
In the field of disaster prevention administration Leveraging DioVISTA

 株式会社 日立パワーソリューションズ

schedule

time	course	substance
10:00 -	1	Utilization of DioVISTA in the field of construction consulting
11:00 -	2	Utilization of Dam Dashboard in the Dam Sector
13:00 -	3	Utilization of DioVISTA in the field of non-life insurance
14:00 -	4	<p>Utilization of DioVISTA in the field of disaster prevention administration</p> <p>We will introduce real-time prediction technology for river water levels and inundation areas using rainfall forecasting, and services that can be used to share a sense of the danger of flood damage and as a guideline for initial response.</p>
15:00 -	5	Proposal of BCP support for flood countermeasures for corporate disaster prevention
16:00 -	6	DioVISTA Flood Simulator– technology & use case

1. Purpose of this seminar

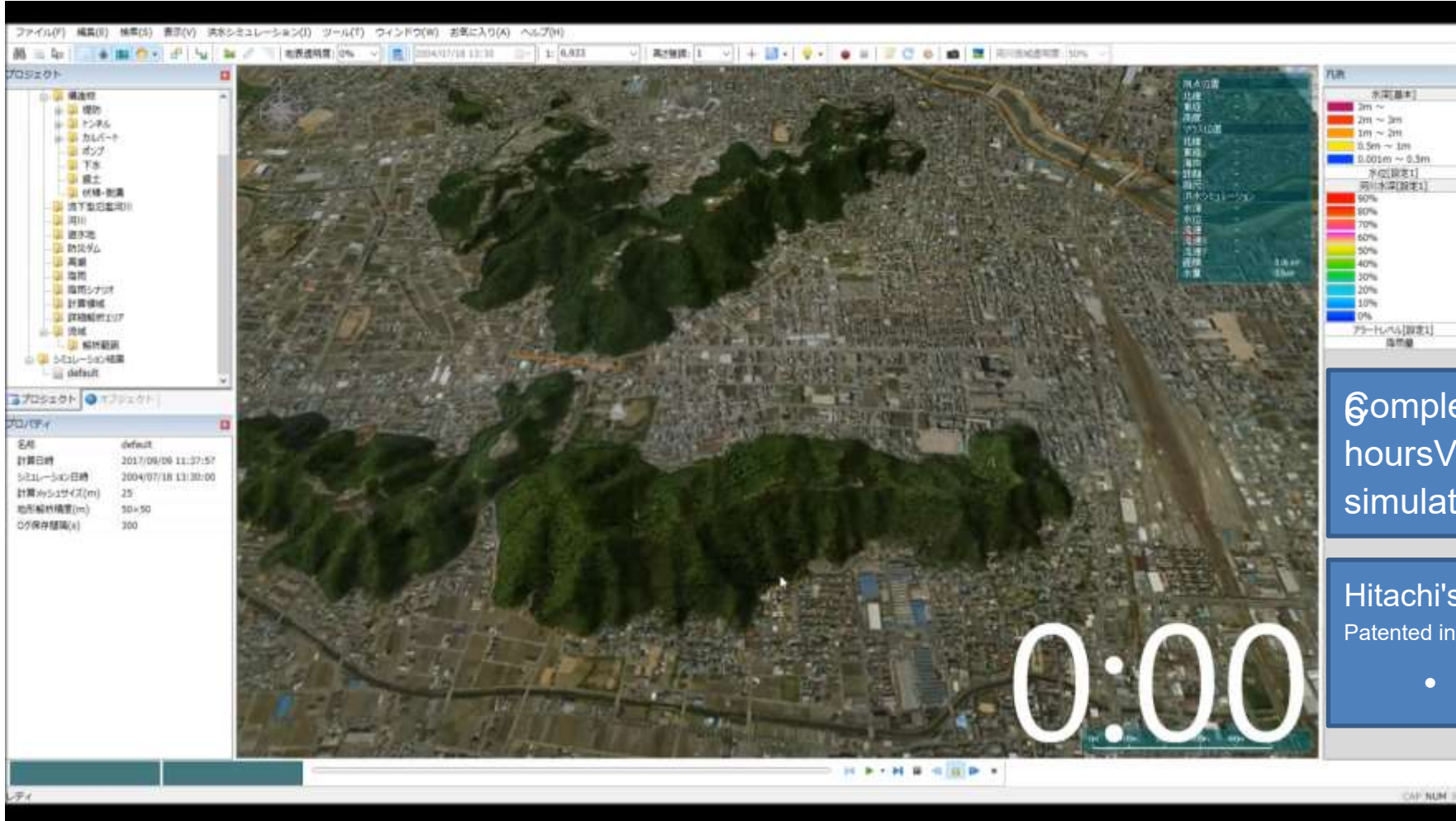
2. Flood Simulation

3. Purpose of the seminar to introduce the flood prediction information

- Major changes in society
 - With Corona, a changing way of working
 - Telework, computerization, cloud computing
 - Standardization, depersonalization, remote OJT
 - Conversion to basin flood control
 - Intensification of climate change and flood damage
 - is necessary for government agencies, private companies, and citizens to consider disaster prevention and mitigation in their awareness, actions, and mechanisms.

1. Purpose of this seminar
2. Flood Simulation
3. Introduction of flood prediction information provision

systemWhat is flood simulation?



