

# T. Yoshikane LAB.

## [AI Regional Earth system]



Large-Scale Experiment and Advanced-Analysis Platform

AI for Civil Engineering

Civil Engineering : Graduate School of Engineering

Department of Human and Social Systems

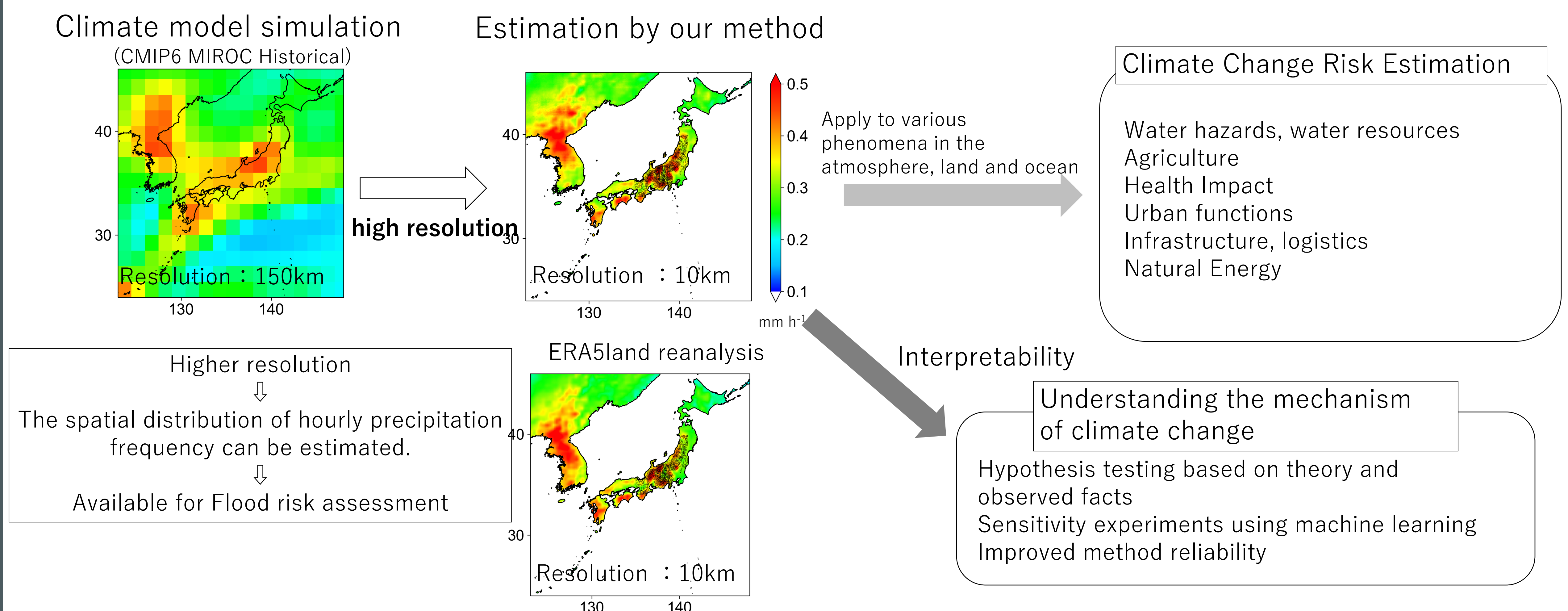
<https://www.iis.u-tokyo.ac.jp/en/research/staff/yoshikane-takao/>

### Background

Climate model simulations, which have developed rapidly in recent years, have revealed a variety of factors that contribute to global climate change. On the other hand, the mechanisms of localized disasters and environments caused by climate change are not easy to understand because they involve various factors such as topography. In addition, detailed regional studies of climate change require high-resolution simulations, **which require enormous computing resources**.

We are developing a method **to estimate regional detailed climate change characteristics** by recognizing the relationship between the phenomena reproduced in climate model simulations and observed values using **machine learning**. For example, this method is a statistical method, but estimates the time variation of hourly precipitation as if it were a dynamical method. In addition, this method is **computationally inexpensive and allows for higher resolution and bias correction**. This approach is expected to enable more accurate estimates of various climate change risks, including **water-related disasters, water resources, agriculture, and health impacts**

### Summary



High-resolution 30-year average precipitation using machine learning methods and understanding climate change mechanisms

### Future Prospects

By combining numerical simulation with machine learning methods (reinforcement learning), it is expected to be possible to take effective measures to minimize damage and promptly recover. Our laboratory is further developing AI forecasting research and working toward the realization of a **disaster-resilient society** (Less damage and faster recovery even in extreme events) while understanding the regional-global system.