

# Public Warning in case of a Flood

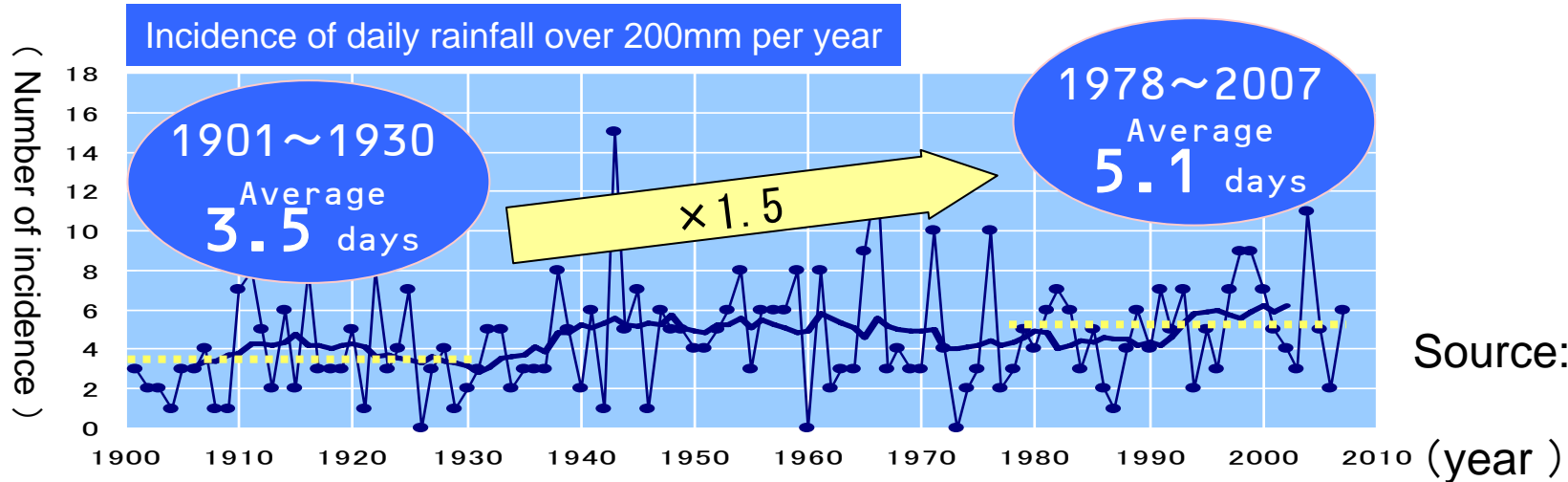
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**Director for Flood Fighting, Disaster Prevention  
and Relief Division, River Bureau**

**Ministry of Land, Infrastructure, Transport and Tourism**

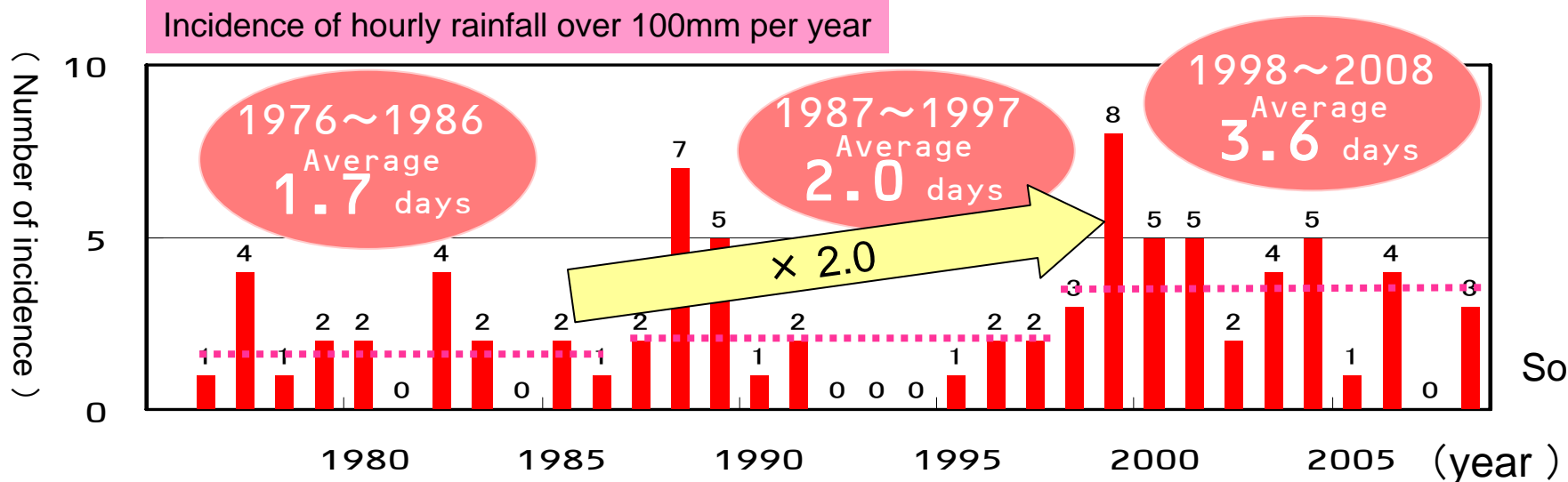
**Koji Nukina**

## Daily rainfall over 200 mm is increasing



Source: JMA

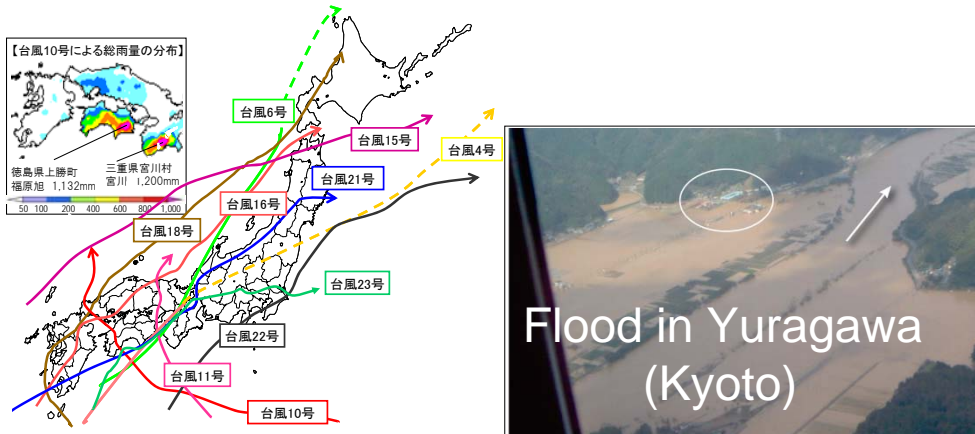
## Hourly rainfall over 100 mm is significantly increasing