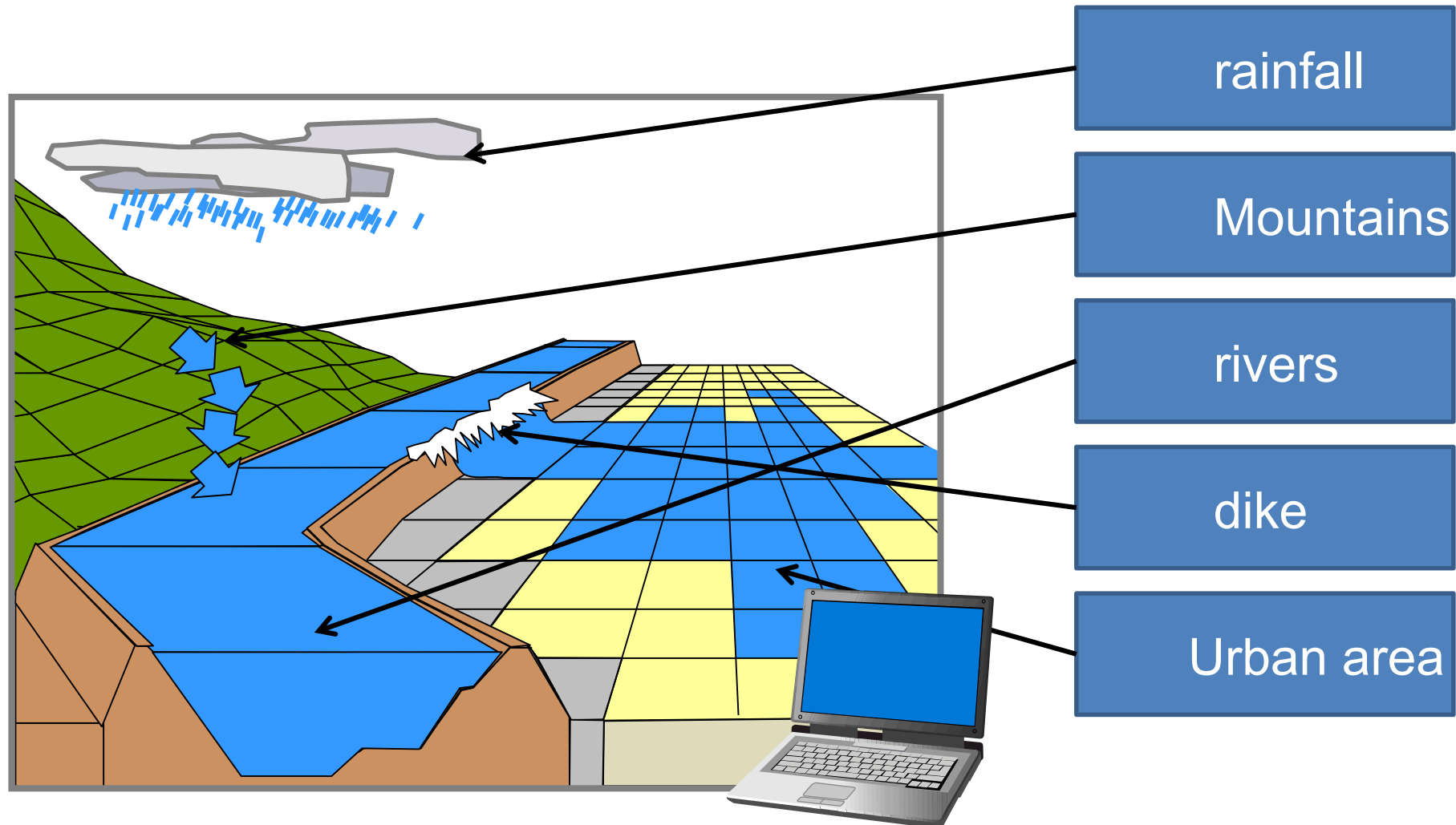
Calculate with
Flood Simulator
DioVISTA/Flood

Completed flood analysis in 4 seconds for
hoursVisualize intermediate results during
simulation executionMesh size 25 m

Hitachi's proprietary high-speed calculation algorithm
Patented in the U.S. and China Japan applying Dynamic DDM

