気候変動予測先端研究プログラム
Advanced Study of Climate Change Projection (SENTAN)

Introduction to Japan's National Climate Program (SENTAN Program)

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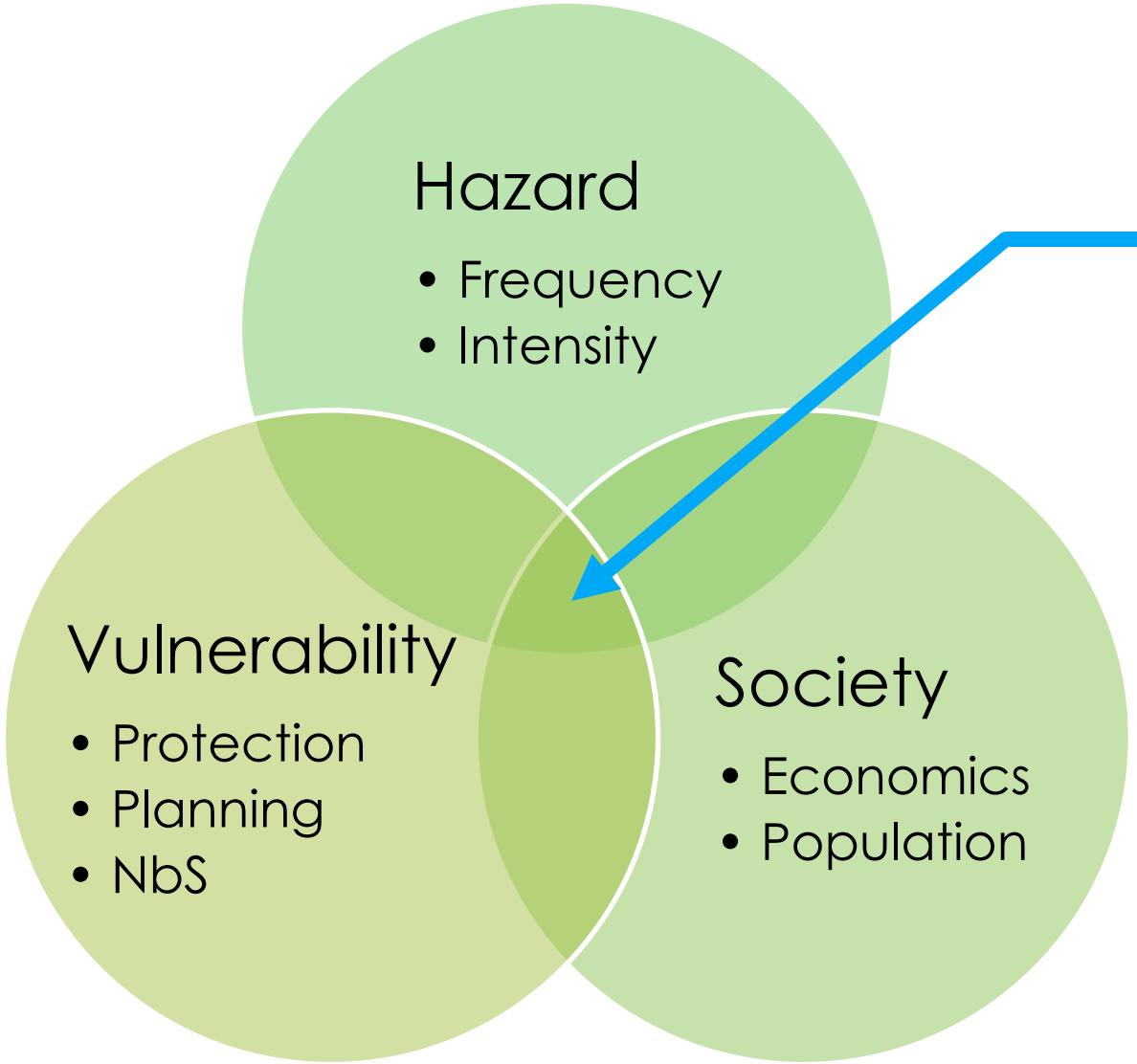
Kyoto University

Projection of extremes is important in Asian hazard assessment

But… Extreme hazard projection is limited

Quantify the Hazard Risks



Potential risk change

- sea-level rise
- precipitation
- river flooding
- coastal flooding
- water resources
- heatwave