Source: JMA

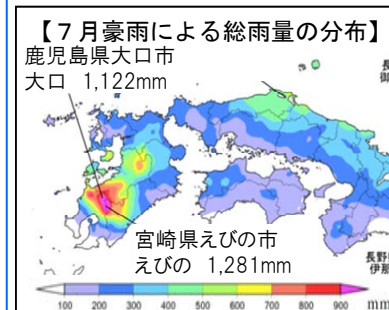
## 2004

- 10 typhoons made landfall (three times of average).
- Total amount of rainfall over 1,000mm in Tokushima .



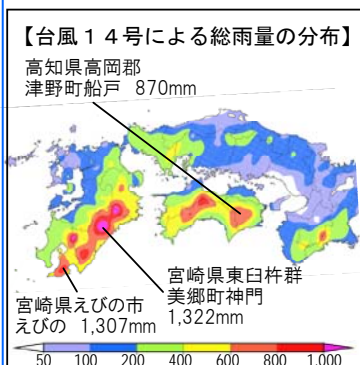
## 2006

- Total amount of rainfall over 1,200mm was recorded in the Kyushu.



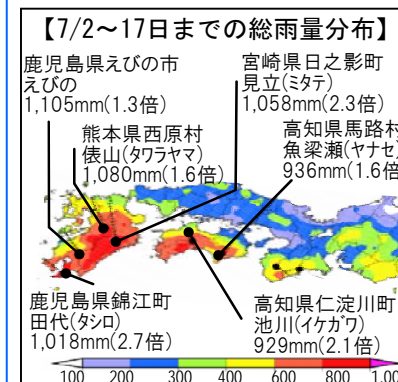
## 2005

- Total amount of rainfall over 1,000mm was recorded in southern Kyushu.