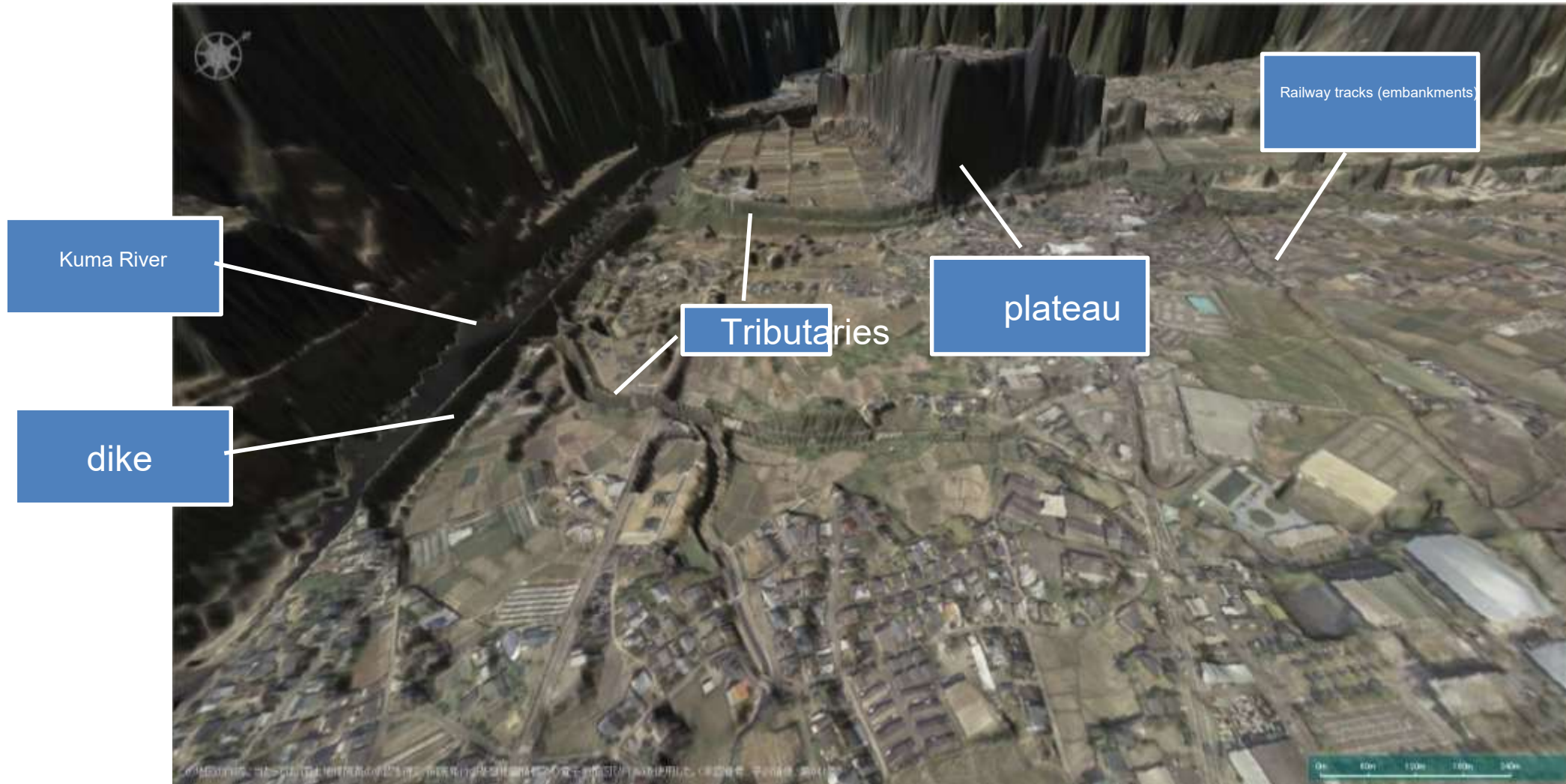
How the simulation works

Computer reproduction of water flow in mountains, rivers, and urban areas



Utilize high-precision terrain data

The accuracy of terrain data determines the accuracy of the simulation



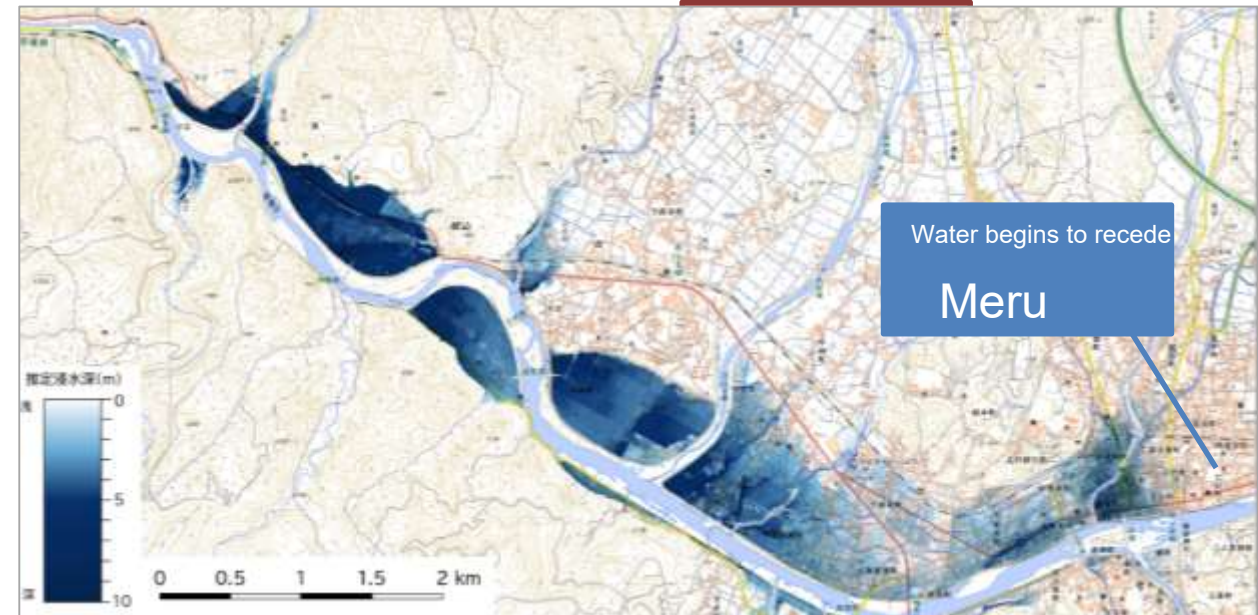
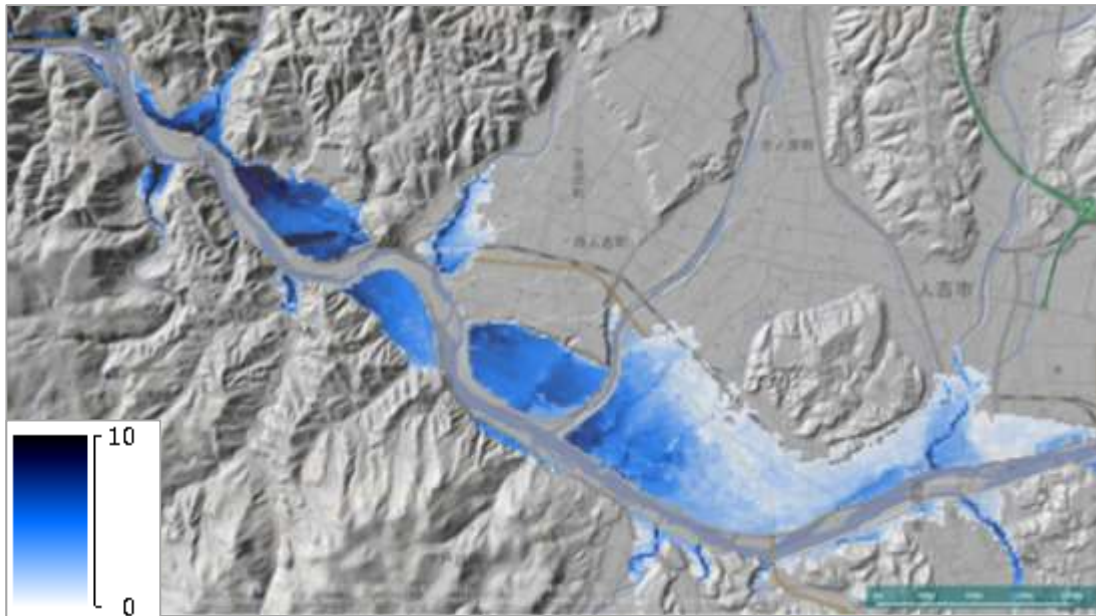
Fine terrain such as embankments can be seen⁷

Simulation accuracy

When set up properly, simulations are highly accurate

A) Simulation results (maximum flood range)

B) Flood estimation map of the Geospatial Information Authority of Japan (prepared from information until 3 p.m. on July 4)



The flood range
matches well

In creating this map, we use basic map information and electronic topographic maps (tiles) issued by the Geospatial Information Authority of Japan with the approval of the Director of Japan (Approval No.29 情使, No. 641).

