DioVISTA webinar July
29 , 2020

HITACHI
Inspire the Next

In the field of non-life insurance Leveraging DioVISTA

株式会社 日立パワーソリューションズ

schedule

HITACHI
Inspire the Next

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 We will introduce examples of proposals for quantifying flood disaster risk over a wide area and reducing damage to target properties using DioVISTA, which is widely used by non-life insurance companies.
14:00 -	4	Utilization of DioVISTA in the field of disaster prevention administration
15:00 -	5	Proposal of BCP support for flood countermeasures for corporate disaster prevention
16:00 -	6	DioVISTA Flood Simulator– technology & use case

Today's materials will be uploaded at a later date.
Participants will be notified of the link by email.

Mokuji

HITACHI
Inspire the Next

Purpose of the seminar

HITACHI
Inspire the Next

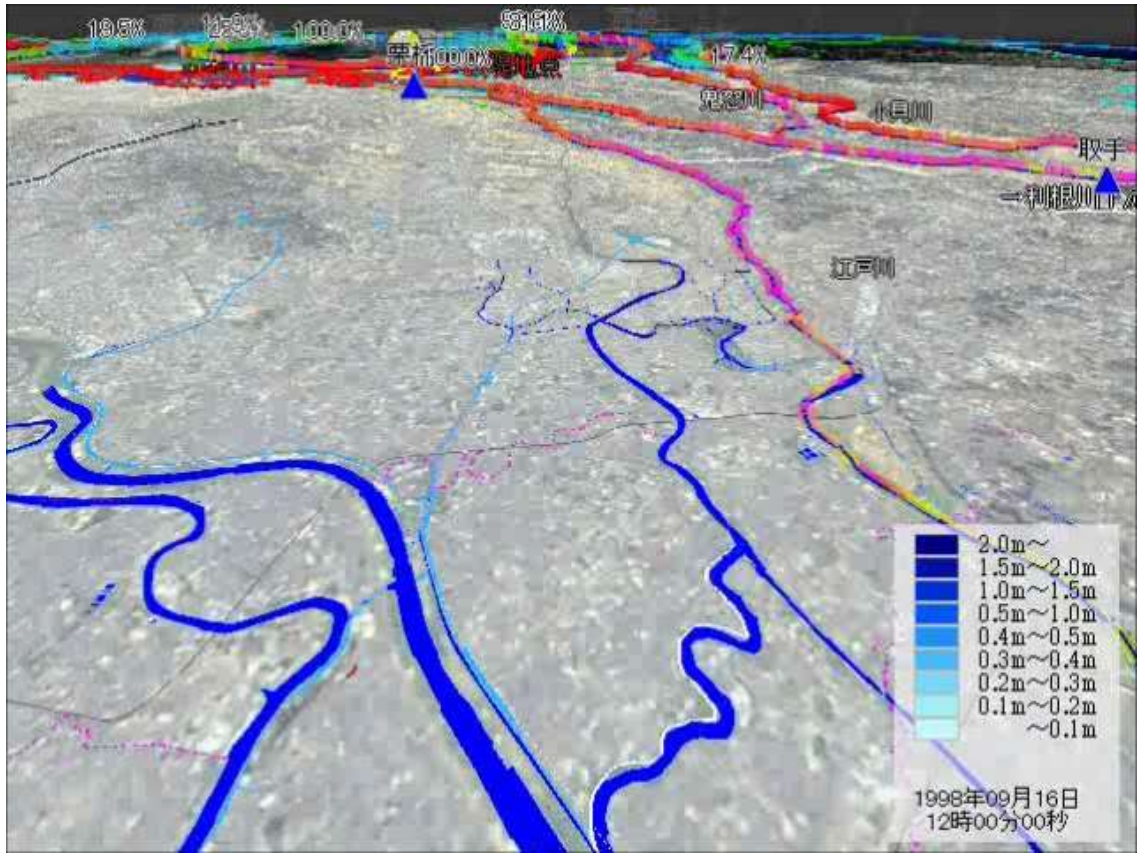
- Major changes in society
  - With Corona, a changing way of working
    - Telework, computerization, cloud computing
    - Standardization, depersonalization, remote OJT
  - Intensification of climate change and flood damage
    - Watershed flood control: It is necessary for government agencies, private companies, and citizens to consider disaster prevention and mitigation in their awareness, actions, and mechanisms.
    - Property and casualty insurance: Regional subdivision of water disaster rates, loss prevention

Ref: MLIT, on water-related disaster countermeasures based on climate change , URL, July 2020 .

Proposals for the field of non-life insurance

HITACHI
Inspire the Next

- Quantify flood risk with DioVISTA
  - DioVISTA's high productivity aids in quality quantification at low cost
  - Used as an engineering method to quantify the huge undeveloped risks of climate change
  - Used as a quantitative scenario for loss prevention



Rainfall with an annual excess probability of 1/200 in the Tone River basin and large-scale flood damage in the Tokyo metropolitan area expected due to levee failure

DioVISTA User Testimonials

HITACHI
Inspire the Next

Easy to use.

As you use it, you can grasp how to use it.

Fast calculations.

The calculation speed is stable enough to withstand large-scale and detailed analysis.

You can consult with them about engineering decisions.

Under the constraints of cost and time, we were able to build a methodology to achieve the accuracy required for insurance.

It is also used for risk assessment of overseas properties.

Our company is mainly humanities, but we can use software.
Be able to explain the results obtained to customers.

Credible.

When we outsourced the analysis work, we received consistent explanations at each step of data collection, condition setting, analysis agency, and result delivery.