Global to local climate risk

Global

Typhoons, Extra-TCs
Sea level rise

Asia/Pacific

Heavy precipitation
Storm surges
Water resources

National

River and coastal flooding
Hazard Risk

Local

Time-line
Hazard intensity
Adaptation

Extreme Projections
Winter Storms
ENSO
Tropical Cyclones

SENTAN Program (2022-2026) is Japan's National Climate Research Program by MEXT

SENTAN Program

2022-2026

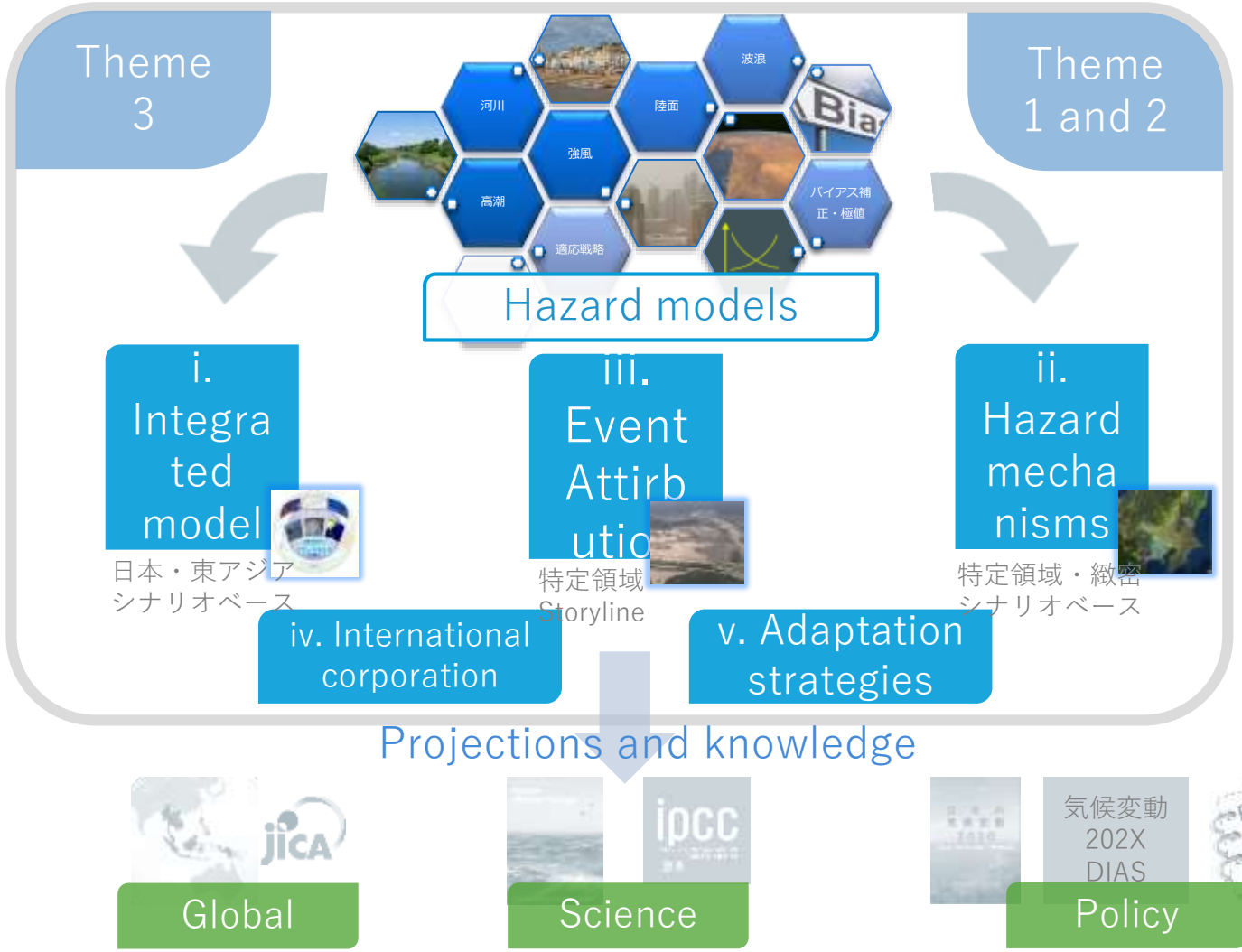
Japan's National Climate Research Program by MEXT

1. Theme 1 AORI, U Tokyo Prof. Watanabe
2. Theme 2 JAMSTEC Dr. Kawamiya
3. **Theme 3 MRI Dr. Tsujino**
4. **Theme 4 DPRI, Kyoto Prof. Mori**

Cooperative working groups (WGs)

- EA, AI, land model, SLR, wildfire, JAXA and international cooperation

SENTAN Program Theme 4: Outline



i. Integrated hazard model development

- Prof. T. Sayama (Kyoto U)

ii. Hazard mechanisms

- Prof. K. Tanaka (Kyoto U)
- Prof. M. Fujii (Hokkaido U)

iii. Hazard Event Attribution

- Prof. T. Takemi (Kyoto U)

iv. International cooperation

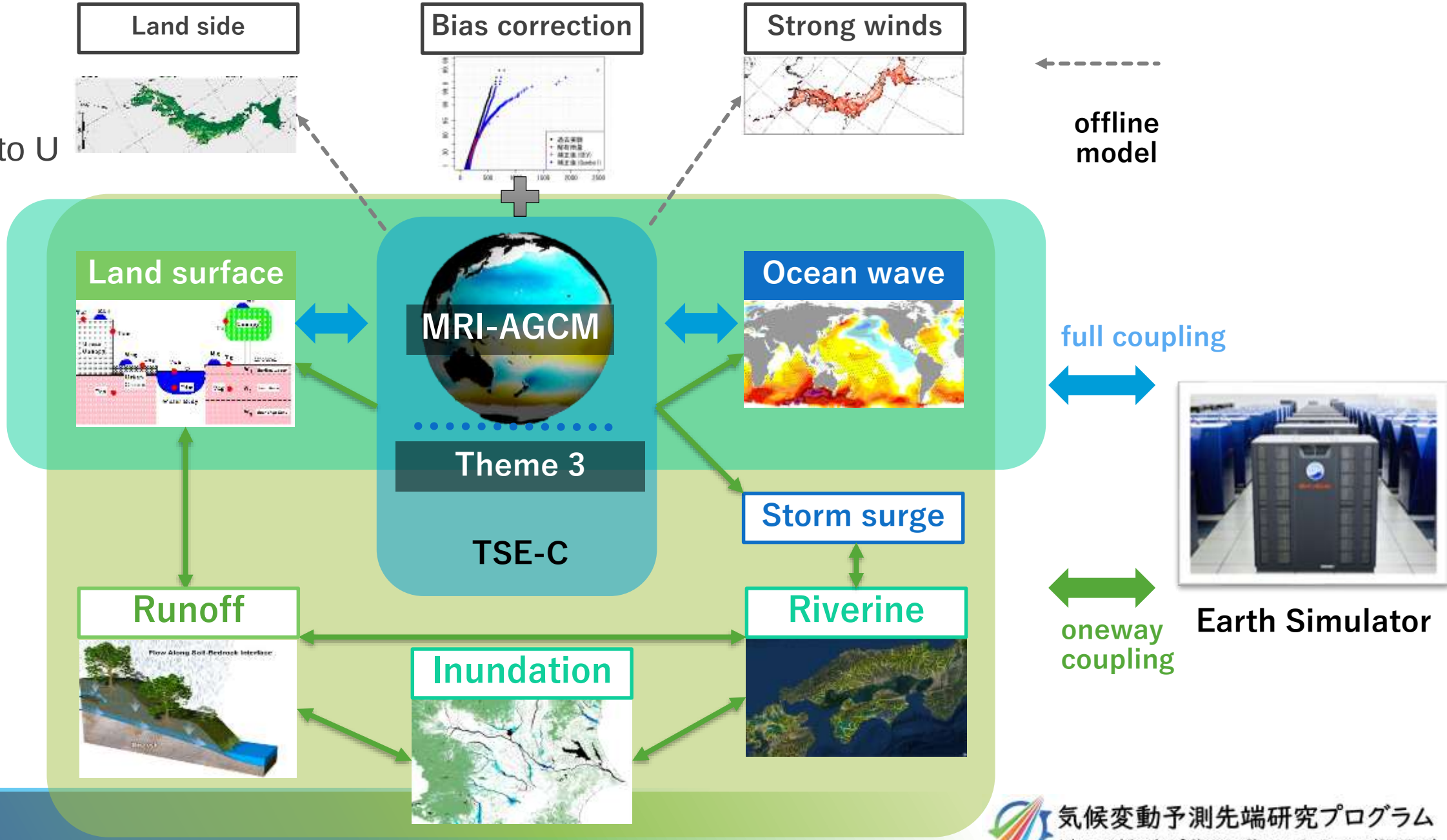
- Prof. Y. Tachikawa (Kyoto U)

v. Adaptation strategy

- Prof. T. Fujimi (Kyoto U)