(a) Simulation results using flood simulation software DioVISTA/Flood

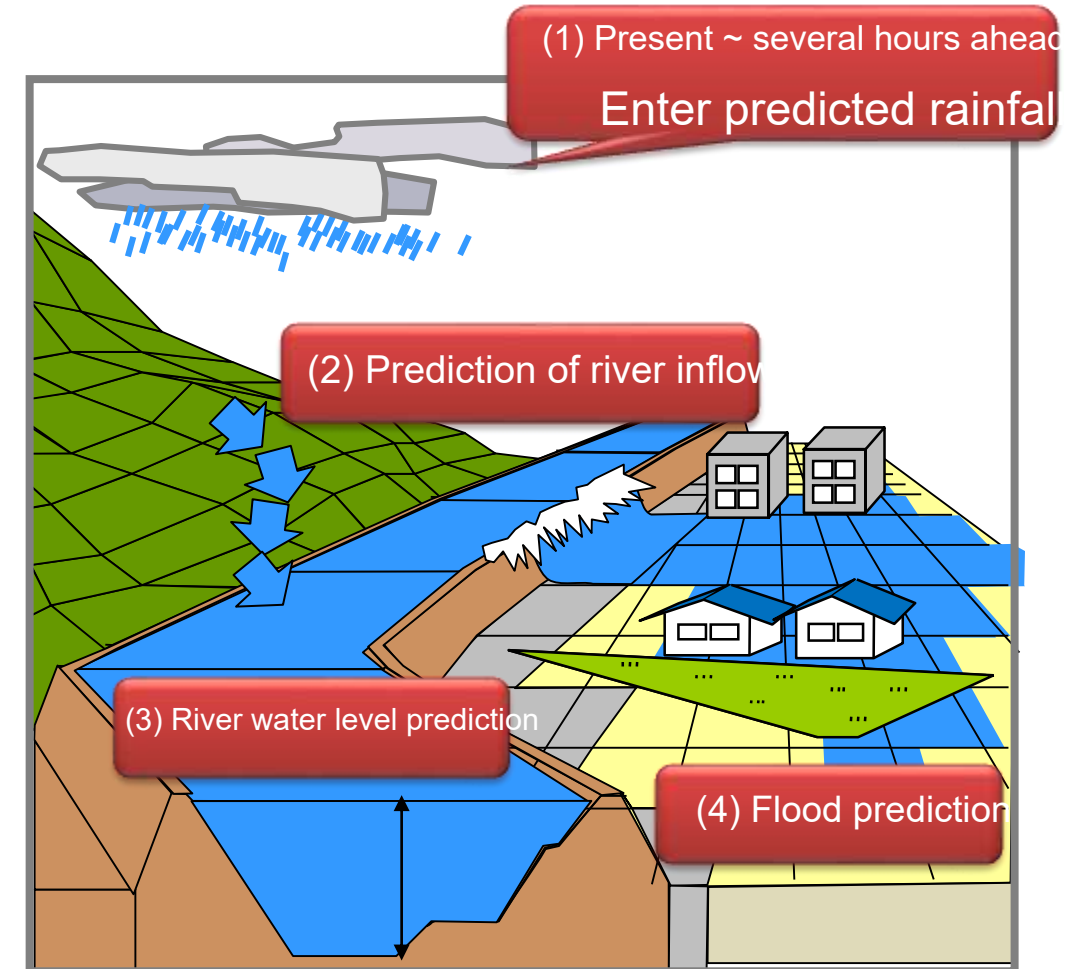
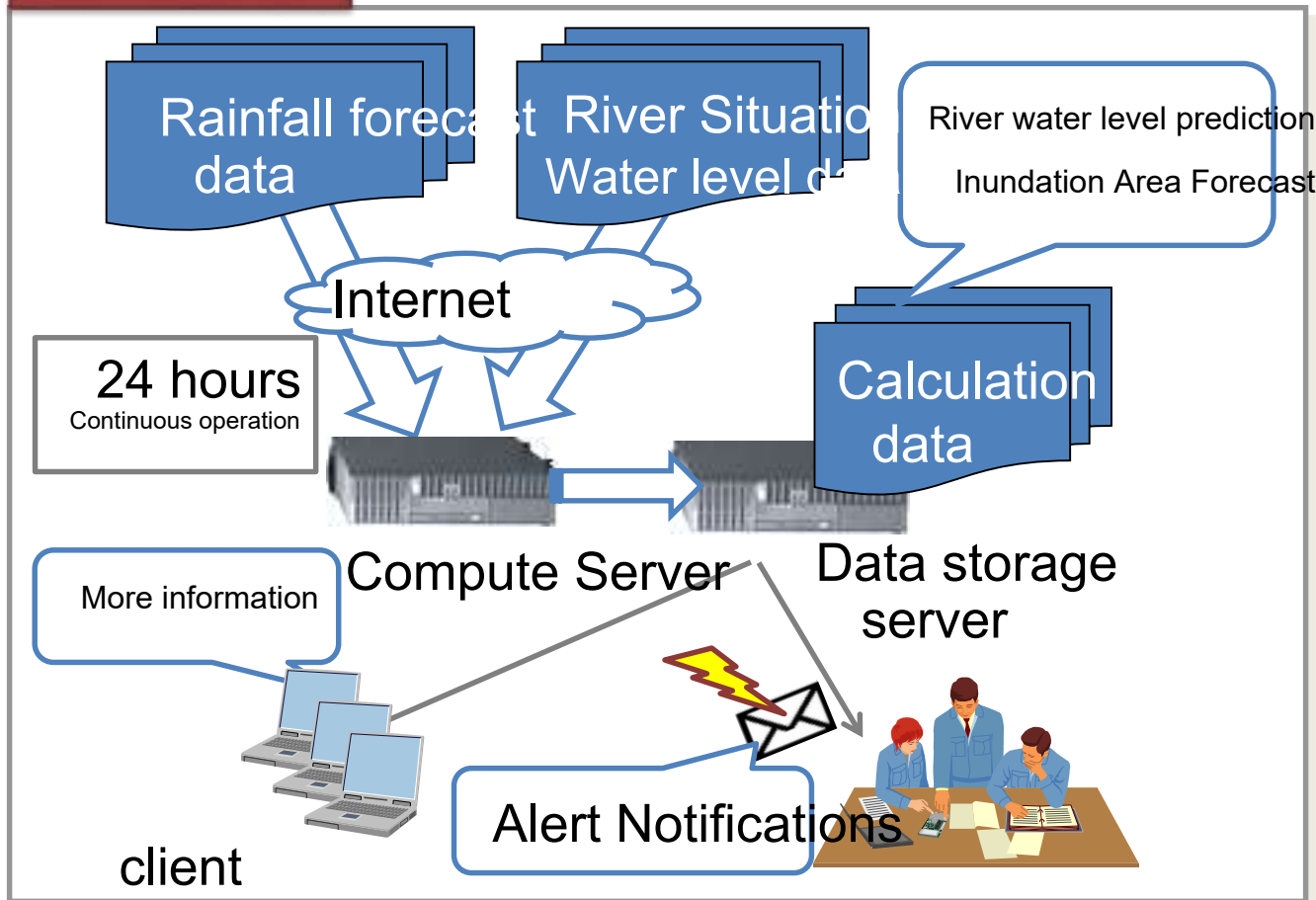
(b) Geospatial Information Authority of Japan, Estimated inundation due to heavy rain from July 3, Reiwa 2, Kuma River Basin Kuma River 5, July 2020 Created on the 4th of the month at 8pm

1. Purpose of this seminar
2. Flood Simulation
3. Introduction of flood prediction information provision system

Overview of the Flood Prediction Information Provision System

Based on rainfall prediction data and actual river water level data, the system calculates continuously for 24 hours and supports decision-making such as evacuation advisories by predicting river water levels and inundation areas.