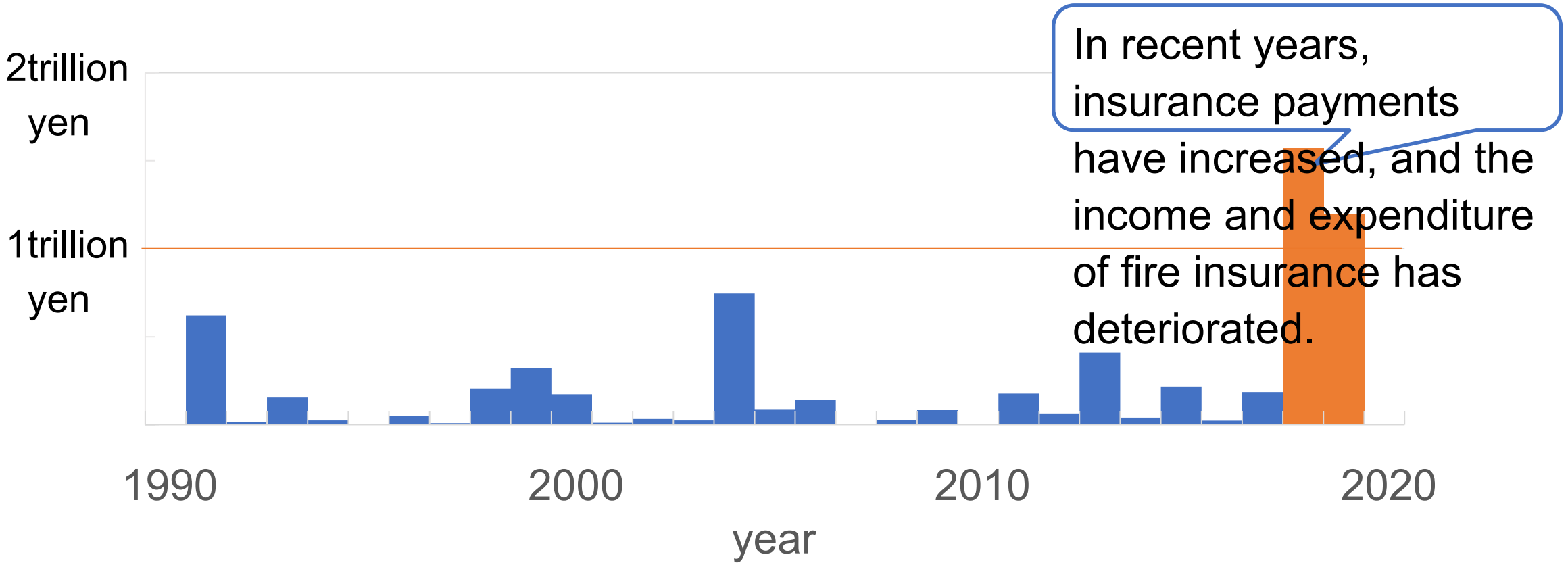
Mokuji

HITACHI
Inspire the Next

Current Status of Property and Casualty Insurance

Inspire the Next

Amount of insurance claims paid due to feng and flood disasters, etc.



Japan General Insurance Association, Property and Casualty Insurance in Japan - Fact Book 2018, URL.
Japan General Insurance Association , on property and casualty insurance for water-related disaster risk, April 17, 2020, URL.

Current Status of Property and Casualty Insurance

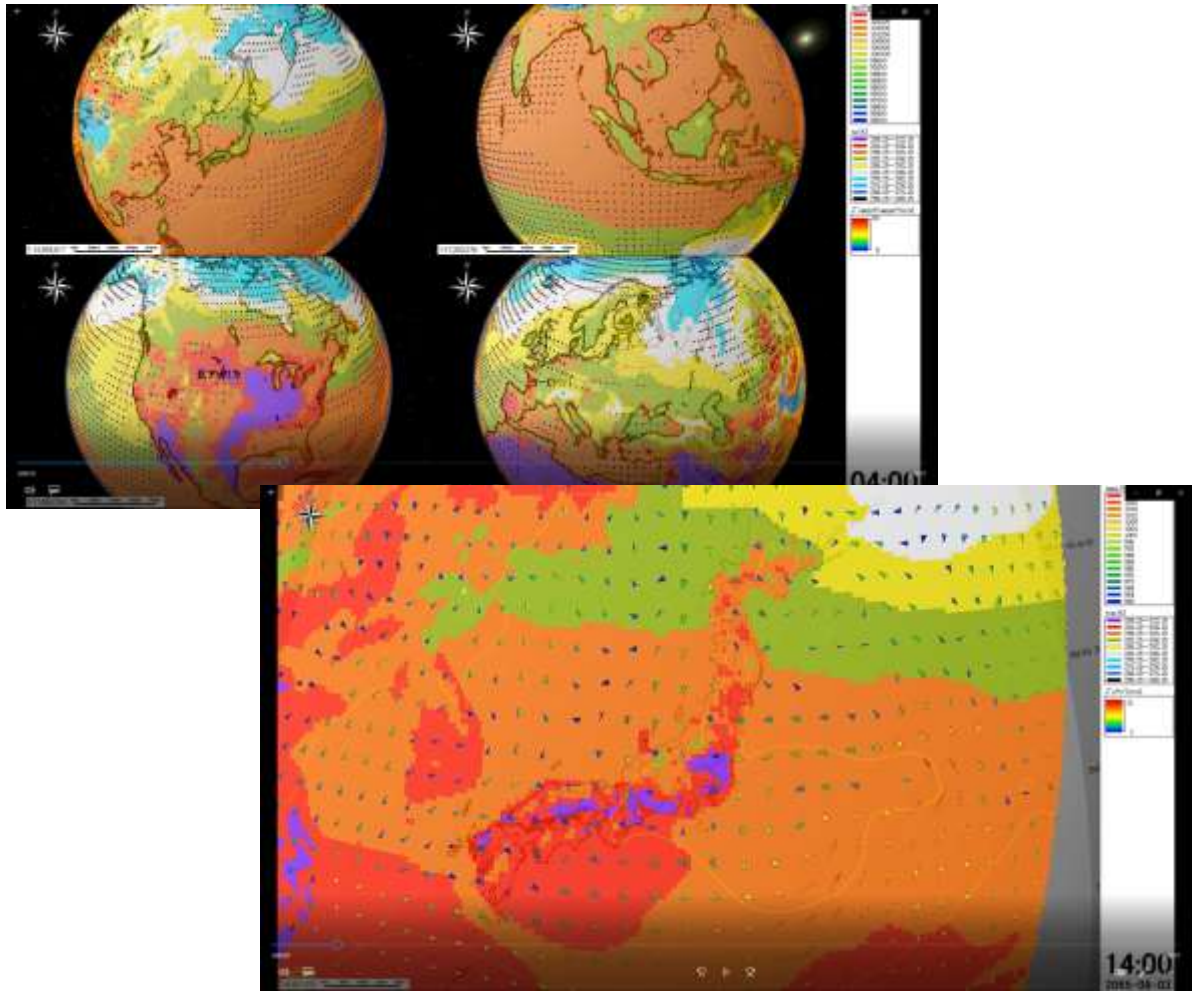
- From materials from the General Insurance Association of Japan
  - Insurance companies are making management efforts to reduce costs, but they have no choice but to revise their fire insurance premium rates based on the revision of the reference net rate.
  - In terms of products, issues include regional subdivision of flood disaster rates and shortening of insurance periods.
  - In anticipation of the arrival of major natural disasters in the future, we believe that it is necessary to develop housing and communities that are resistant to wind and water disasters.

