Flood Risk Mapping Project Using Satellite Data

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AGENDA

1 4th Asia-Pacific Water Summit and Kumamoto Initiative for Water

2 Flood Risk Map Projects under Kumamoto Initiative

3 Required Earth Observation Data
4th Asia-Pacific Water Summit and Kumamoto Initiative for Water
4th Asia-Pacific Water Summit
4th Asia-Pacific Water Summit: Outcomes

- Approximately 5,500 participants*1 including online with the Heads and Ministers of State and Government from 30 countries in the Asia-Pacific region discussed various water-related issues in this Water Summit.
- His Majesty the Emperor of Japan gave his Remarks and Commemorative Speech at the Opening Ceremony, after that Mr. Kishida, Prime Minister of Japan, announced “Kumamoto Initiative for Water”, and “Kumamoto declaration” expressed the determination by the Heads of State and Government was adapted at the Heads of State and Government Meeting.
- Nine Thematic Sessions, four Integrated Sessions and two Special Sessions were held to discuss concrete actions to the inquiry by the Heads of State and Government of “Kumamoto declaration”, and “Chair’s Summary” summarizing the answers from the Sessions to the inquiry was announced at the Closing Ceremony.
Kumamoto Initiative for Water

- Promoting the development of “Quality Infrastructure”
- Contribution to fill gaps of observation data
- Contribution to governance (systems, human resources and capacity)
- Utilization and expansion of the Joint Crediting Mechanism (JCM)

**Climate change adaptation measures**
- Development of “Quality Infrastructure” by the use of hybrid technology to implement both adaptation and mitigation measures
  - Effective use of existing dams
    - Operational improvement (operation rules)
    - Renewal (redevelopment) of dams
      - Preventive release operation
      - Higher hydropower generation efficiency
      - Enhancement of discharge facilities
      - Raising of the dam height
  - Sewerage systems
    - Reduction of inundation in urban areas
    - Use of sewage sludge for biomass power generation
  - Irrigation and drainage facilities
    - Reduction of flooding in rural areas
    - Use of the rainwater storage function of paddy fields
    - Reduction of greenhouse gas emissions through small hydroelectric power generation

**Climate change mitigation measures**
- Enhancement of governance and systems
  - Cooperation with the related organizations of each country and human resource development
  - Cooperation with assistance organizations and international organizations

**River basin sustainability and resilience against water-related disaster risks**
- Flooding of rivers
- Inland flooding
- Flooding in rural areas

**Creation of clean energy**
- Promoting energy conservation
- Reduction of greenhouse gas emissions

**Solution of social issues**
- Sustainable economic growth
2

Flood Risk Map Projects under Kumamoto Initiative
Flood Risk Map

- High Frequency (1/10)
- High & Middle Frequency (1/30)
- Middle Frequency (1/50)
- Low Frequency (1/100)
- Probable Maximum Flood Analysis area

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(Inundation by Inland water)
Flood Risk Map

- A map showing the extent and frequency of the flood in more easy-to-understand manner.

- Expected utilization of the flood risk map
  - Visualization of the damage reduction by the improvement of DRR infrastructures such as dams or levees.
  - Wise land use considering flood risk
  - Contribution to ESG considerations
  - Reflection to BCP
  - Evacuation planning
Recipe for Flood Risk Mapping (1/2)

- Elevation data
- Land use data
- Precipitation data
- Other data

Combining satellite and ground observation data
Recipe for Flood Risk Mapping (2/2)

Ground observation data
- Each country uses its original data format
- High accuracy
- Mostly point data
- Use may be restricted

Convert point data into accurate mesh data

Satellite observation data
- Universal data format
- Accuracy is not always high
- Mostly mesh data
- No restriction for use

Integrate satellite observation data and ground observation data, and create accurate mesh data

Create mesh data from satellite observation data
International Cooperation on Flood Risk Mapping

**Goal**
- Visualize flood risk changes between current and future condition.
- Determination of appropriateness of investment in flood countermeasures
- Urban development with low flood risk
- ESG investment and BCP considering flood risk

**Schedule**
2023-2025

- Study on acquiring method of satellite and on-ground observation data on target countries
- Study on inundation analysis and risk assessment method using satellite data together with on-ground observation data on target countries
- Inundation analysis and additional countermeasures (such as hazard map, etc.) based on the risk assessment for target countries
- Preparation of manual and guideline about b and c.
- Seminar for the explanation of manual, and the procedure of b to d.
3

Required Earth Observation Data
Precipitation

Global Satellite Mapping of Precipitation (GSMaP)
*real-time precipitation data provided by Japan Aerospace Exploration Agency
Land use

- Classify multiple satellite data to create high-resolution land-use maps
Flood Observation

- Emergency satellite observations during floods
Earth observation to flood risk maps
# Summary

<table>
<thead>
<tr>
<th>Japan’s commitment</th>
<th>Flood risk mapping</th>
<th>Required data</th>
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<tbody>
<tr>
<td>Under Kumamoto Initiative for Water, Japan has committed to enhance accumulation and evaluation of data for Quality Infrastructure.</td>
<td>Japan start bilateral cooperation on flood risk mapping under Kumamoto Initiative for Water.</td>
<td>Accurate Earth observation data is required with proper evaluation for the formulation of flood risk maps.</td>
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Japan will continue cooperating in flood risk mapping using earth observation data, collaborating with space agencies and the academic sector.
Thank you for your attention!!

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