Group i: Integrated hazard model with GCM

Leader
T. Sayama
DPRI, Kyoto U



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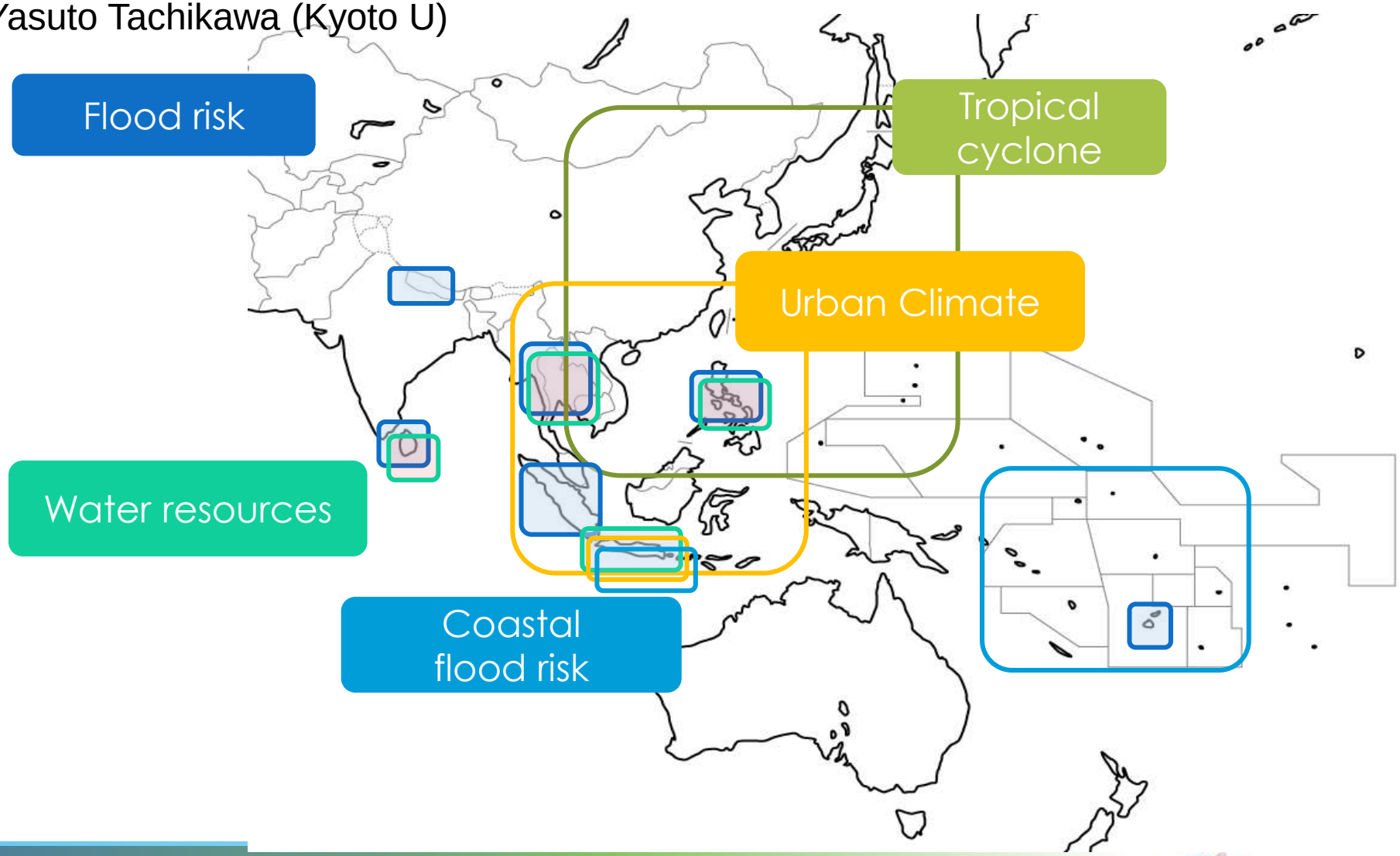
Sub-theme iv：International cooperation for hazard and risk assessments in the Asia-Pacific region

Leader: Yasuto Tachikawa (Kyoto U)



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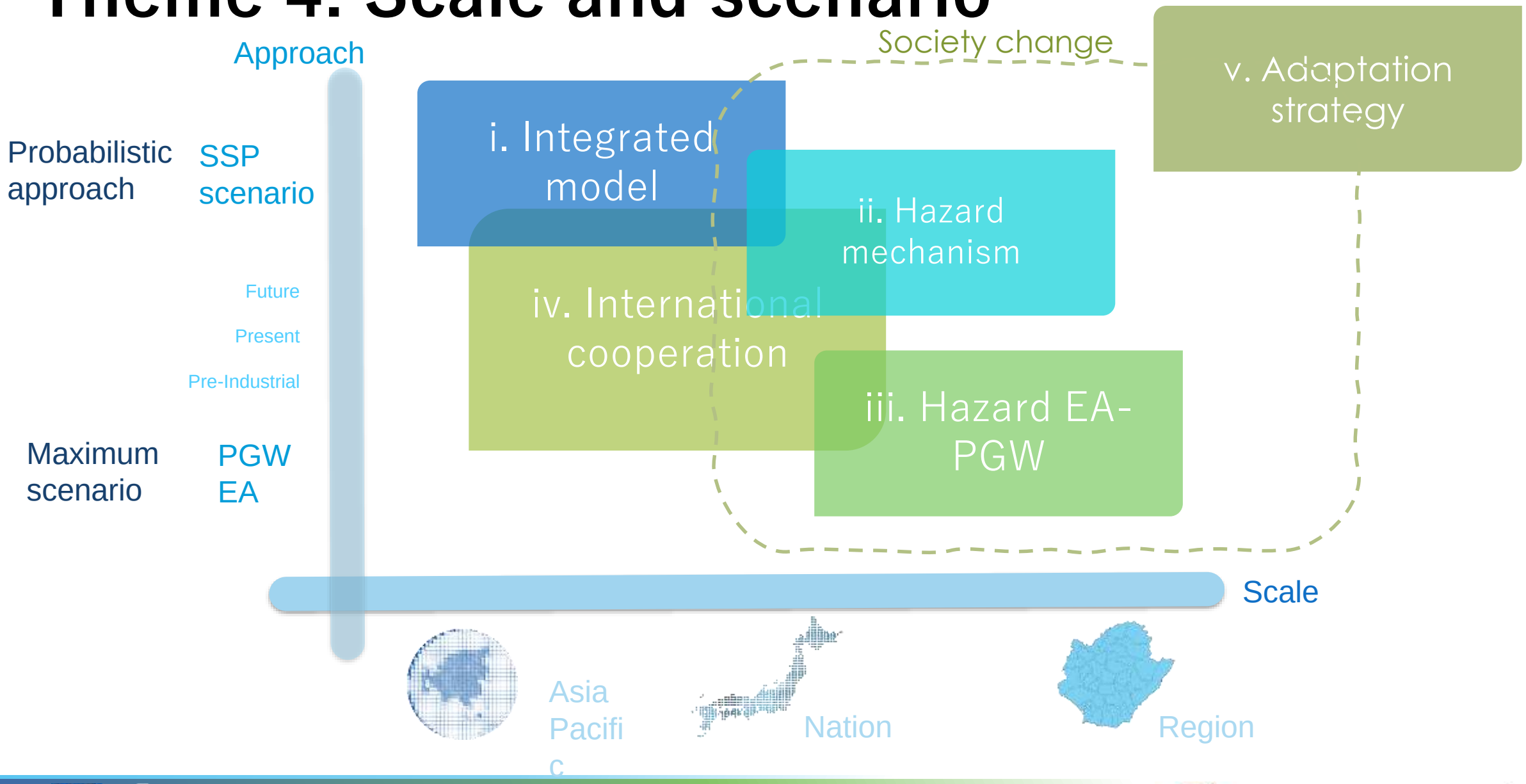
Theme 4: Scale and scenario