Association of Japan General Insurance, Property and Casualty Insurance for Water-Related Disaster Risks , April 17, 2020, URL, (emphasis added) is by the quoter)

Impacts of climate change

HITACHI
Inspire the Next

- Projections of climate change impacts
  - The risk of heavy rain is further increased
    - Average annual maximum basin rainfall: about 1.1~1.3 times
  - Flood damage becomes more frequent and intense.
    - Frequency of flooding above the basic high water: about 1.8~4.4 times



Example purple of climate simulation results at temperature rise of 2° C: 35° C or higher (d4PDF HFB-2K-MI m108)

Reference: Ministry of Land, Infrastructure, Transport and Tourism, Reference material on the report of the Subcommittee on Flood Control Measures Adapted to Climate Change , August 27 , 2015.

Using d4PDF created by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and collaboration between multiple academic research programs ("Genesis", "Integration ", SI-CAT, DIAS) and the Earth Simulator

For Sustainable Property and Casualty Insurance

HITACHI
Inspire the Next

- Quantify huge risks
  - Consider the effects of climate change
  - Consider fragmented local conditions
- Be resilient to disasters
  - Loss prevention for flood disasters

Mokuji

HITACHI
Inspire the Next

What is Flood Simulation?

HITACHI
Inspire the Next

Image of flood simulation

Calculation results by DioVISTA/Flood (video)