System configuration



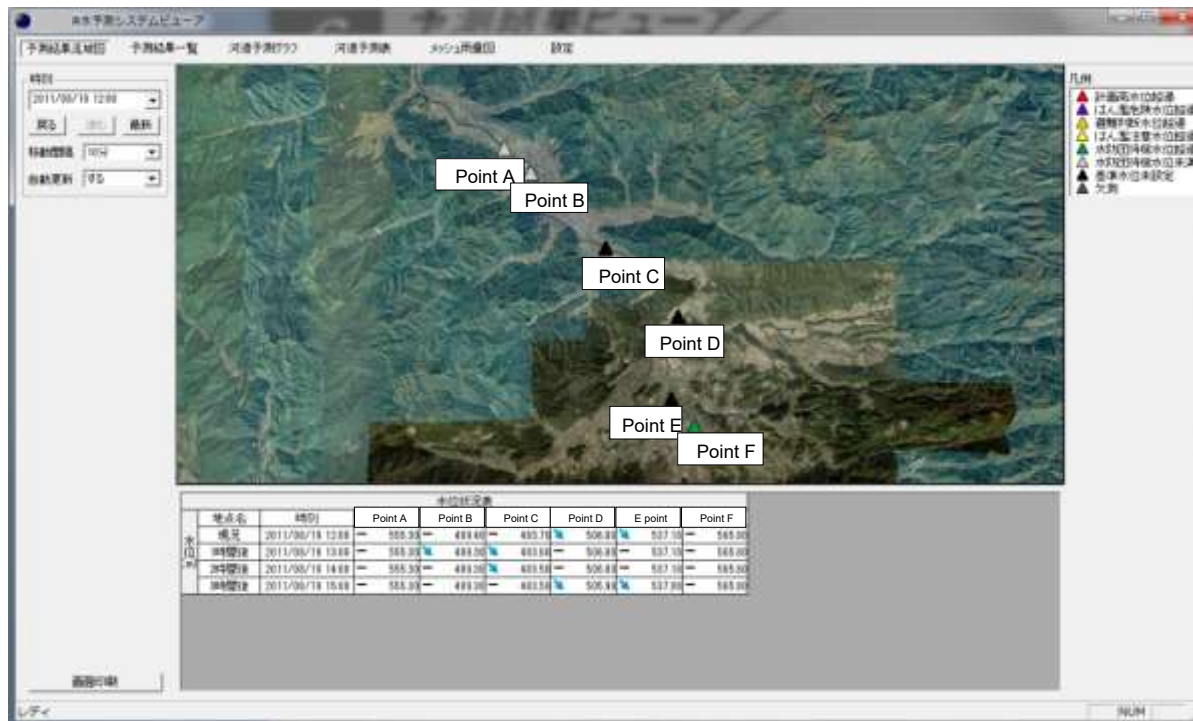
Rainfall prediction ~ flood prediction is possible.

Water level prediction information (point evaluation)

It is possible to evaluate the water level prediction results at a designated point from the calculation results by the system.

Support for evacuation decision-making based on the water level prediction results of rivers that have not become flood forecasting rivers and the water level prediction results of points where water level gauges are not installed

Prediction result watershed map



In creating this map, we use basic map information and electronic topographic maps (tiles) issued by the Geospatial Information Authority of Japan with the approval of the Director of Japan (Approval No.29 情 使 , No. 641).

Check the color of the water level gauge



When each reference water level is reached, the color of the water level gauge changes.

Check the upward trend of the water level

水位状況表								
水位 (m)	地点名	時刻	Point A	Point B	Point C	Point D	Point E	Point F
	現況	2011/08/19 07:20	555.80	489.40	483.60	506.10	537.40	565.90
	1時間後	2011/08/19 08:20	555.70	489.60	483.80	506.30	537.50	566.00
	2時間後	2011/08/19 09:20	555.70	489.80	484.00	506.50	537.70	566.10
	3時間後	2011/08/19 10:20	555.70	489.90	484.20	506.60	537.70	566.10

If the water level is trending upward, it is displayed.

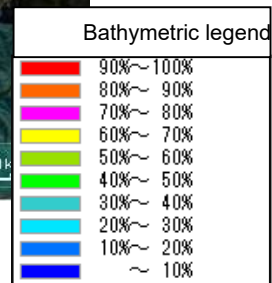
Water level prediction information (line evaluation: river risk line)

The calculated results make it possible to grasp the water level and depth information of the entire river and longitudinally.

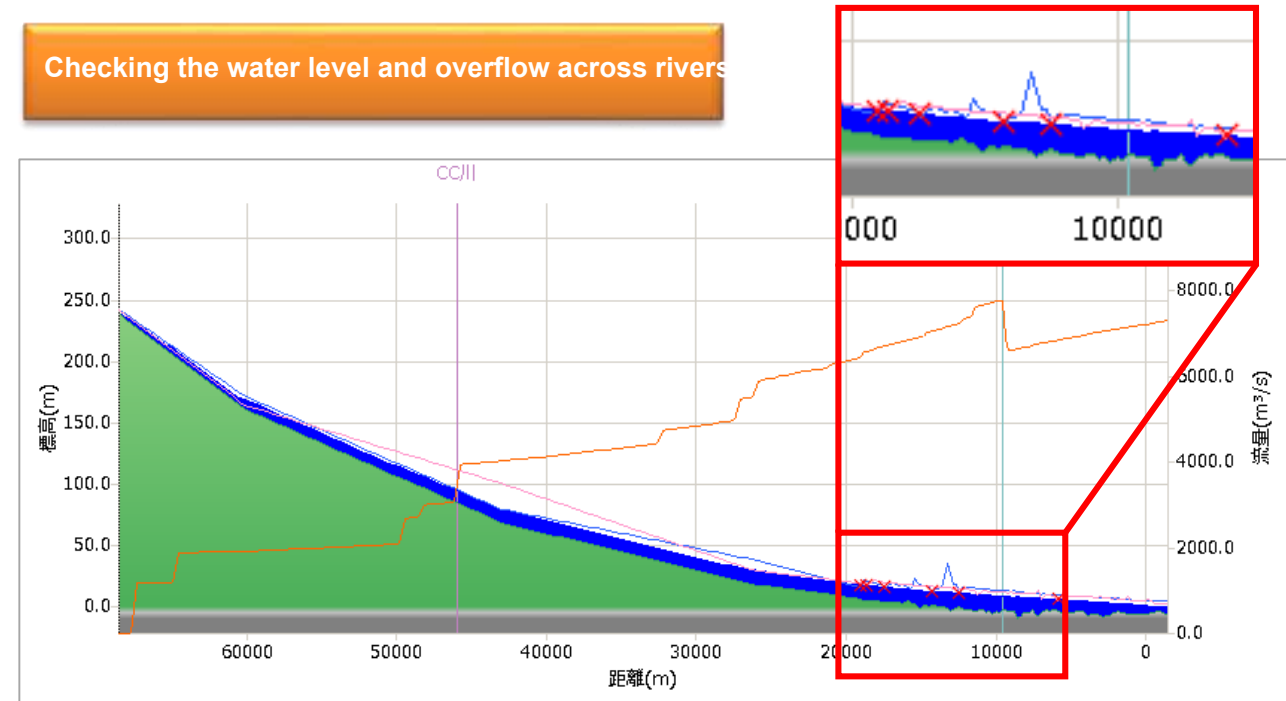
Easily check the level of danger of rivers



Color-coded visualization of the percentage of water depth to the banks of rivers



Checking the water level and overflow across rivers



In case of overflow ~~X~~ appears.

