T. Yoshikane LAB.

[AI weather forecasting]

Large-Scale Experiment and Advanced-Analysis Platform

AI for Civil Engineering

Civil Engineering : Graduate School of Engineering
Department of Human and Social Systems
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Background

Extreme events

Observation : 100 years at most

Return periods: 100 years
(The probability of ocurring is 1% in any one year)

What should we do?

Utilize the d4PDF
(d4PDF: database for Policy Decision making for Future climate change)

Purpose: Reduce the uncertainty of extrere events

Advantage: Massive amount of simulation data more than 3,000 years

Disadvantage: Model biases

methodology

Application of d4PDF

Clarification of extreme events patterns

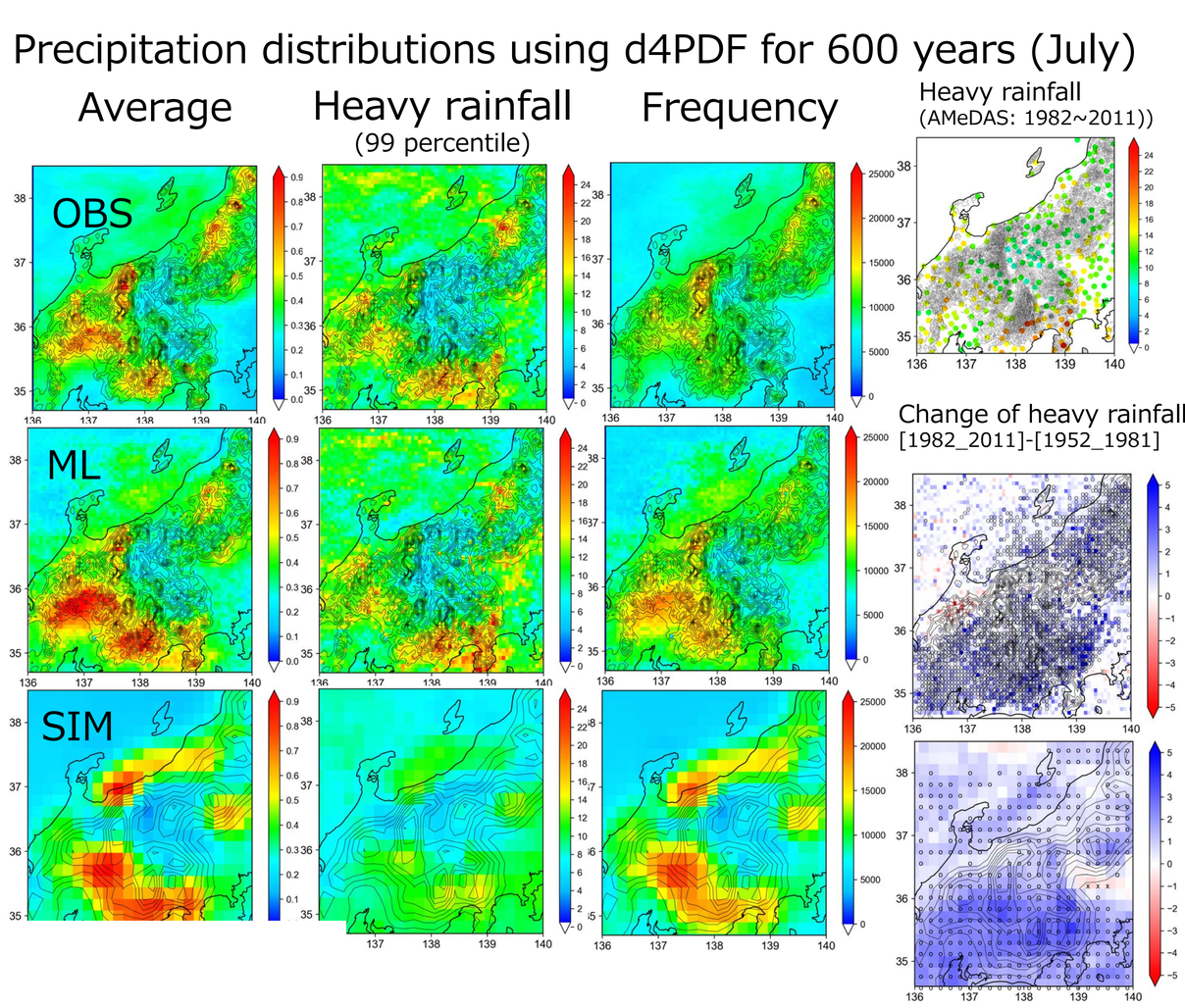
Recognition of weather patterns
(using observations in 12 years data)

Weather patterns in d4PDF → **Classifier**

Bias correction & Downscaling

Estimation of extreme events

Precipitation distributions using d4PDF for 600 years (July)



Application

Global warming causes Typhoon 19?
It may not be related
➡Necessity to understand extreme events

Weather patterns causing extreme events
- a super typhoon
- localized torrential downpours
- serious drought

Recognition of extreme events by ML
Improving weather & flood forecasting

⇨***Disaster Resilient Cities***

Data for 3,000 years ↔ Todays Earth/Japan
(Flood forecasting system)

Prediction of Extreme events

Decision making supporting by AI

Changes in external environment
(e.g. Urban population)

Water management
Dam, retension basin, Underground Discharge Channel, stormwater infiltration
Evacuation plan
Environment & energy
Small hydropower generation, Heat pimp

Greenhouse gas reduction/ Mitigation of Heat island