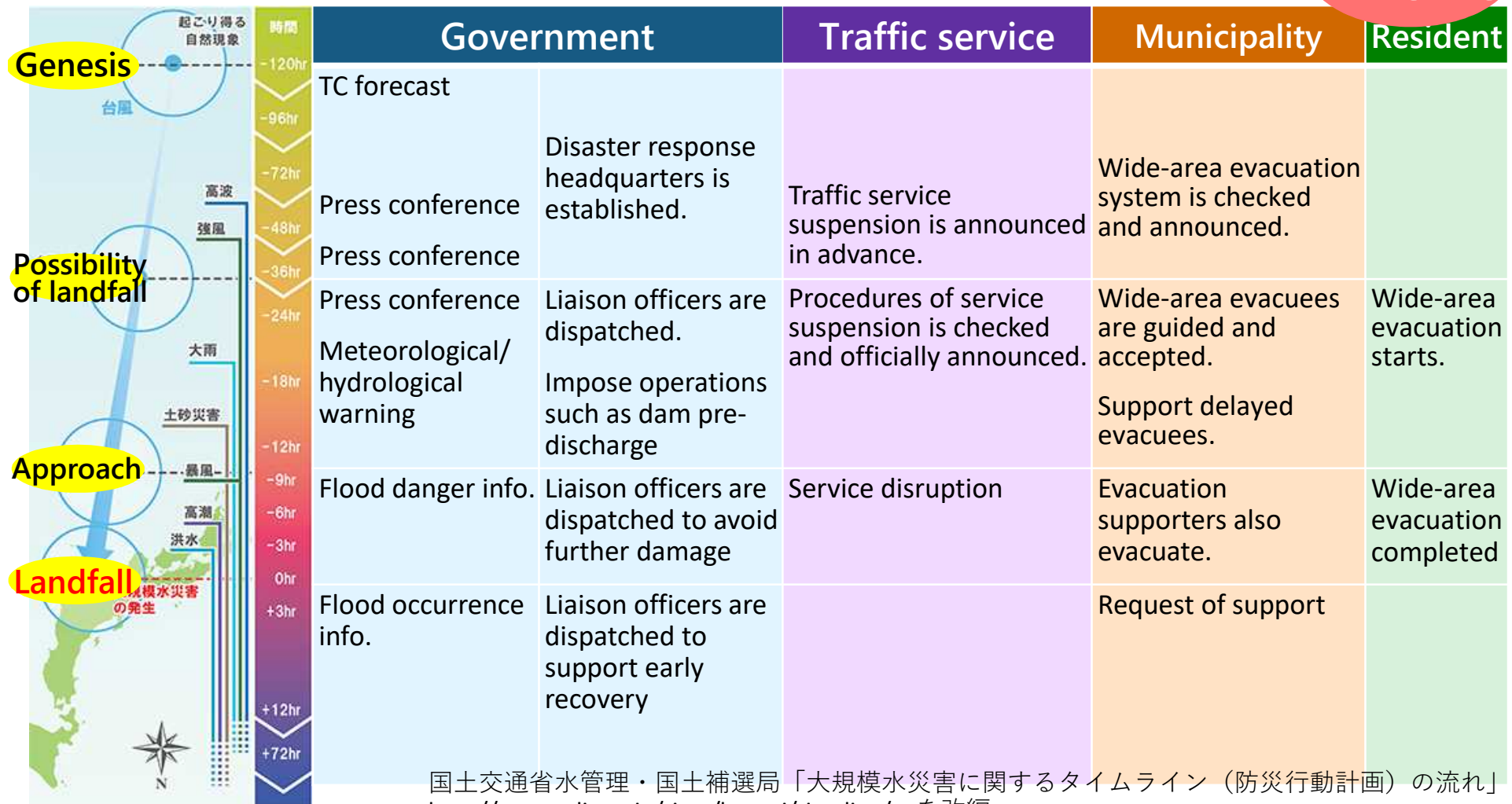
Alert Level	Action to be taken by residents	Information from municipalities	Information from JMA and others			Corresponding Level
5	Disaster already occurred. Take action to protect life.	Disaster occurrence info.	Heavy Rain Emergency Warning	Risk map	Flood occurrence info.	5
4	Evacuate immediately	Evacuation order (emergency) Evacuation advisory	Landslide alert info.	Extreme risk High risk	Flood danger info.	4
3	- People in areas at risk start evacuation - Elderly people evacuate	- Evacuation preparation - Start of evacuation for elderly people	Heavy rain/ Flood warning	Warning	Flood alerting info.	3
2	Check evacuation action with a hazard map etc.		Heavy rain/ Flood advisory	Advisory	Flood advisory info.	2
1	Prepare for disaster					

Example

Efforts on information design and delivery in Japan

[National design] Timeline – when, who and what –

My
Timeline



Priority action areas

Public awareness and education campaign

- Meteorologist for Society -

- mutual understanding
between NMS and disaster management authorities
- diversified activities for a wide range of target users to
raise public awareness

Example

Public awareness and education campaign

- Workshop on meteorological disaster preparedness



- Meteorological Disaster Mitigation Advisors



Training held in JMA



Ryugasaki City, Ibaraki Pref.

Public awareness and education campaign

- “Map contest for elementary school pupils’ BOSAI Expedition”**



Supported by
the Cabinet Office, MEXT and JMA

Roles of regional centers

Regional centers will

- support each NMS working on the priority action areas, and
- take the lead in promoting
 - sharing of data and analysis results within each region on real-time basis
 - providing technical support and technology transfer
 - sharing reviews of disasters and responses from social science perspectives within and among regions,
 - training to develop capacity in providing weather operations with full awareness of disaster management.

High-level Dialogues on Tropical Cyclones

A 10-year Vision to Protect Life and Property



10-year Vision to Protect Life and Property

We, National Meteorological Services, **recognizing our role as a trigger for disaster response in our own country or territory**, will **co-operate** with other areas in physical science, including hydrology, as well as social science, and emergency response and civil protection sectors, will **provide information that support decision making and initiate disaster response** of relevant organizations and individuals for protecting life and property from disasters caused by tropical cyclones and minimizing loss and damage, and **promote the use of such information**.
By doing so, we will **realize a tropical cyclone resilient society**.

Thank you