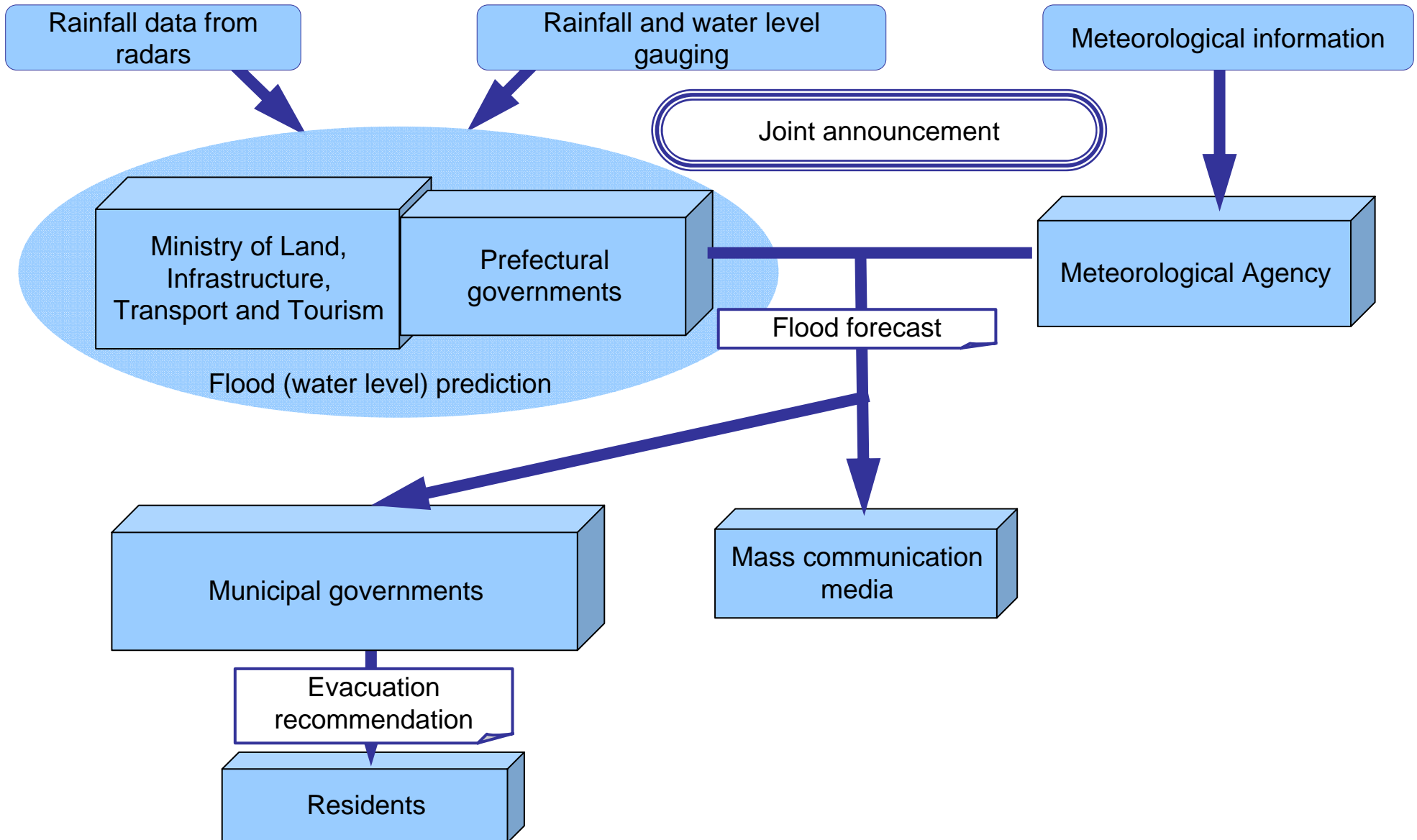


## 2007

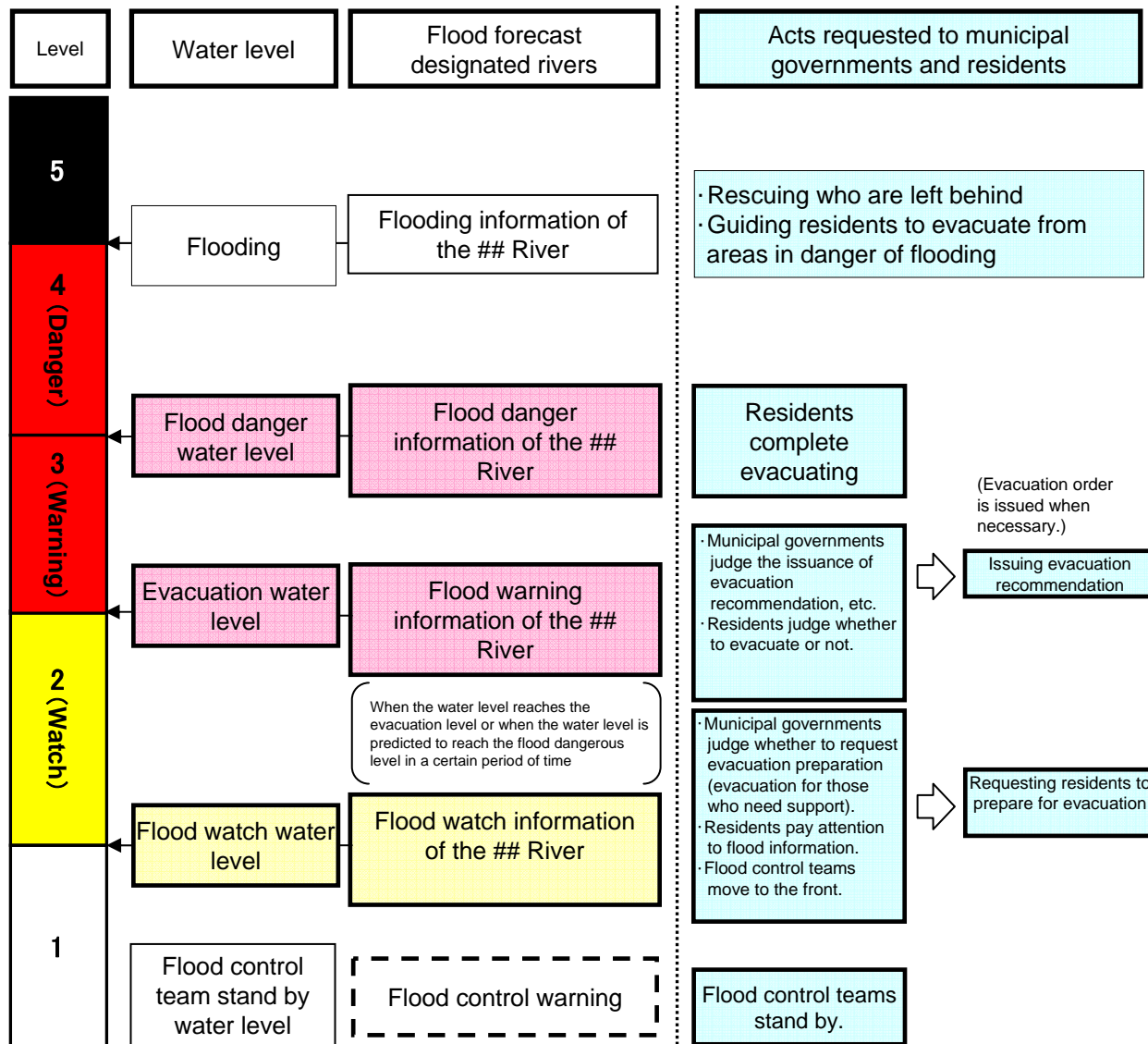
- Total amount of rainfall over 1,000mm by Typhoon No.14 was recorded.