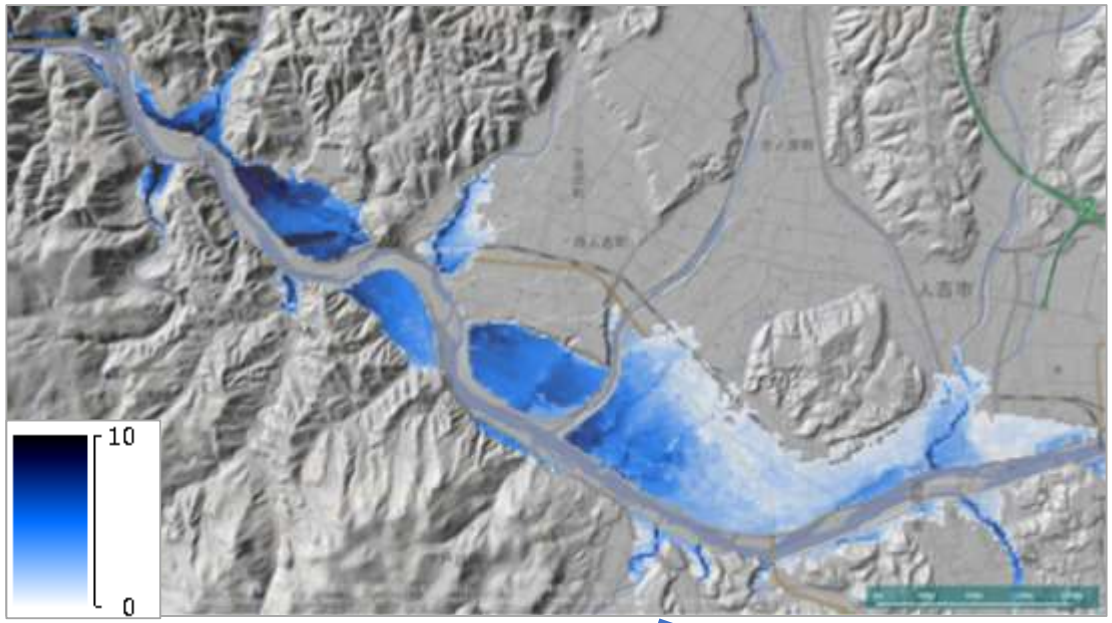
Simulation accuracy

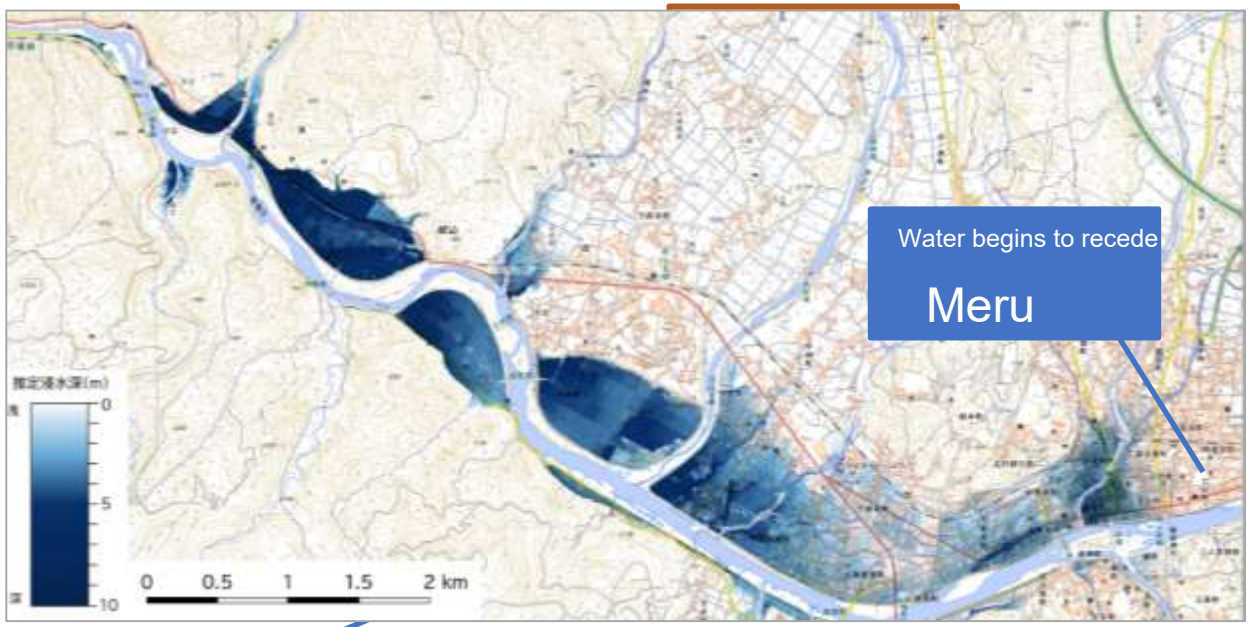
HITACHI
Inspire the Next

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)





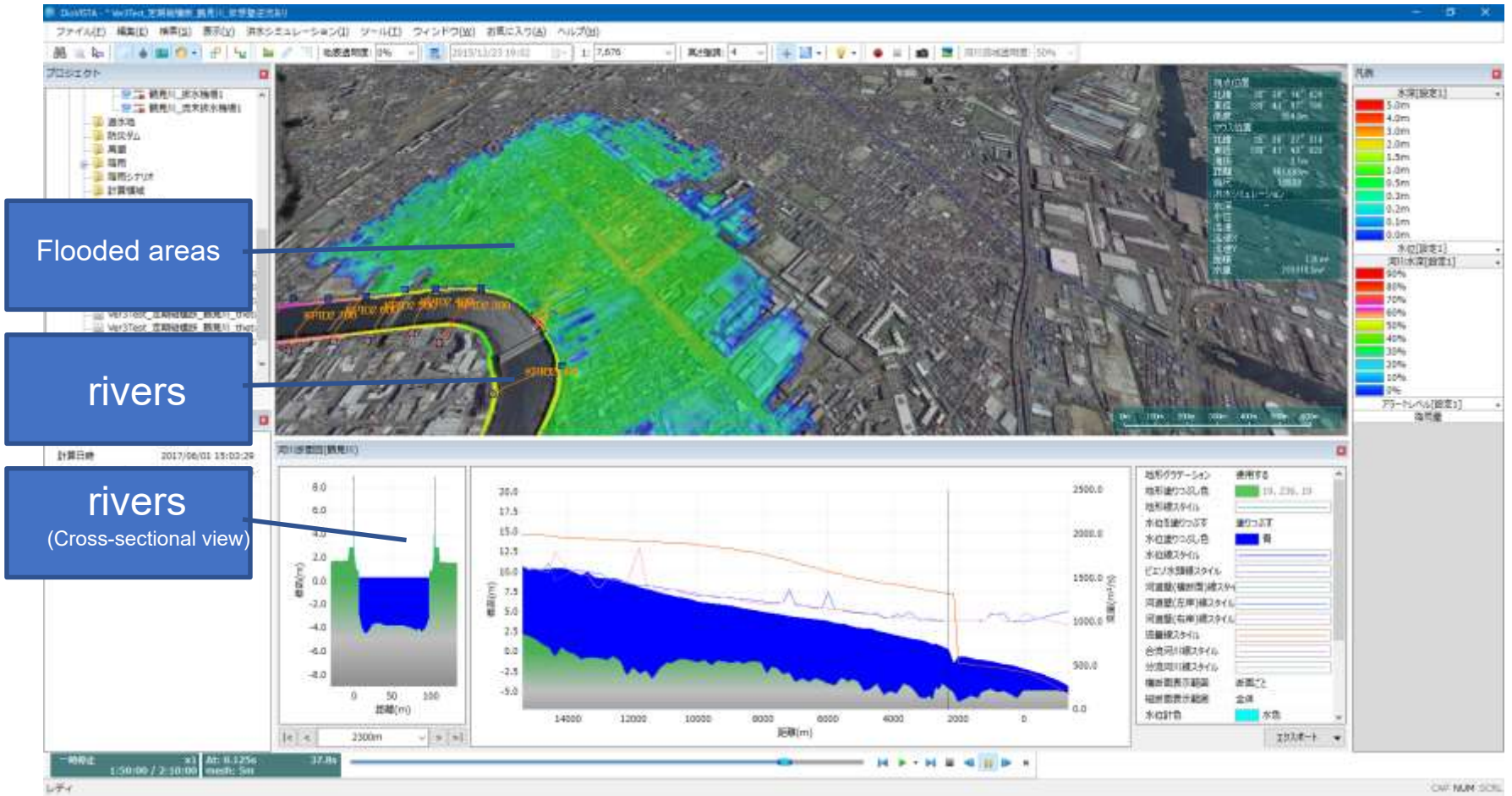
The flood range matches well

(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

Flood Simulation Software

HITACHI
Inspire the Next

- Hitachi developed simulation software and started sales in 2006
- DioVISTA/Flood