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SENTAN P4 Goals

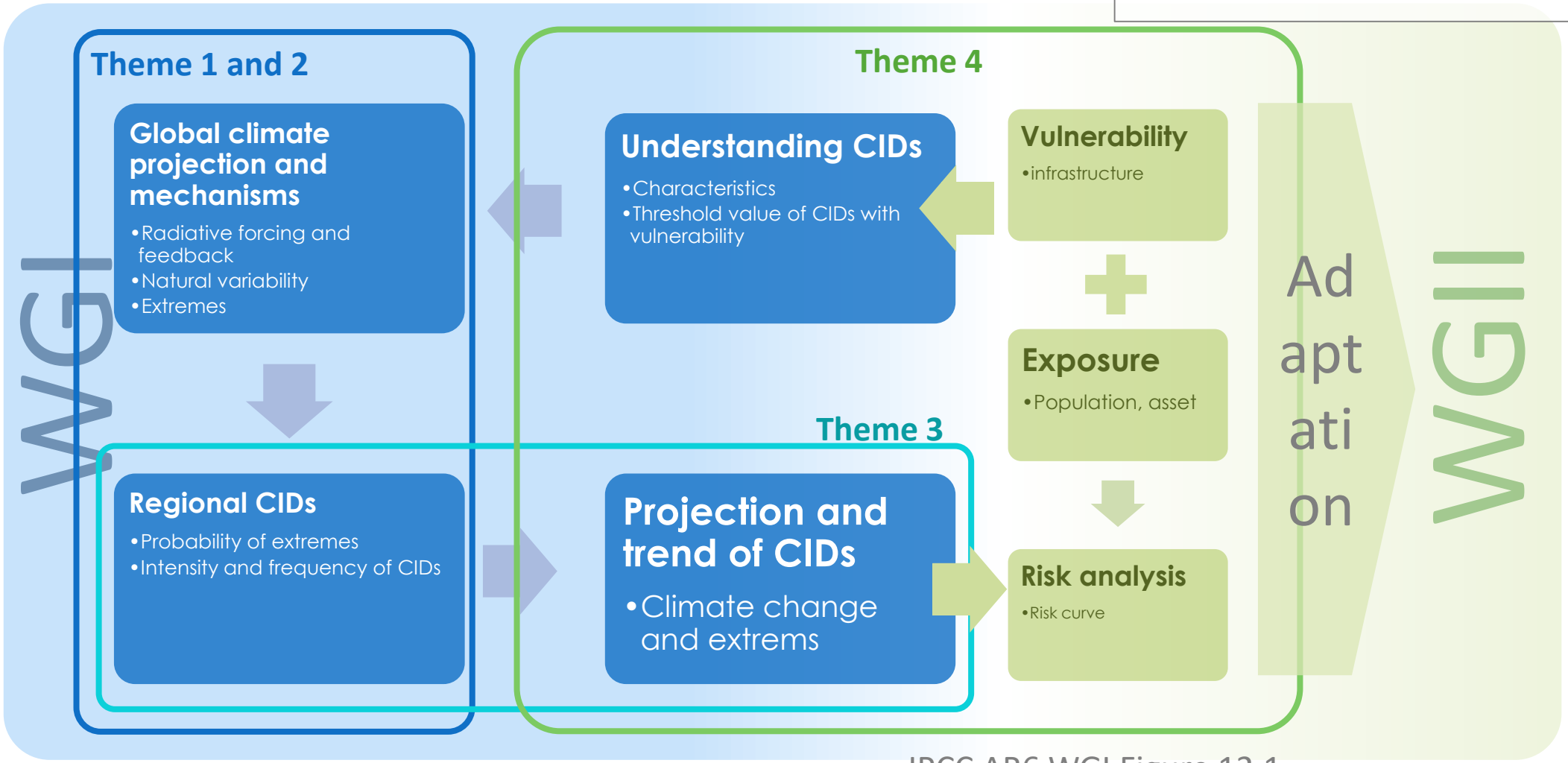
Targets

1. Integrated hazard model
2. Hazard to risk assessment
3. Making climate risk information

Outcome

A) IPCC AR7 and related Special Report
B) National report and dataset
C) Collaboration with governmental agencies and technical users

SENTAN Program and
Climatic Impact Drivers (CIDs) in AR6 WGI



IPCC AR6 WGI Figure 12.1

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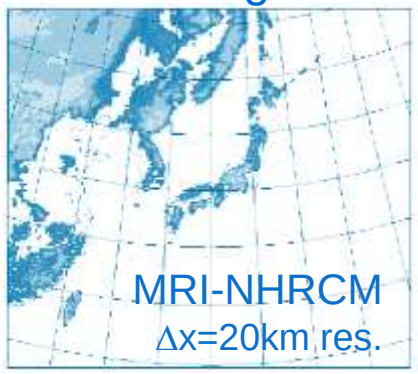
Developing impact assessment model
Making projection (with theme 3)