In creating this map, we use basic map information and electronic topographic maps (tiles) issued by the Geospatial Information Authority of Japan with the approval of the Director of the Geospatial Information Authority of Japan (approval number).

Flood prediction information (visualized in time series)

Check the flood status on the map

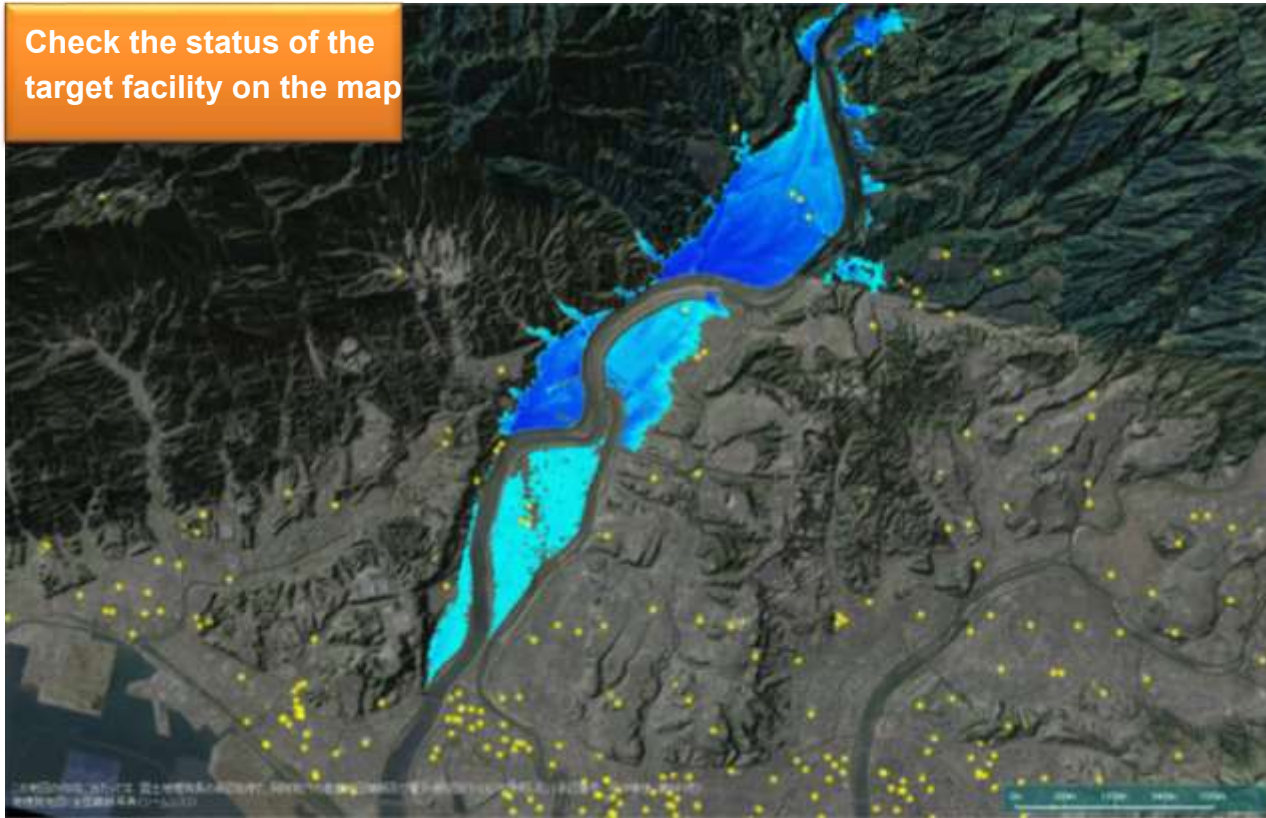


Flood prediction information (point output)

It is possible to output the **prediction result of the maximum inundation depth of the** specified point for each point.

Support for decision-making on proactive measures and confirmation of flooding status after the fact

Check the status of the
target facility on the map



output



.CSV

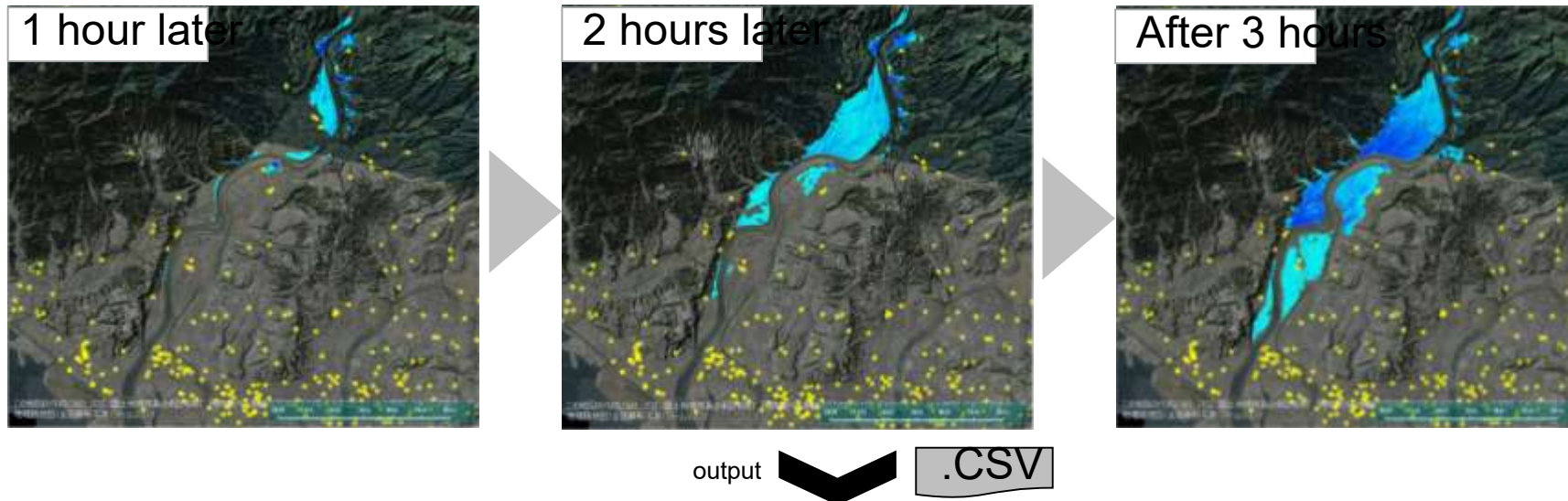
Example of extracting flooded facilities from the output results