DioVISTA/Flood operation screen

DioVISTA Flood Users

HITACHI
Inspire the Next

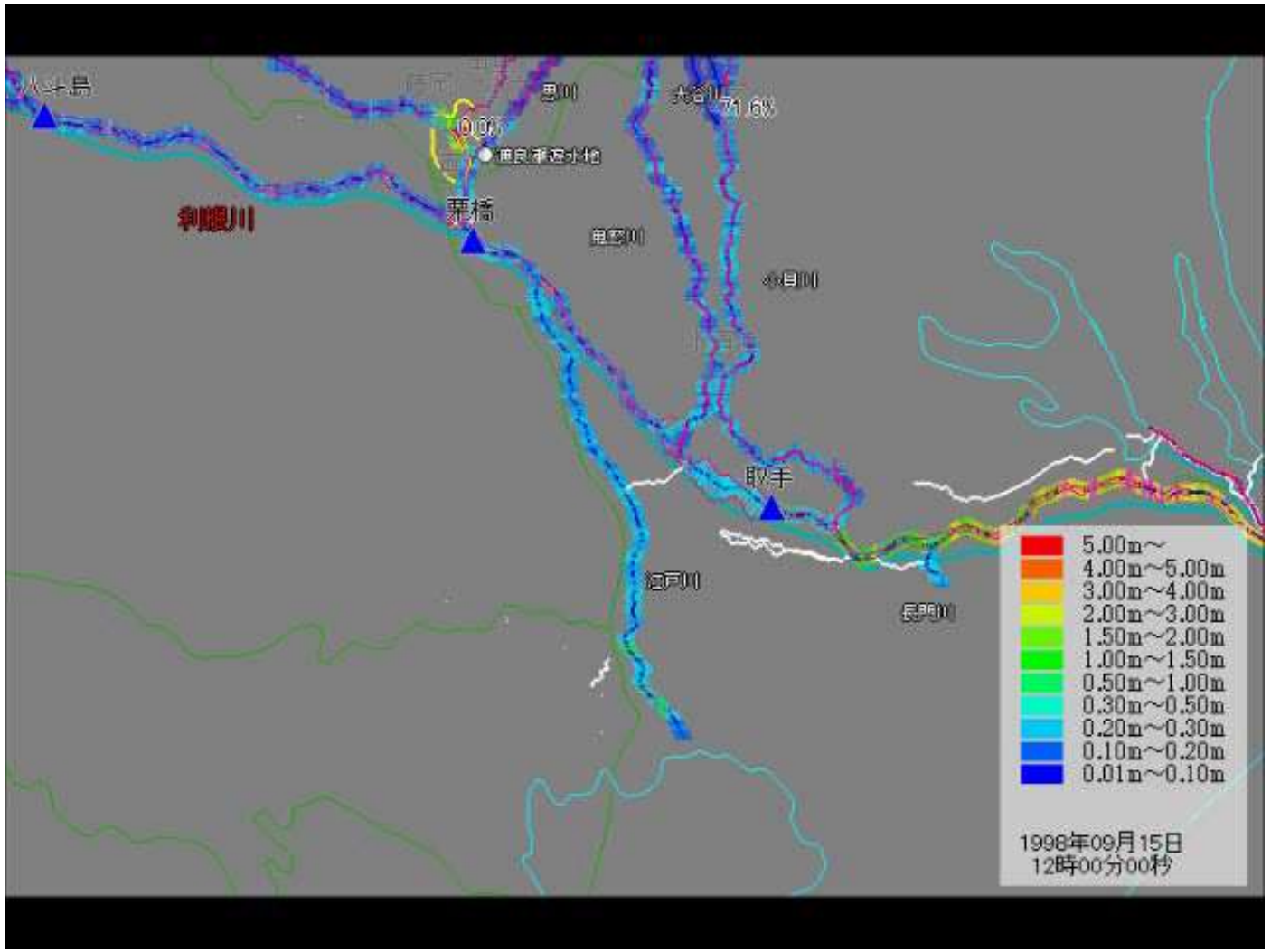
- Property and casualty insurance companies
- Construction Consultant
- State/Province
- Railways
- Research Institutes
- Ministry of Land, Infrastructure, Transport and Tourism

As– CommonMP-GIS

Received "Excellent Business in FY21" from the National Institute for Land and Infrastructure Management of the Ministry of Land, Infrastructure, Transport and Tourism for the development of simulation software "CommonMP" for river operations