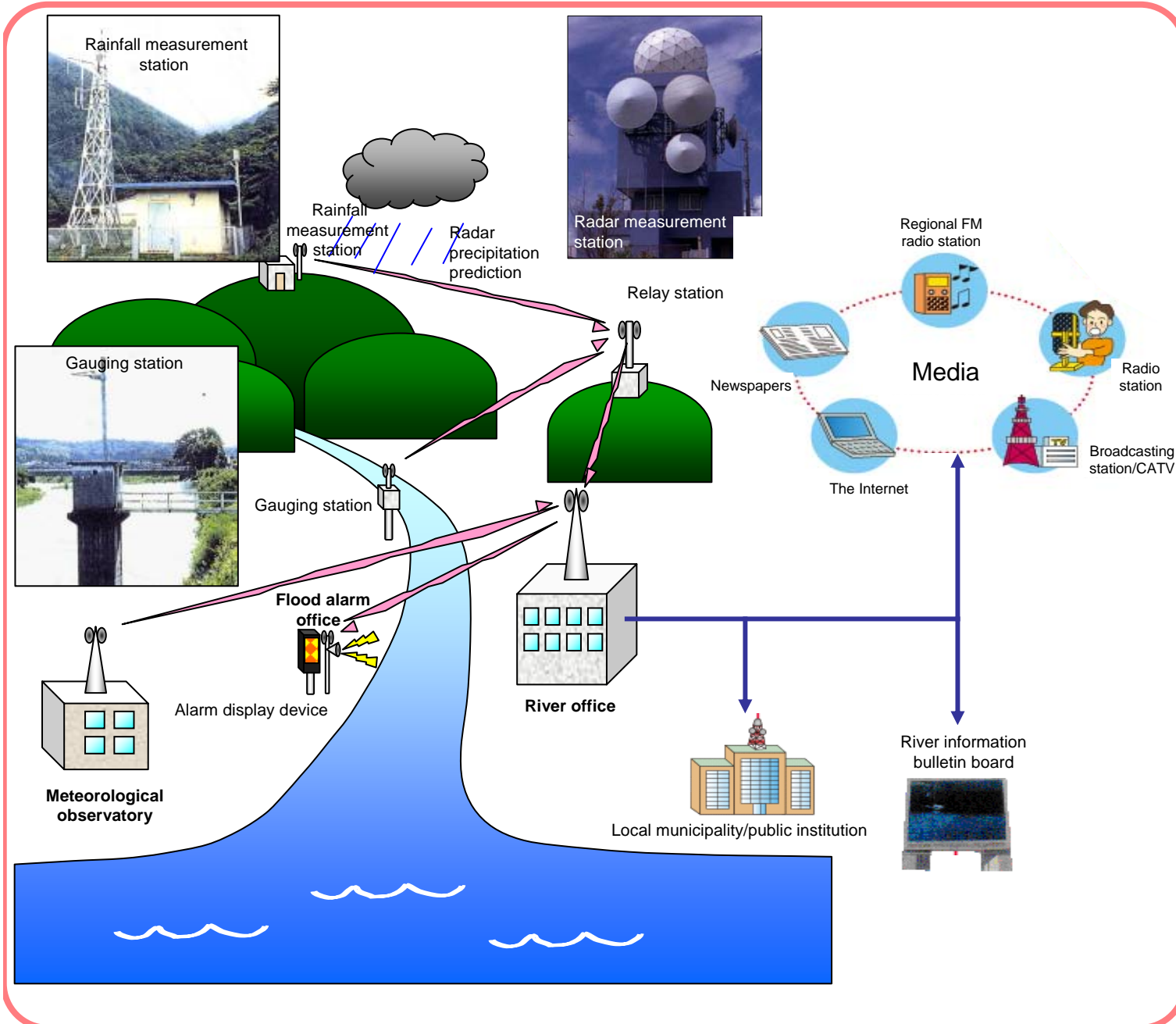


- Flood forecasts are announced jointly by the river administrator (national or prefectural government) and the Meteorological Agency. Municipal governments issue evacuation recommendations based on the forecasts.



- Water levels and standardized color expressions were introduced in 2007. Relationships between water level and flood-control and evacuation activities were decided and are used to issue warnings, etc.