Large Ensemble Projection: d4PDF

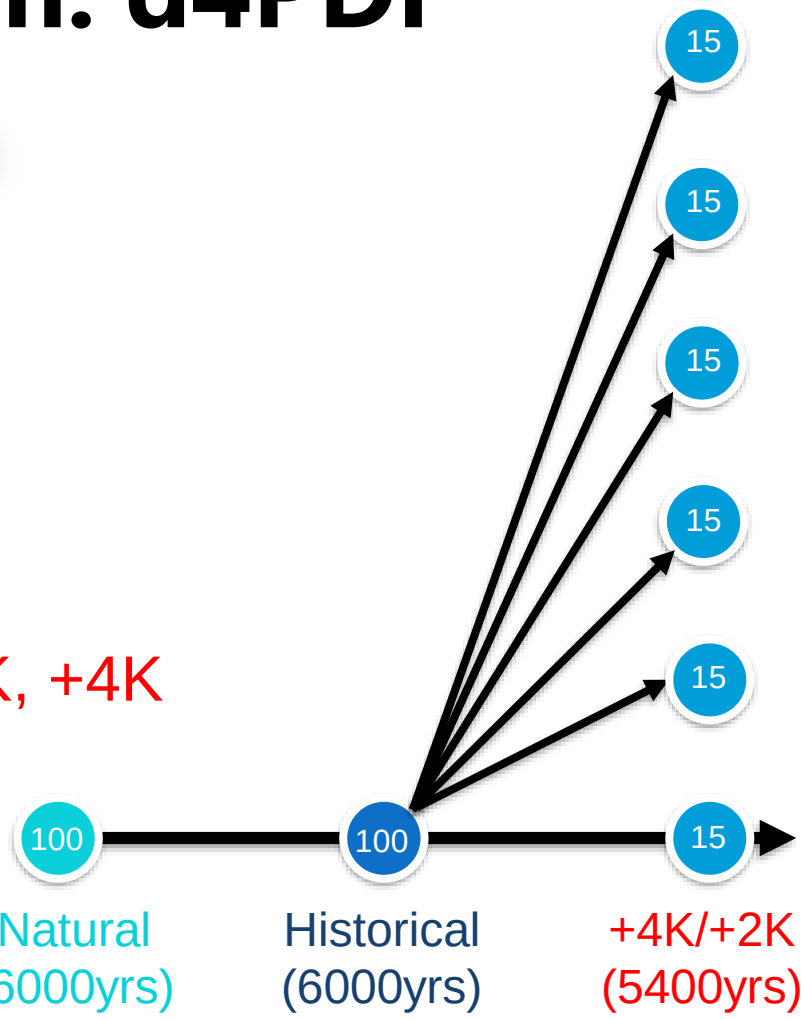
Model

Downscaling to EA



Exp. Configuration

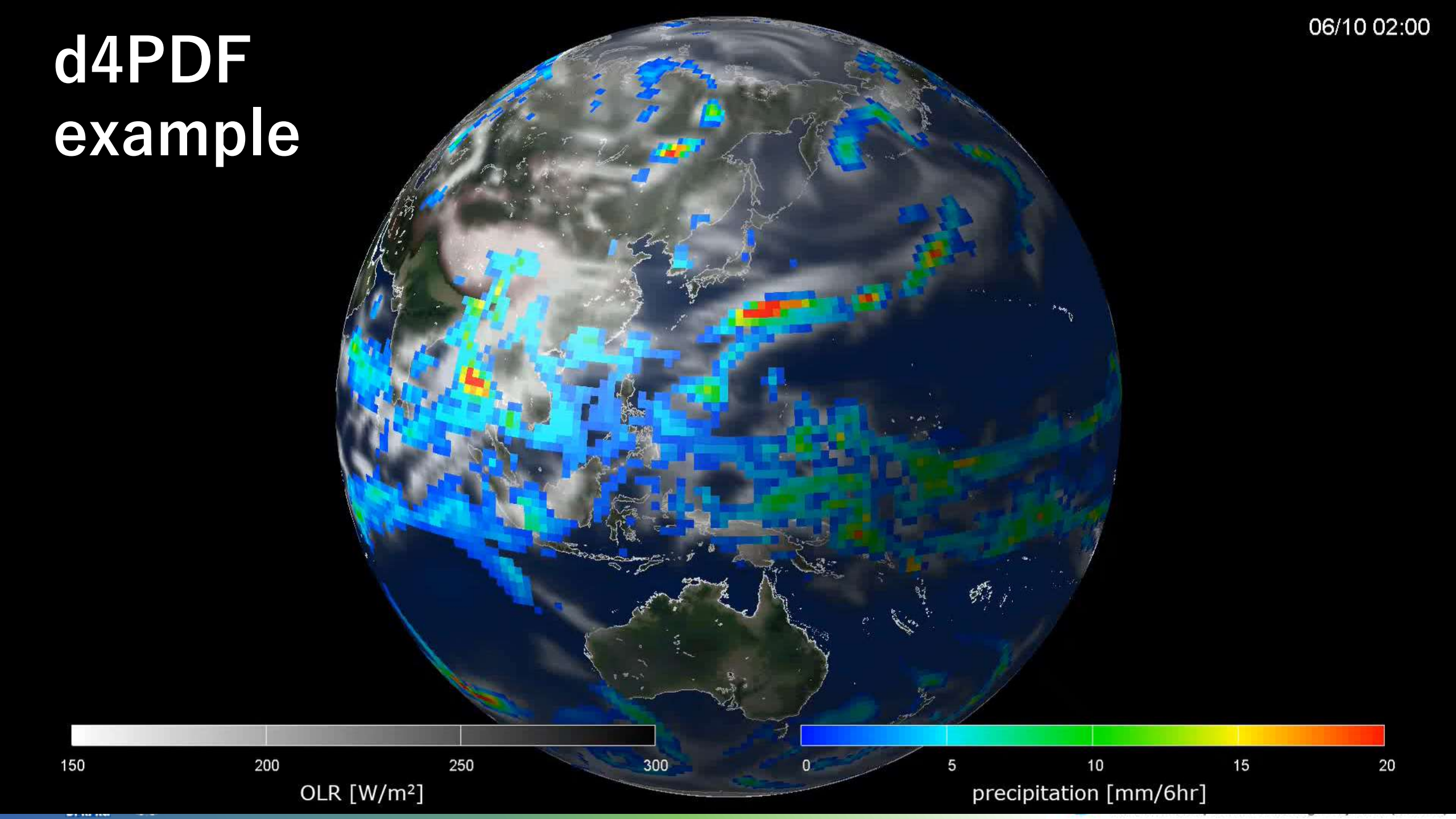
- One ensemble
  - 60yrs
- Initial perturbation
  - 100 for historical/Nat.
  - 15 for future
- Future climate
  - Global mean temp. +2K, +4K
- SST/Sea ice
  - Historical
    - COBE2-SST
  - Future
    - SSTs from CMIP5