Simulation of mega-risks

HITACHI
Inspire the Next



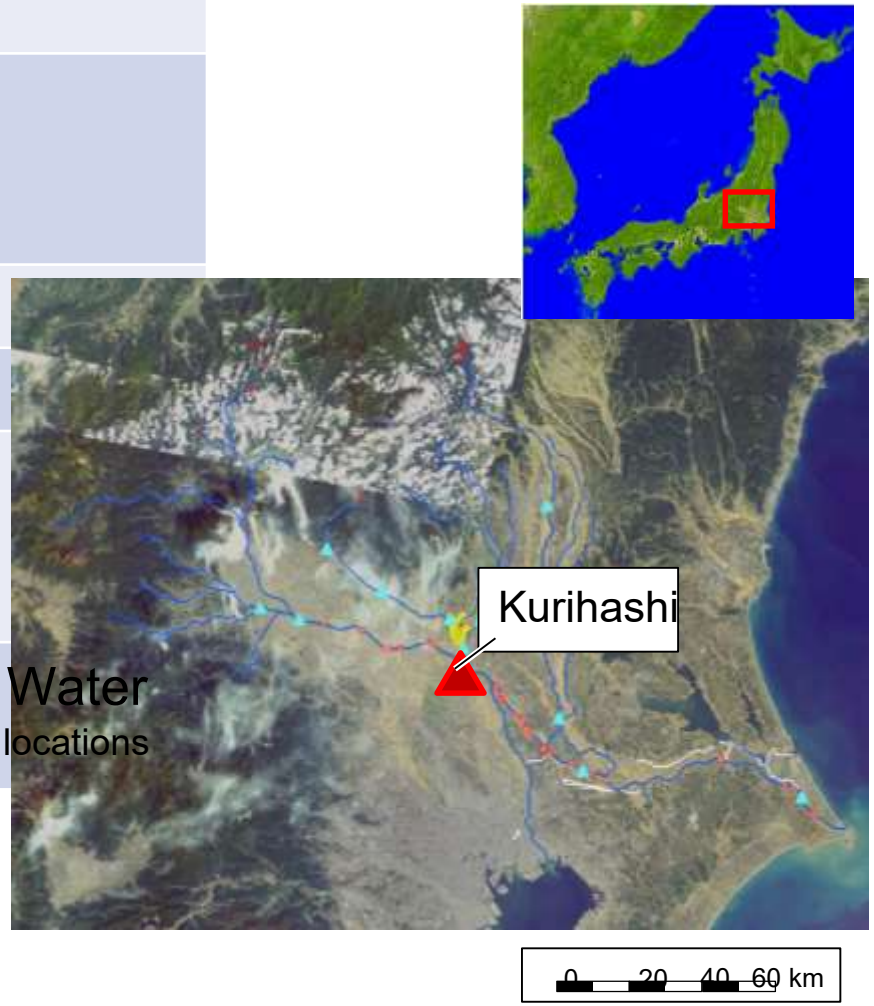
Assuming annual excess probability 1/200 rainfall + breach (near Kurihashi), the flooded area was 920 km2.

Yamaguchi et al ., Development of a large-scale flood simulation system for non-life insurance, Japan Society of Civil Engineers, URL, 2012.

Target area: Tone River

HITACHI
Inspire the Next

target	Tone River
Spillage model	Basin area : 16,840 km2, cell size: 100 m
River model	Main River 1, Branch River 20, Spillway 2 Survey Cross-sectional 1, cell size 50m
Flood Model	2, cell size 50m
Drainage Basin Model	2 locations
Input conditions	Rainfall radar (1 km, 30 min) Dam discharge (hourly) Estuary tide level (hourly)
Verification methods	2007 Typhoon No. 9 High Water 10 with water level observation at 10 locations

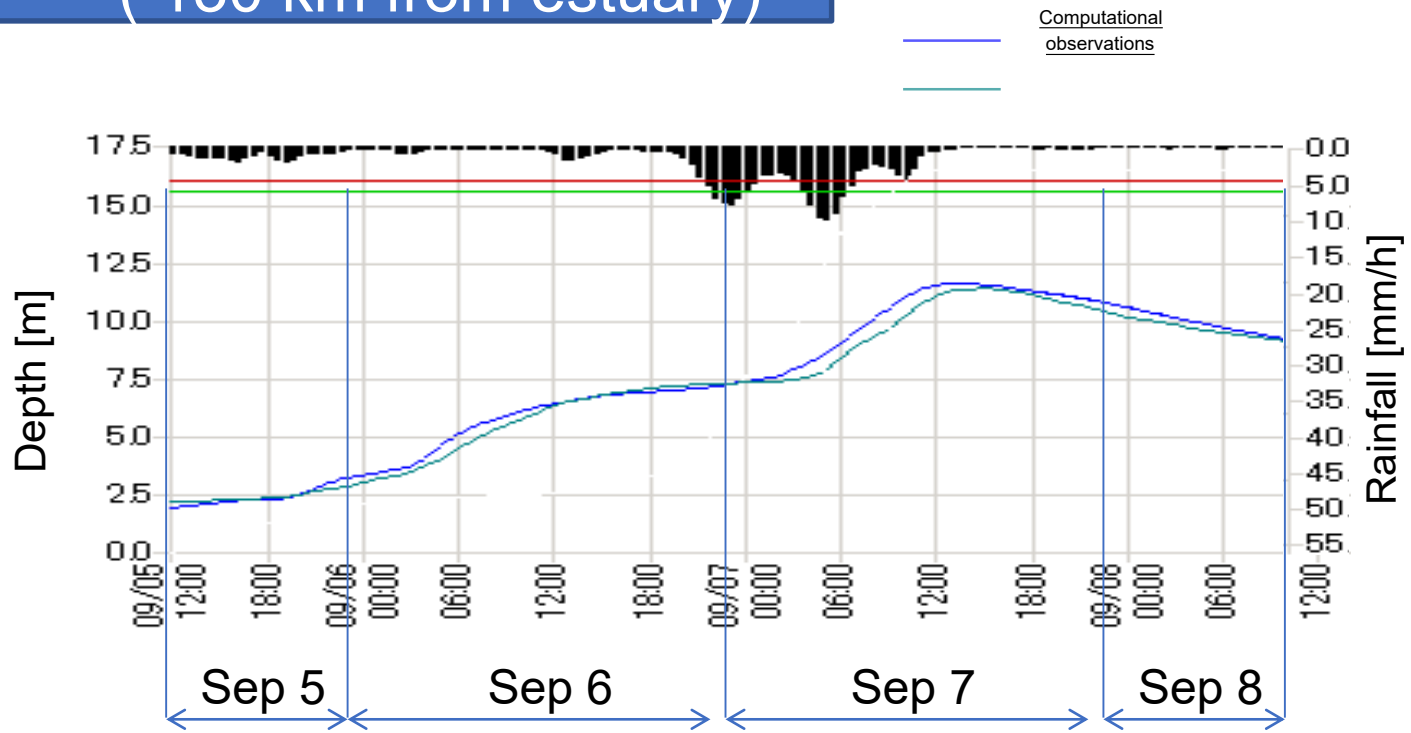


Recreating past high-water events

Re-enactment of the 2007 Typhoon No. 9 High Water Event

Kurihashi Water Level Observatory

(130 km from estuary)