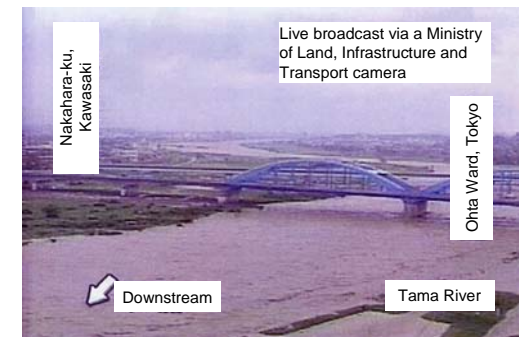




Information provision via cellular phone or personal computer



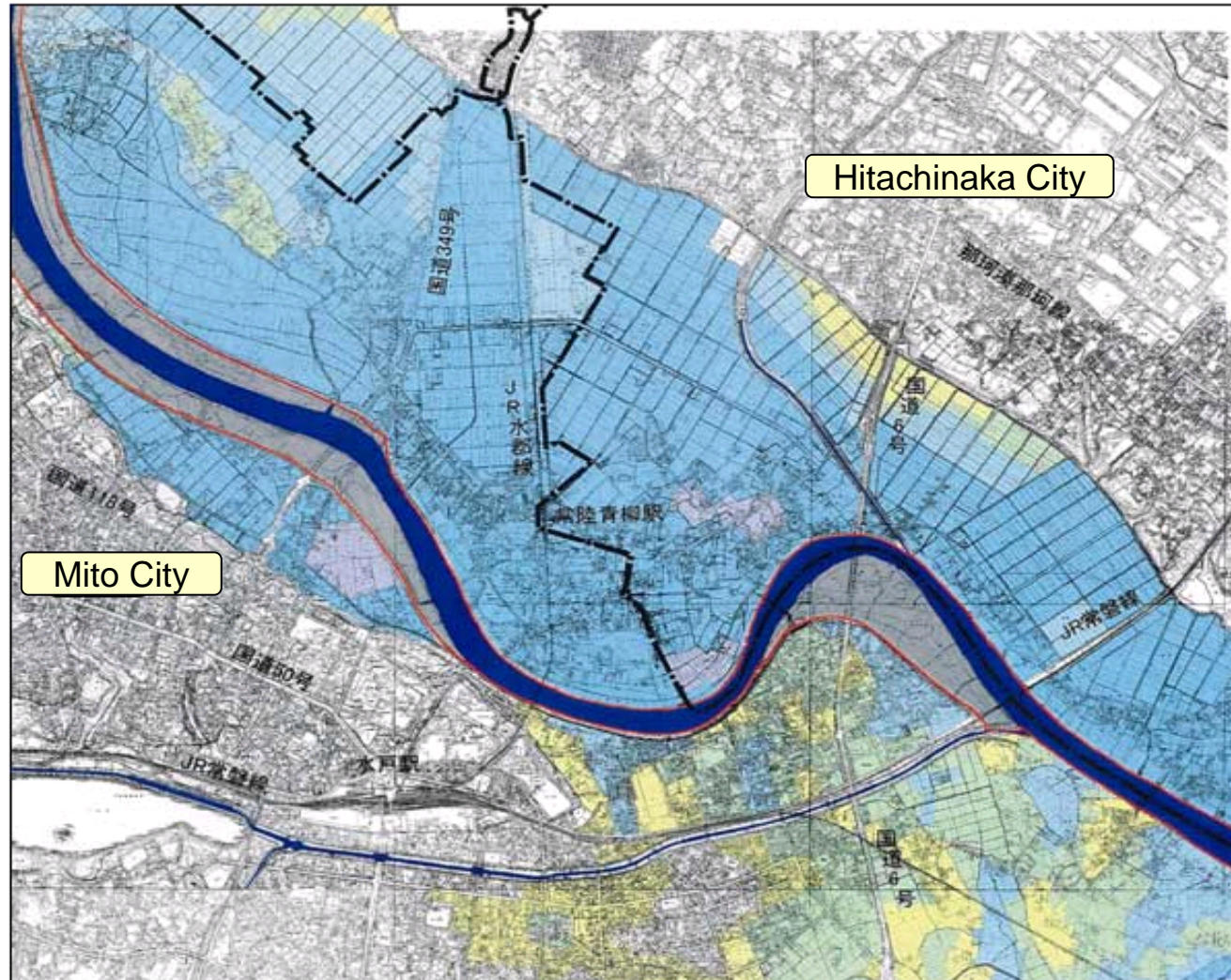
Delivery of an image to a TV screen



Provision of information in front of a station




Map of anticipated flood area for Naka River



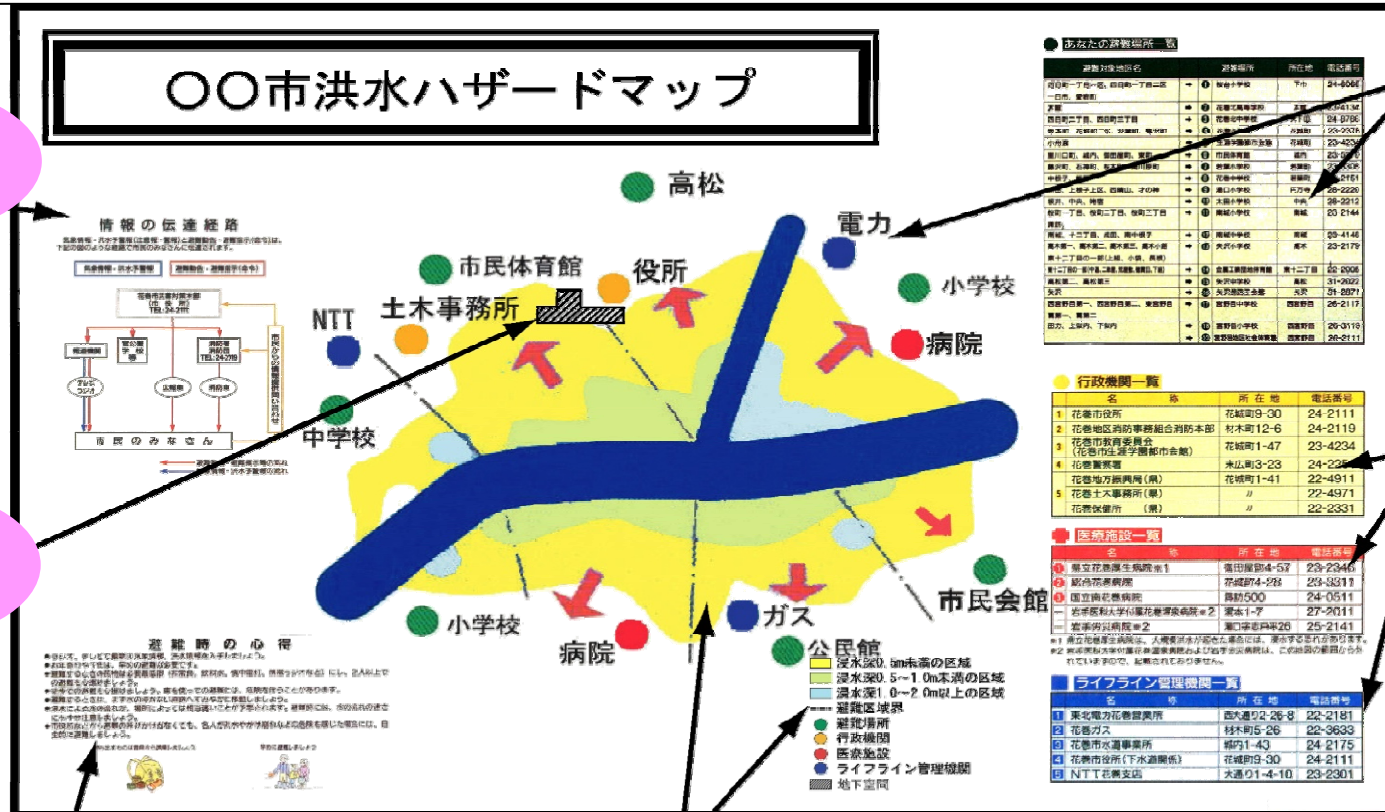
**Legend**

Grading of area by expected depth of flood water

- Less than 0.5 m
- 0.5–1.0 m
- 1.0–2.0 m
- 2.0–5.0 m
- 5.0 m or more

 River targeted for designation of anticipated flood area

Aimed at showing community residents the anticipated flood area and refuges in an easy-to-understand manner with a view to enhancing their disaster awareness and ensuring their smooth and swift evacuation in the event of a disaster



Communication routes of information

Distribution of underground space

Locations and names of evacuation places

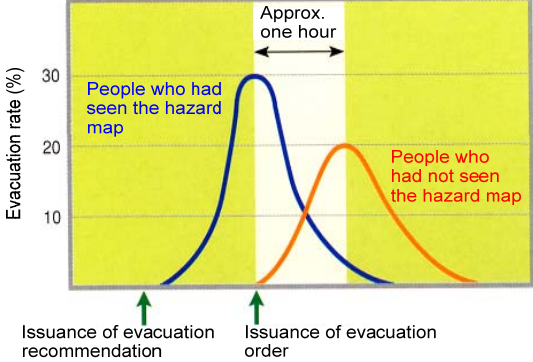
Contacts  
 • Administrative bodies  
 • Medical institutions  
 • Lifeline management organizations

Useful Hints for Evacuation & Necessities for Evacuation

Detailing of anticipated flood areas and their immersion depths

### Effect of flood hazard map

During a torrential rain disaster that occurred in and around Koriyama City in late August, 1998, the effectiveness of a flood hazard map in bringing forward the evacuation start time was demonstrated.