1	id	i	j	値
2	施設421	63	202	5.53
3	施設545	70	191	5.04
4	施設353	75	188	4.97
5	施設291	118	284	2.04
6	施設361	176	454	0.22
7	施設1	-1	-1	
8	施設2	-1	-1	
9	施設3	-1	-1	
10	施設4	-1	-1	
11	施設5	-1	-1	
12	施設6	-1	-1	
13	施設7	-1	-1	
14	施設8	-1	-1	
15	施設9	-1	-1	
16	施設10	-1	-1	
17	施設11	-1	-1	
18	施設12	-1	-1	

● : Output point

Flood prediction information (line output)

It is possible to output the **inundation prediction results of the specified point over time**, supporting the decision-making of measures in advance



Example of extracting facilities that are expected to be flooded from the output results

id	i	j	現在（基準日時）	1時間後	2時間後	3時間後
施設421	63	202	0.1	1	3	5.53
施設545	70	191			0.5	5.04
施設353	75	188	4.97	4	2	0.5
施設291	118	284				1
施設361	176	454				0.22
施設1	-1	-1				
施設2	-1	-1				
施設3	-1	-1				

Example of operation of flood prediction information provision system (1)

system
Inspire the Next

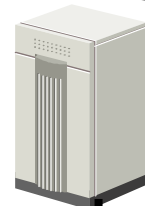
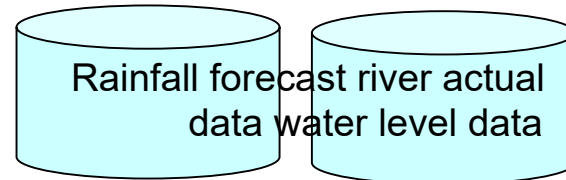
Flood information prediction system operation image

Heavy rain and flood warnings are issued · Warning · (Typhoon X in 20xx)

simulation

Grasp the situation

Provision of evacuation information

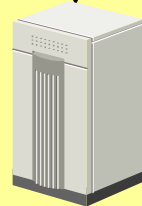


15:45

Flood Simulation Server

Possibility of flooding up to a few hours later periodically simulated by the system

Ration & Monitoring



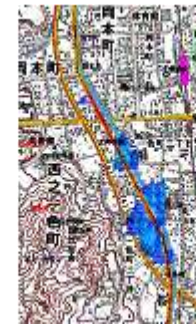
Flood Prediction Information System



Status



5minutes after 20 minutes



30 30 minutes



1hour later



11 hour and 30 minutes

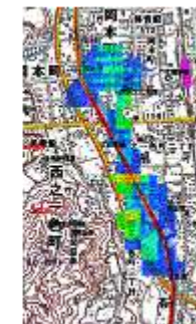


2hours later

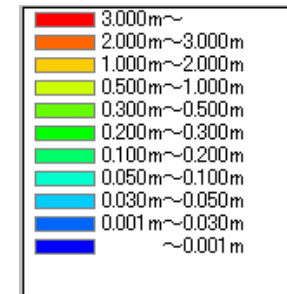


2hours 30 minutes after 3 hours

Possibility of flood damage discovered



33 hours and 30 minutes



· 25m square calculation and elevation data: Geospatial Information Authority of Japan 50m mesh

Example of operation of flood prediction information provision system (2)

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Flood information prediction system operation image

Heavy rain and flood warnings are issued · Warning · (Typhoon X in 20xx)

simulation

Grasp the situation

Provision of evacuation information

Alarm Notification

15time 45minute

Possibility of flood damage discovered



Depends on the screen
Reminder

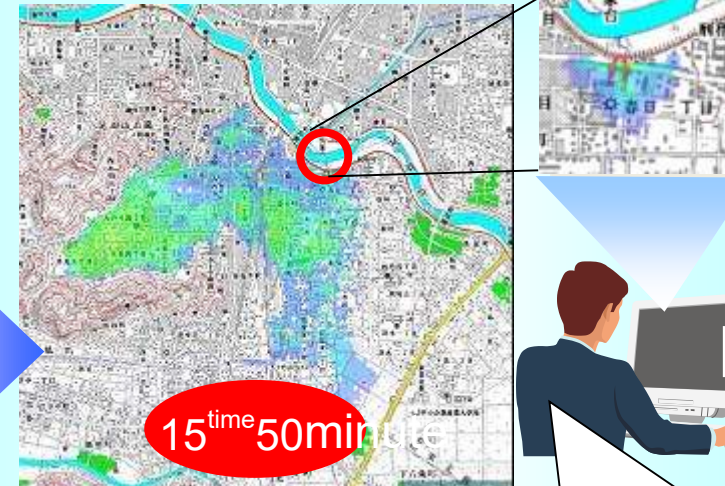
By email
Staff convocation

To : xxx
From: Flood control system
3Precipitation at XX hour xx hours later
mm and flooded in the vicinity
There is a possibility.
Relevant sections will proceed with the consideration of countermeasures.
Primitive.
You can check the flood forecast from the link below.
http://www.*****

Crisis Management Department, etc.

By audible warning and voice
Reminder

Confirmation of flooded areas and dangerous areas



15time 50min

Flooded areas and flooding
From estimated time
Appropriate on-site dispatch
Plans can be developed

On-site dispatch

16time 00minute



Patrol Squad's
Dispatch of personnel to the site

Example of operation of flood prediction information provision system (3)

Inspire the Next

Flood information prediction system operation image

Heavy rain and flood warnings are issued · Warning · (Typhoon X in 20xx)