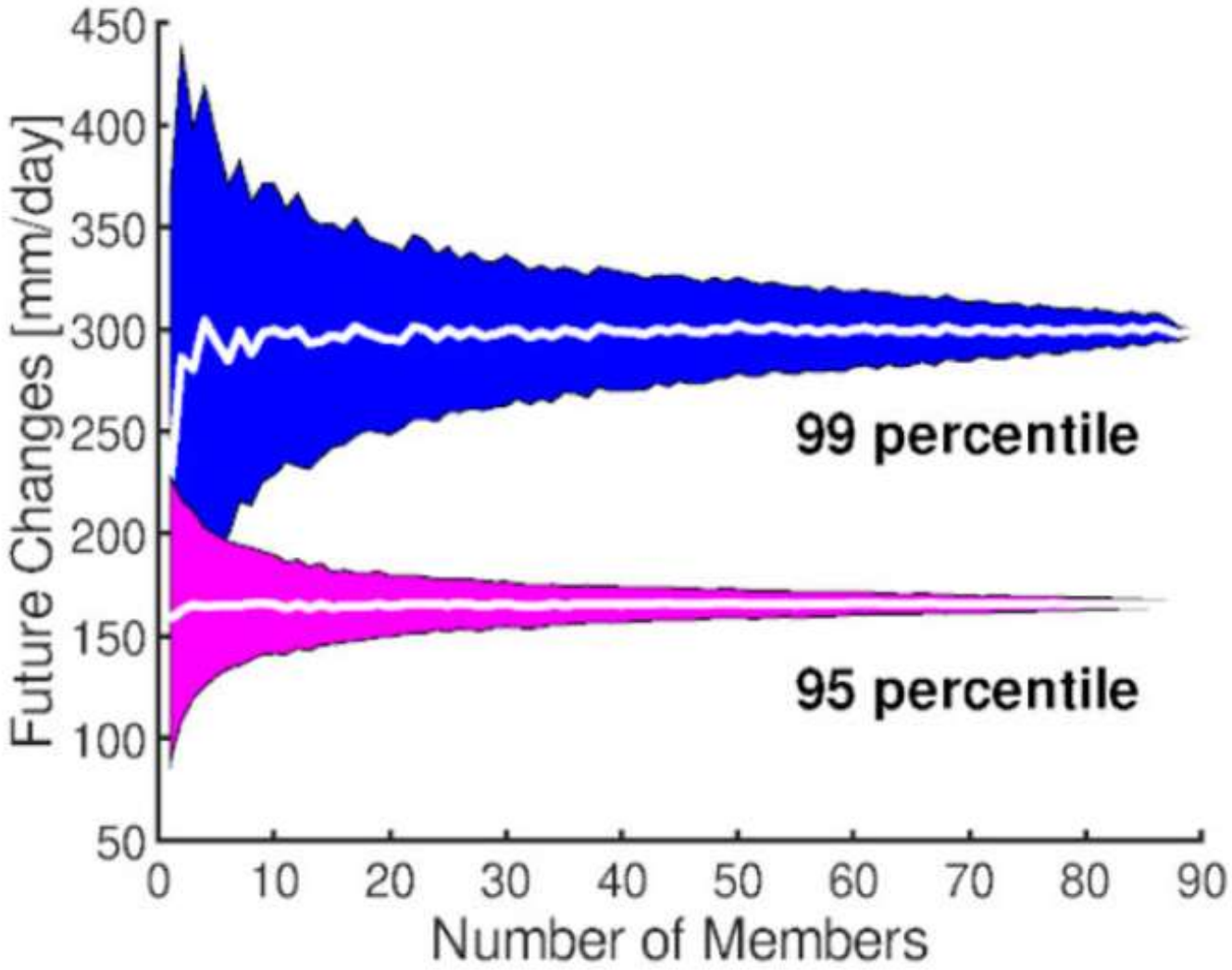
Ishii and Mori (2020) PEPS

Mizuta et al. (2017) BAMS

d4PDF example



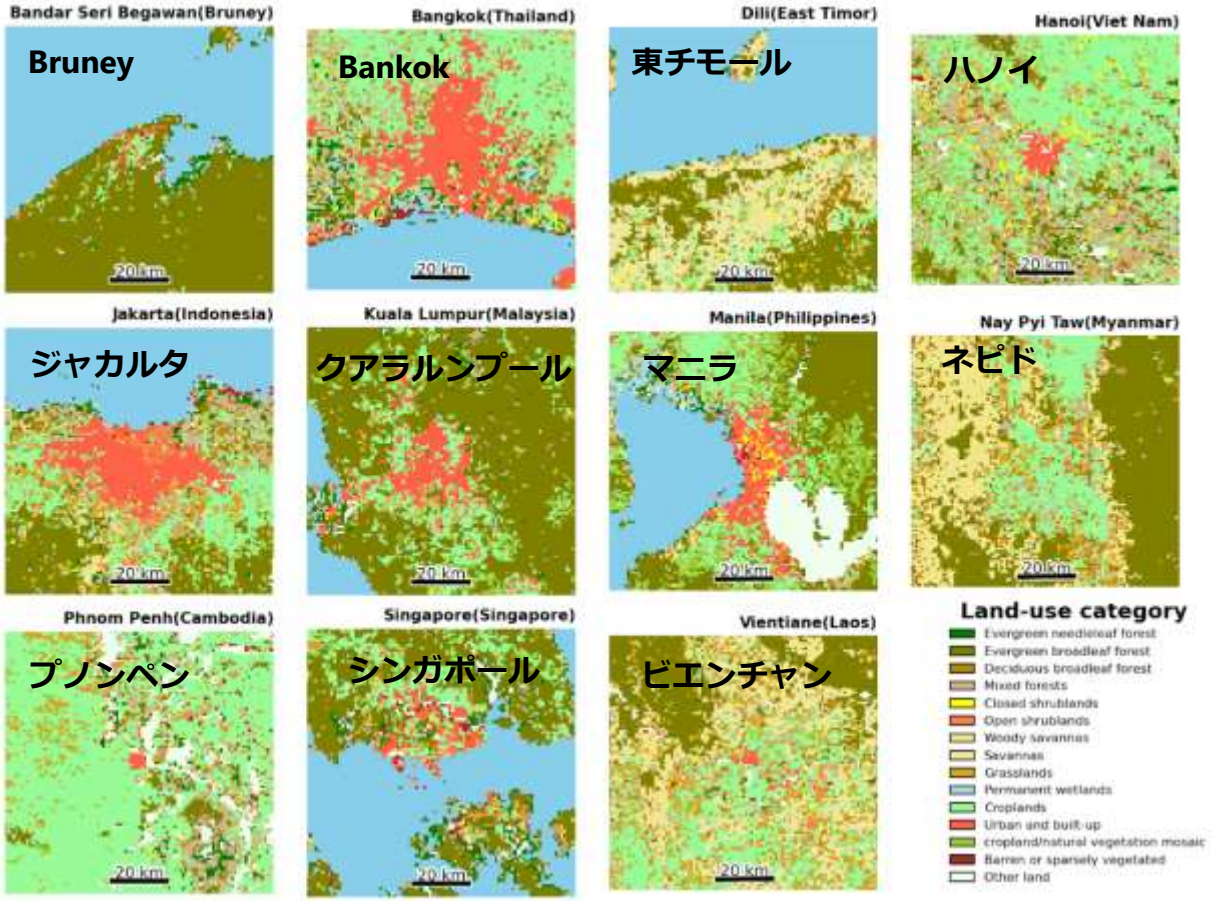
Large ensemble can reduce uncertainty



Ishii and Mori (2020) PEPS

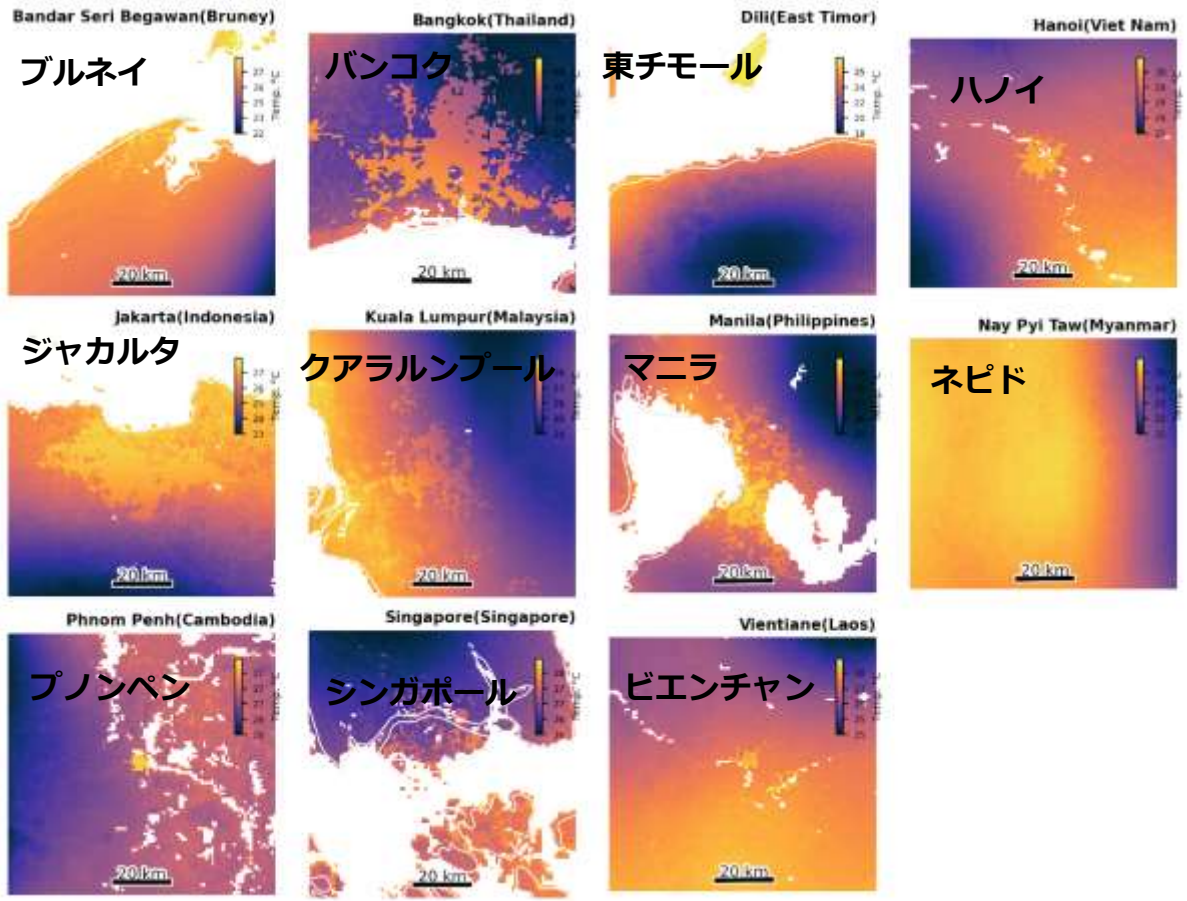
Heat Island in Southeast Asia

1-km land use（MODIS）



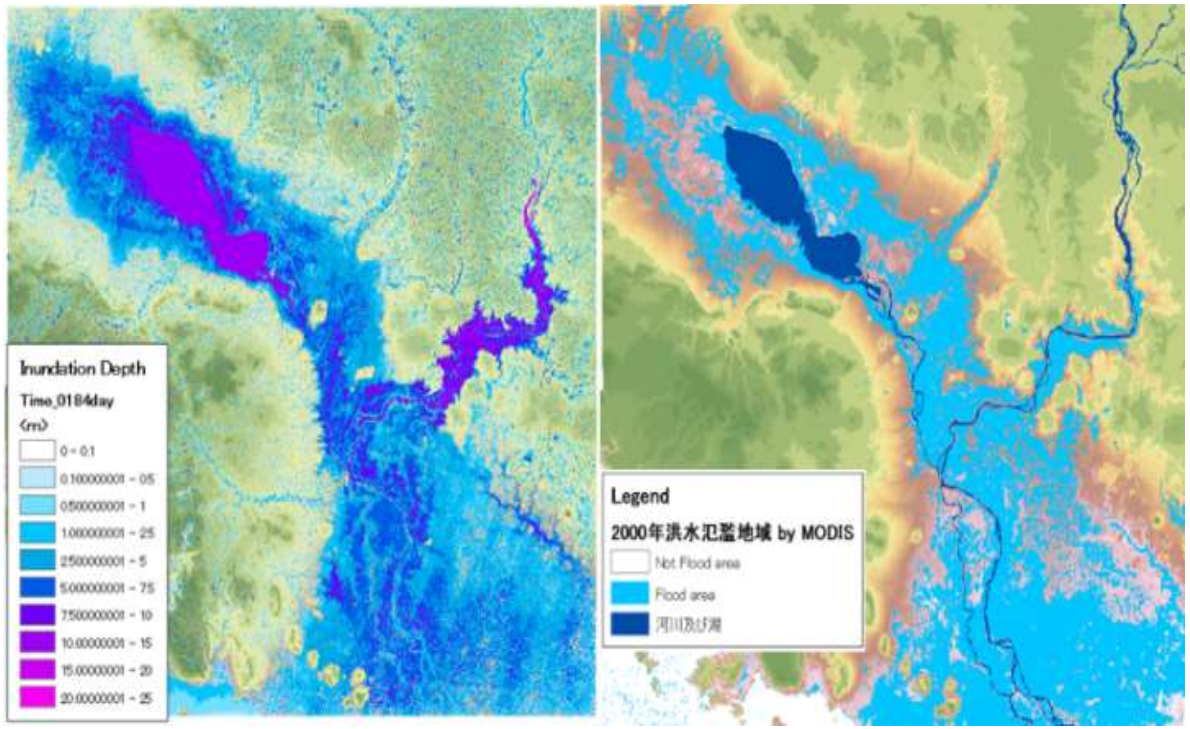
Land-surface-model-base DS