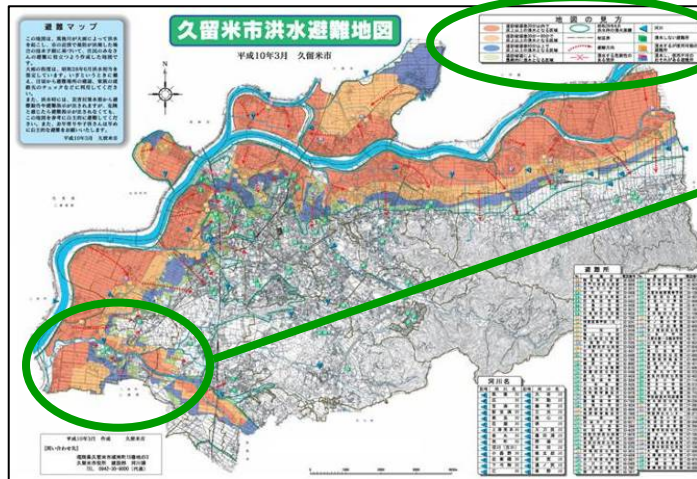


# Flood Hazard Map — Example

Legend			
	Area expected to be flooded to above floor level within 30 minutes of embankment failure		Area inundated during actual flood event in June 1953
	Area expected to be flooded to above floor level in 30-60 minutes of embankment failure		School district boundary
	Area expected to be flooded to above floor level after more than 60 minutes of embankment failure		Direction of evacuation
	Area expected to be flooded eventually		Site at risk of flooding
			River
			Refuge not subject to flooding
			Refuge subject to flooding but expected to be usable
			Refuge subject to flooding and possibly rendered unusable

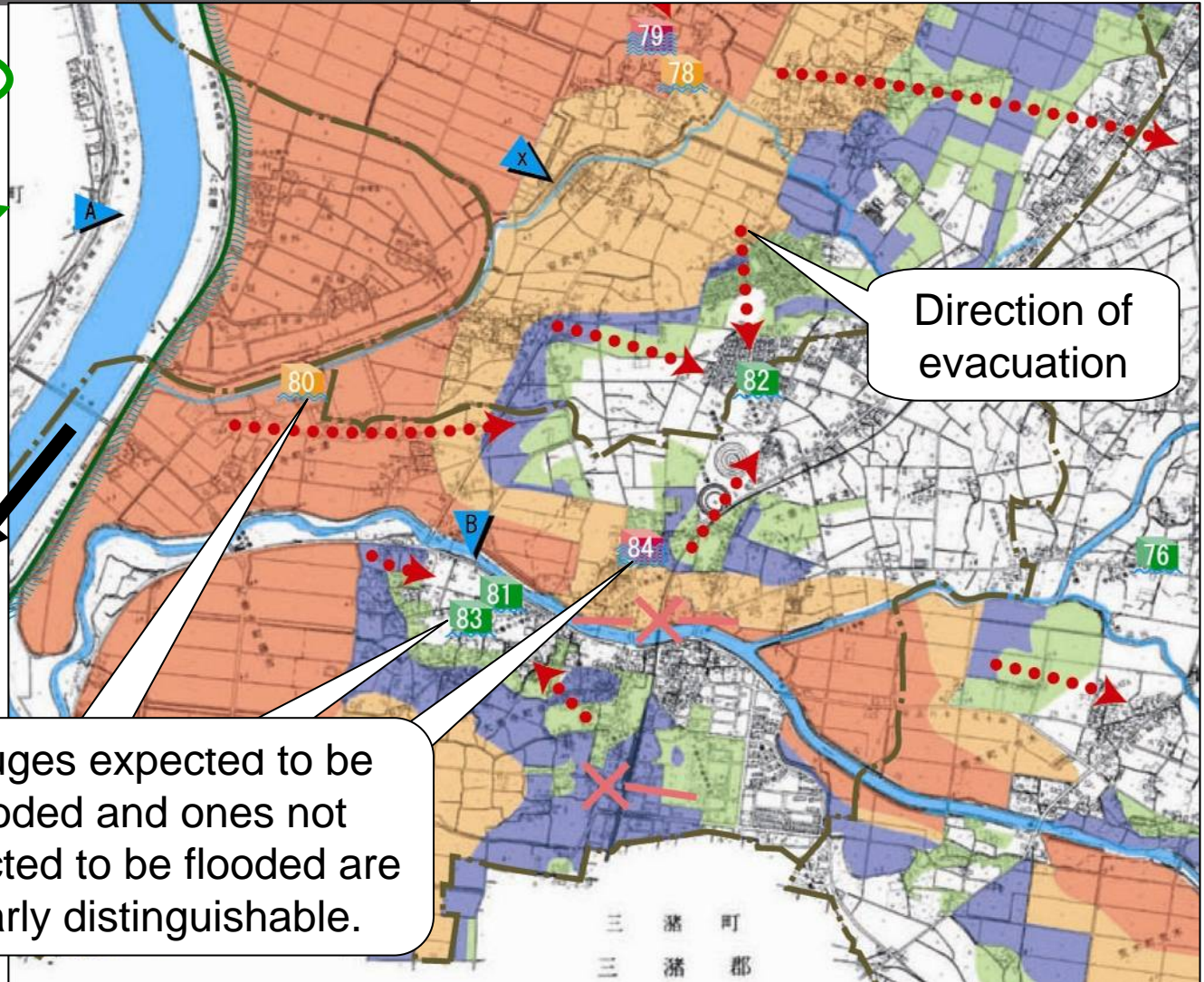
Multistory facility located in area subject to flooding but serviceable as refuge except for 1st (ground) floor

Facility unsuitable for use as refuge during flood (intended for earthquake)



Chikugo River

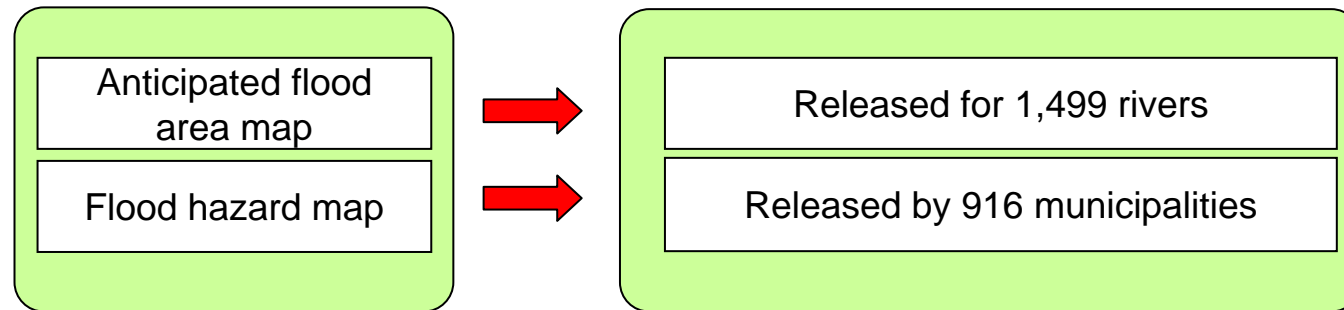
Kurume City's Example



Direction of evacuation

Refuges expected to be flooded and ones not expected to be flooded are clearly distinguishable.