Provision of simulated evacuation information

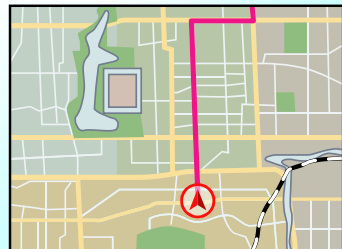
16: 30 of

Provision

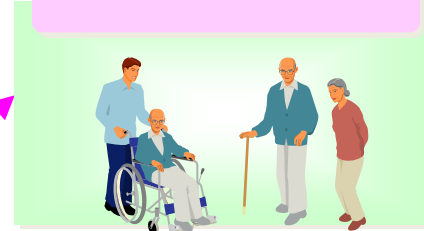
countermeasure
Shelter

instructions
evacuation
with plenty of time to
consider countermeasures

Safe evacuation routes



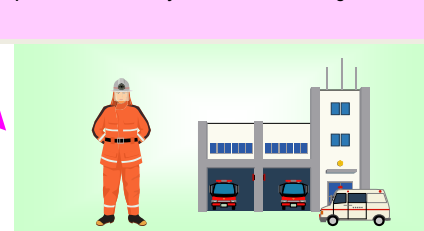
Support for people in need of assistance



Provision of information to residents



Cooperation with Voluntary Disaster Prevention Organizations and Fire Brigades

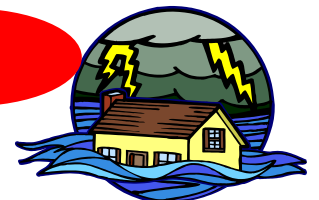


17: 00

Evacuation complete!



18: 15



Utilization image

Normal times

Implementation of Proactive Measures

- Convening staff and establishing a system
- Review of disaster prevention plans
- Create hazard maps



Used for evacuation drills

- drills using simulation results
- the map of this system during disaster prevention drills

Raising Awareness of Residents

- Public disclosure on the web
- Simulation video open to residents
- Multiple patterns of hazard maps

Instructions to staff • Dispatch of staff to areas where damage is expected

- of flood prevention measures such as sandbags

Opening of evacuation centers

Risk Management Department

Respond appropriately to ever-changing circumstances

- forecasting considering rainfall conditions
- Consideration of specific measures
- Provision of information to residents



Minimization of damage

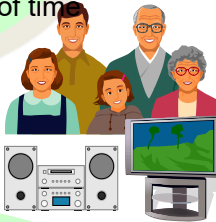
Determination of dam discharge

- Mayor's decision support

In the event of a disaster for residents

Alerting and Evacuation Information

- through mass media collaboration
- Disaster prevention administrative radio, disaster prevention e-mail transmission
- Provision of evacuation information with plenty of time



Support for people in need of assistance • Understanding the place of residence of persons in need of assistance

- Priority evacuation of people in need of assistance
- Dispatch of volunteers

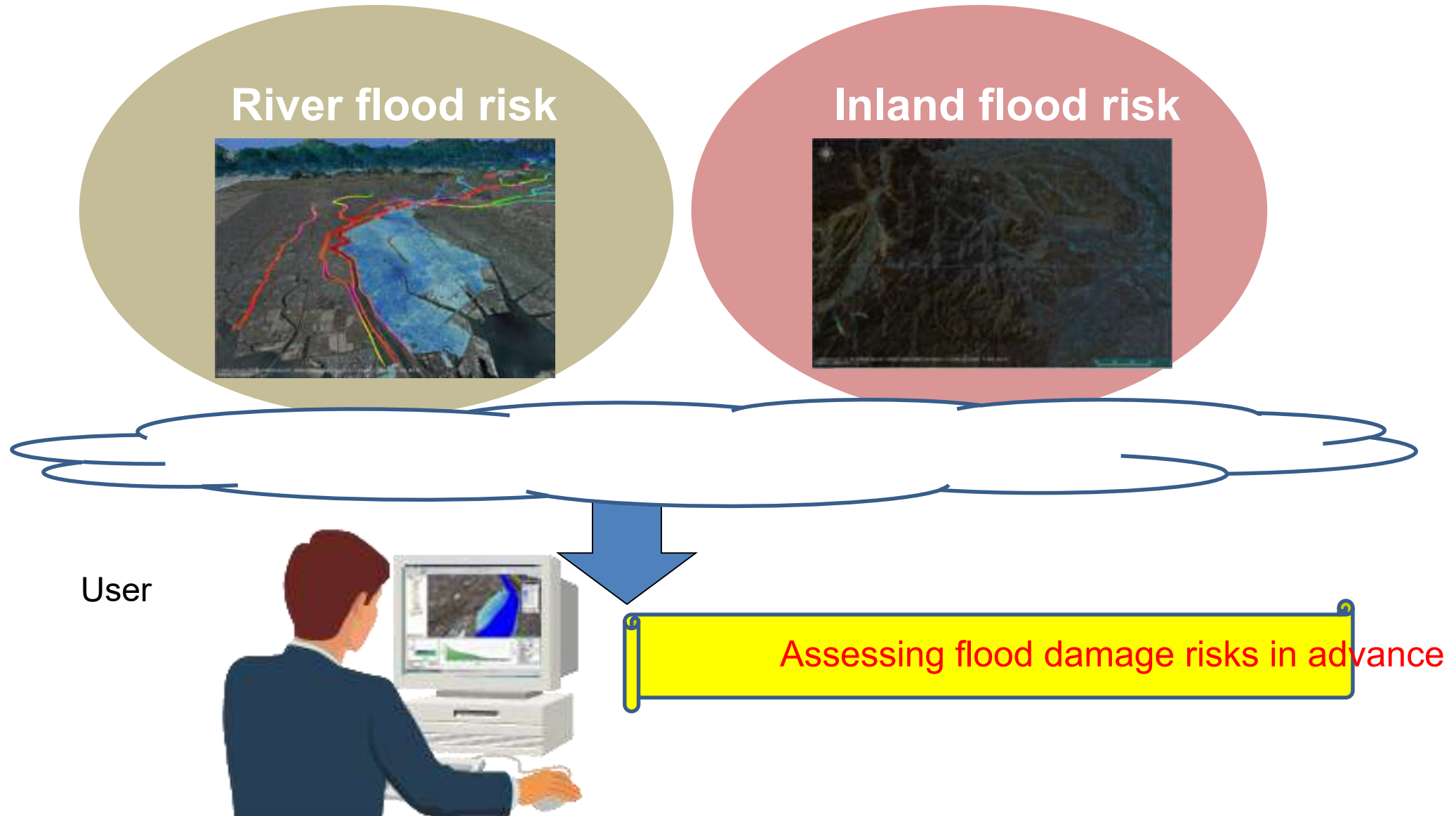


Cooperation with Related Organizations

- Fire and police support
- Request for support from neighboring municipalities
- Contact lifeline operators

【 Future 】 Flood Risk Information Provision Platform

Hitachi
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- Flood simulation
 - Use Flood simulator DioVISTA/ Flood
 - Accurate simulation
- Flood prediction information provision system
 - It is possible to predict river water level and flooding based on rainfall prediction data and actual river water level data.
- Built a flood risk information infrastructure
 - Support for countermeasures against flood risks (river flooding and inland flooding)

END