Mokuji

HITACHI
Inspire the Next

Supporting corporate BCP planning

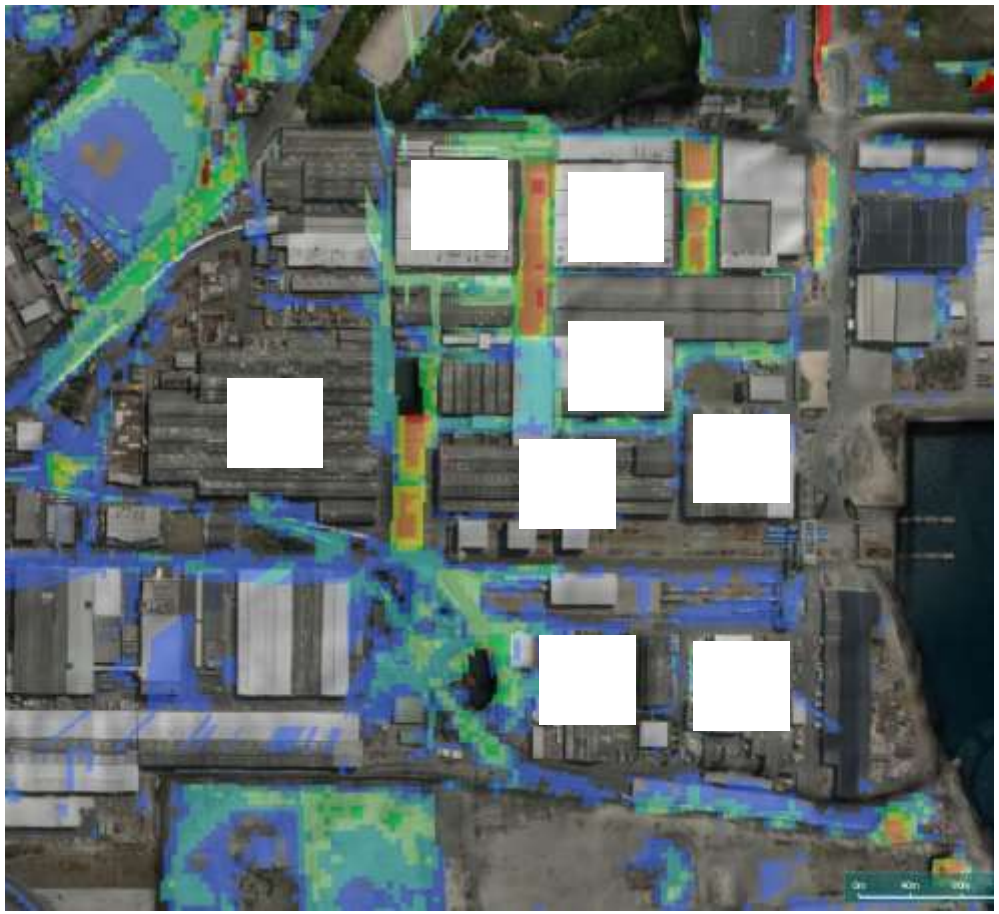
- Setting your own disaster prevention targets
  - Example: No damage to flood damage once every 100 years, prevention of human damage and leakage of hazardous materials for flood damage once every 1,000 years
- List critical facilities that are expected to be flooded
- Develop emergency action manuals for employees and self-defense fire brigades
  - Setting triggers for abnormal situations (water levels in nearby rivers, rainfall, etc.)
  - Demolition of manufacturing facilities and evacuation plan for employees at the site
  - Plan to prevent leakage of dangerous substances (poisonous, deleterious, explosive, etc.)
  - Plans for relocation of equipment, raising of bases, installation of earth fills, trenches, water stop boards, etc.
- Review of property and casualty insurance policies
- Request cooperation from the government

Important facilities expected to be flooded

HITACHI
Inspire the Next

Calculate the expected inundation depth due to a once-in-a-century flood by DioVISTA

Estimated inundation depth on site



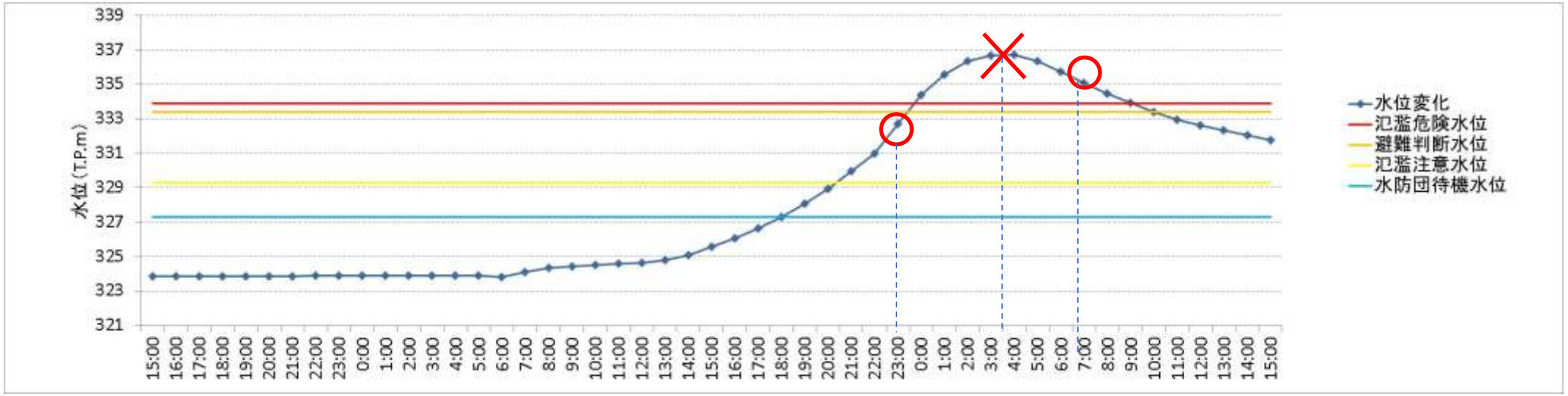
Assumed inundation depth for each building