Ground temperature

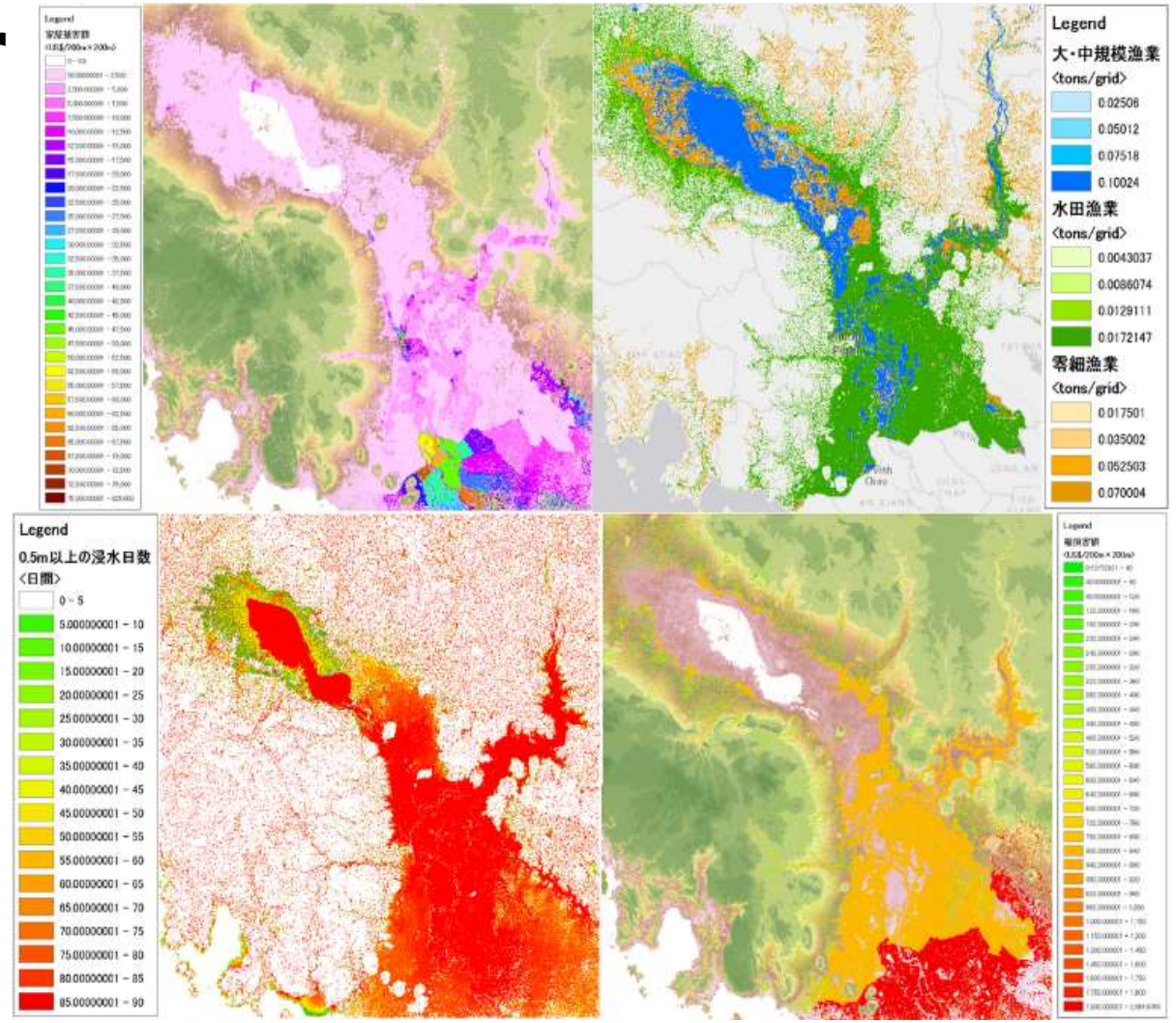


Research on Mekong River flooding and damage

2000/5/1 UTC～2000/10/31 UTC



Left: Simulated Results (Oct. 31)
Right: MODIS Image



Upper left：House damage price
Upper right: Catch by fishery type
Lower left：Days of immersion of 0.5 m or more
Lower right: Amount of agricultural damage

Summary

- Impact assessment for extremes will be dramatically improved in SENTAN program.
- Targets for the next 5 years
  - Multi-hazard assessment
  - Risk assessment
  - Maximum class assessment
  - Close linkage with adaptation measures
- Impact assessment for Asia and the Pacific areas
  - IPCC does not care individual country
  - Need for international cooperation

Thank you for listening and willing to collaboration