Current situation  
(end of March 2009)



## Future targets

- Awareness-raising drills aimed at ensuring the effective utilization of the flood hazard map
- Clarification of criteria for the issuance of an evacuation recommendation (preparation of a manual)
- Desirable manner of evacuation (swift response to floods involving small/medium-size rivers, etc.)

Incorporation into flood hazard map

# Setting-up of Flood Signs across a Town (Turning a whole town into a real-scale hazard map)

- We produced and nation-widely standardized a set of flood-related signs (3 kinds of signs: “Flood”; “Flood Shelter”; “Embankment”), and put up flood indicators on facilities in a town such as electricity poles to show a prospective water depth in a flood situation

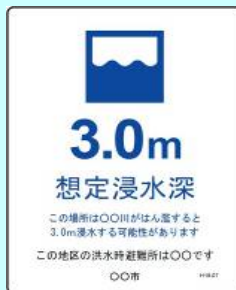
(These signs are registered to the Japanese Industrial Standard in Jan, 2007)

➡ Raising everyday consciousness for disaster prevention, and supporting smooth evacuation at the time of emergency

## Flood signs and their set-up situation



Embankment



Prospective water  
depth in a flood  
condition



Flood Shelter



- Digital terrestrial broadcasting started in November 2003. Analogue broadcasting will end by July 24, 2011.
- The ISDB-T method used in Japan can broadcast to mobile phones and terminals by effective use of bands (“1 seg”).
- Both images and data can be broadcasted. The data broadcasting can transmit information for each zip code, and thus can communicate the water level of the district.
- A proving test was conducted in March 2008 along the Yamato River and
  - communicated the water level of the river, static CCTV images, rainfall, evacuation recommendation and order, flood forecast, flood hazard maps, and flood simulation images.
- TV is a familiar medium and should be effective in transmitting river information. Cooperation with TV stations will be enhanced and related systems will be constructed by 2011 when the shift will be completed.

**Broadcasted image**

**実証実験大和川河川情報**

国土交通省の実証実験に協力して、読売テレビでは大和川河川情報を2008年3月31日まで提供しています。一部、通信コンテンツを含んでおり、通信コンテンツにアクセスする場合、ご自宅のインターネット環境によっては通信費がかかる事があります。

◎ コンテンツの説明  
◎ 雨量情報を見る

◎ 水位情報へ

大和川

遠里小野 布忍橋(西除川) 道明寺(石川)

はん濫注意水位以上 通常水位

カーソル切り替えてご覧になりたい観測地を選んで[決定]ボタンを押してください。 黄 天気ニュースへ戻る

**Display of broadcasted data**

【大和川水位情報】

▼遠里小野 [水位情報]

実況 水位グラフ

2月25日16:00 時点 更新間隔: 約10分

現在の水位: 0.42m

はん濫危険水位 5.90m

水位 河川断面図

※数値は速報値であり、検定済みデータではありません。

データ提供: 国土交通省

更新

▼通信が発生し、パケット代がかかる場合があります。

用語解説へ  
地点選択へ

ページトップへ

**Data broadcasting to a mobile terminal (“1 seg”)**


- Example of providing river information through digital broadcasting (The following images are for giving an impression. In actual broadcasting, a part of the broadcasted image remains on the screen.)

**川の防災情報 河川カメラ画像**

あなたの地区 **板橋区〇〇町**

**はん濫警戒情報発表中**

現在の川の様子 **荒川** 10月2日10:00 更新



荒川では避難判断水位に到達し、水位はさらに上昇する見込みです。市町村からの避難情報に注意してください。

**赤** 現在の川の水位

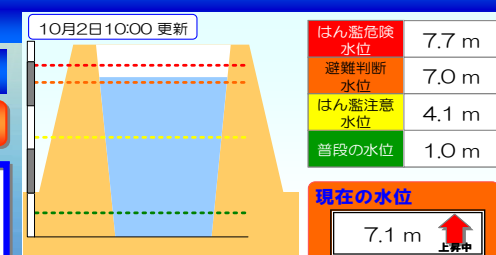
Image from a camera

**川の防災情報 現在の川の水位**

あなたの地区 **板橋区〇〇町**

**はん濫警戒情報発表中**

荒川では避難判断水位に到達し、水位はさらに上昇する見込みです。市町村からの避難情報に注意してください。



はん濫危険水位	7.7 m
避難判断水位	7.0 m
はん濫注意水位	4.1 m
普段の水位	1.0 m

**現在の水位**  
7.1 m ↑ 上昇中

【はん濫注意水位】  
普段よりかなり増水しています。避難の準備をしましょう。  
【避難判断水位】  
大きく増水しています。避難を開始しましょう。  
【はん濫危険水位】  
川がはん濫するおそれがあります。これまでは避難を終えましょう。