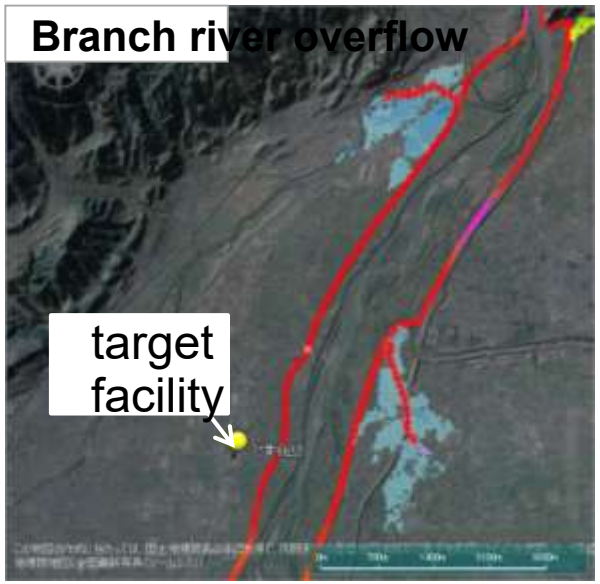
No	Building name	Immersion depth [m]	Floor height [m]
1	Building A	0.5~0.9	0
2	Building B	0.5~0.9	1.1
3	Building C	0.2~0.6	-
4	Wastewater Treatment Building	0.1~0.4	0.7
5	Substation Building	0.1~0.4	0.2
6	Special Experiment Building	0.4~0.7	0.4
7	parking lot	0.1~0.3	-
8	warehouse	0.2~0.6	0

Image of detailed survey results

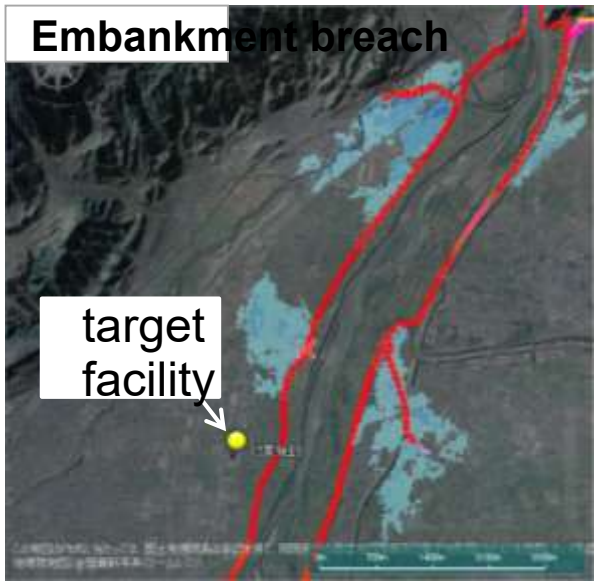
HITACHI
Inspire the Next

< time series evaluation>

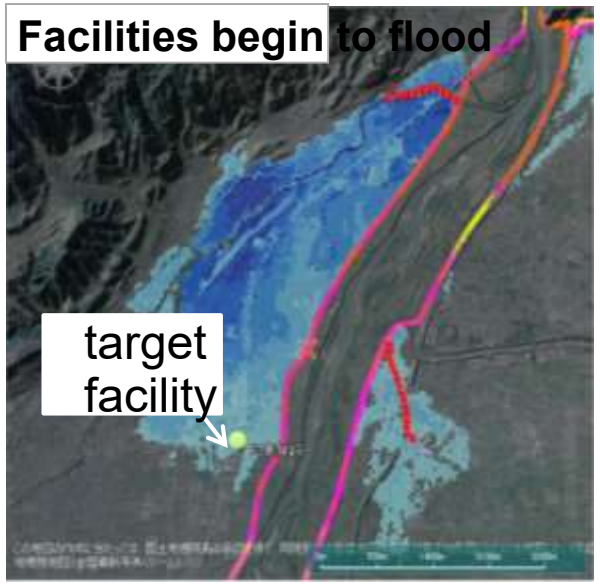




44 hours



After 3 hours



Features of the detailed survey service

forte	substance	Purpose
science	Scientific flood simulation	Quantify the expected flood risk based on field surveys
dialogue	Dialogue with administrative agencies (national governments, prefectures, cities)	Convey that the business site is highly interested in flood countermeasures and understand the requests of the business site
tradition	Survey of local lore and old maps	For all parties involved to deeply understand the risk of flood damage (it is easy to think that a major disaster will not occur)

<Example dialogue> Identify levees that will be damaged by business sites if they fail, communicate that business sites pay special attention to those levees, share their importance, etc.

< traditional example> there are cases where land that was once a riverbed, river nakasu, or retained water area was improved and turned into a factory.

Mokuji

HITACHI
Inspire the Next

Summary

HITACHI
Inspire the Next

- Quantify flood risk with DioVISTA
  - DioVISTA's high productivity aids in quality quantification at low cost
  - Used as an engineering method to quantify the huge undeveloped risks of climate change
  - Used as a quantitative scenario for loss prevention

END