**赤** 洪水ハザードマップ

Water level graph

**川の防災情報 洪水ハザードマップ**

あなたの地区 **板橋区〇〇町**

**はん濫警戒情報発表中**

近くの避難所 **〇〇小学校**  
区分：避難所  
場所：板橋区〇〇町x-x-x  
電話：xxx-xxx-xxxx

**凡例**  
● 避難所  
水の深さ 0.2 0.5 1.0 2.0 [m]



提供元：板橋区 xxx-xxx-xxxx 1km

**赤** 河川カメラ画像

Hazard map


**川の防災情報 はん濫情報**

あなたの地区 **板橋区〇〇町**

**はん濫が発生しています**

近くの避難所 **〇〇小学校**  
区分：避難所  
場所：板橋区〇〇町3-11-1  
電話：xxx-xxx-xxxx

○月○日10:20に△△市□□付近で、荒川がはん濫しました。浸水の予想される地域では、嚴重な警戒をお願いします。



提供元：板橋区 xxx-xxx-xxxx 1km

**赤** 洪水ハザードマップ

Flood forecast

14:40

Water level: -0.33m



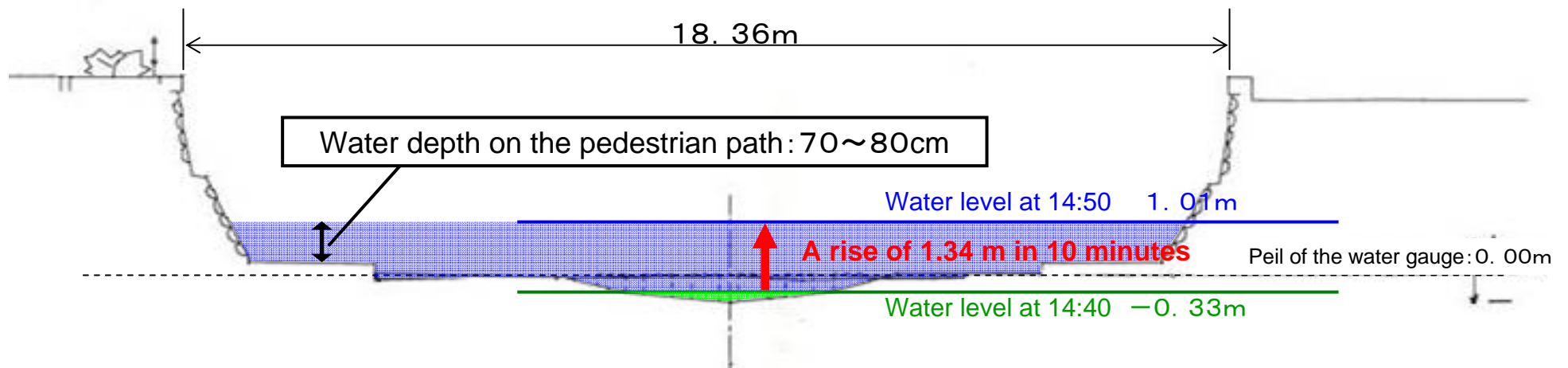
14:50

Water level: 1.01m



※Images from the monitoring camera of Kobe City

Profile at Kabutobashi Station (from the upstream to the downstream)



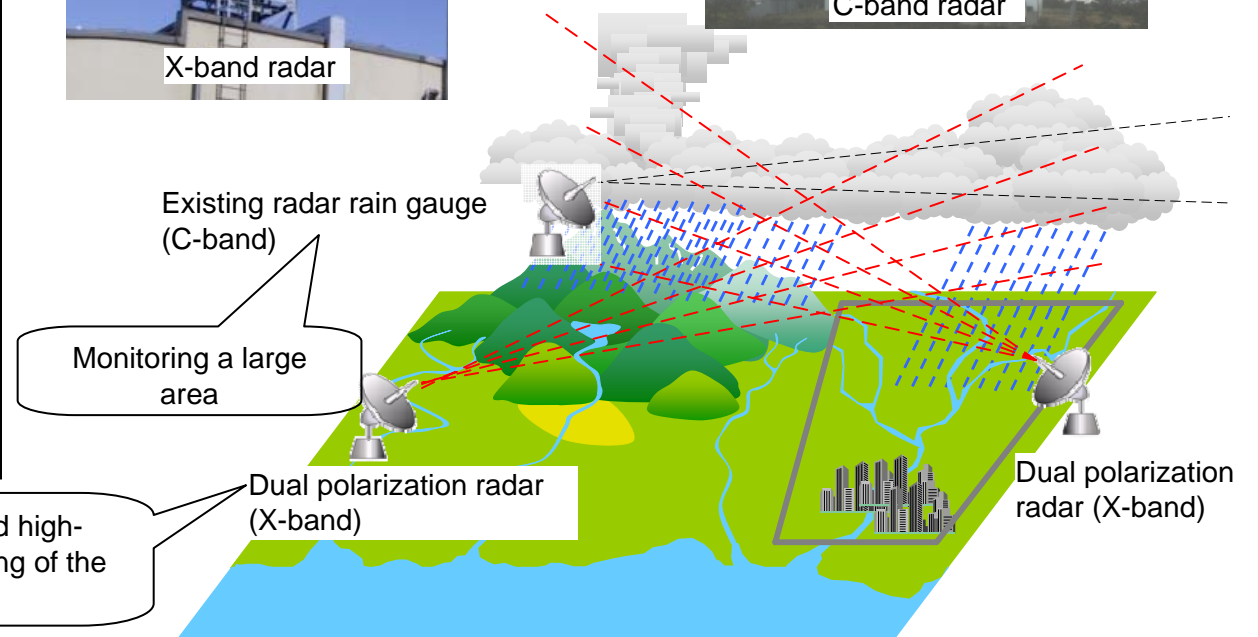
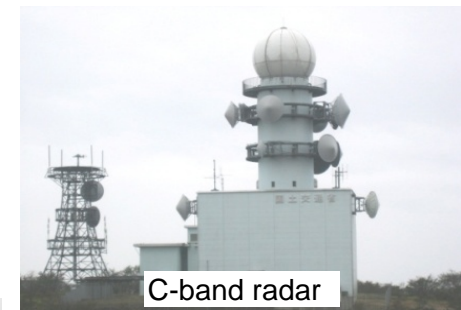
- Meteorological radars (X-band MP radar) of a high resolution will be established in the three metropolitan areas, etc. where local storms can cause serious flood damages and will be used combined with the network of 26 C-band radars to enhance monitoring of local storms.
- A flood prediction method will be quickly developed jointly with related organizations to also predict development and moves of local storms.

## Advanced use of X-band radars

- High-frequency and high-resolution monitoring of rainfall distribution
- Monitoring the development of clouds and winds in the skies by volume scanning
- Combining with data from C-band radars on rainfall distribution and numerical forecast in large areas

Predicting local storms in 10 to 60 minutes  
(predicting development of cumulonimbus clouds that bring storms)

High-frequency and high-resolution monitoring of the target area



Rainfall monitoring to cover the gaps of existing radars in terms of space and time