NITTA LAB.

Development of Integrated Land Simulator

Department of Human and Social Systems

Integrated Land Modeling
Department of Civil Engineering, Graduate School of Engineering

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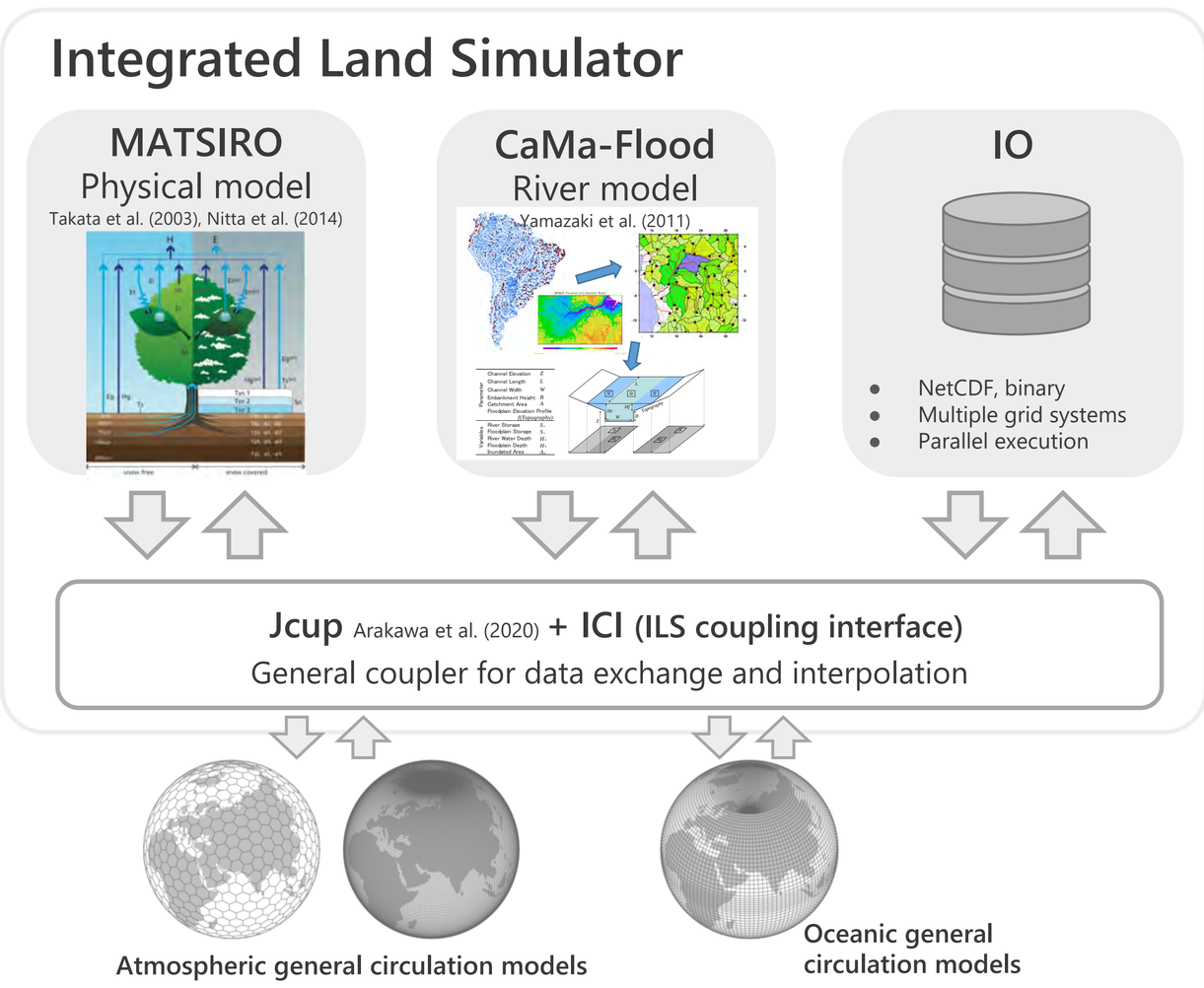
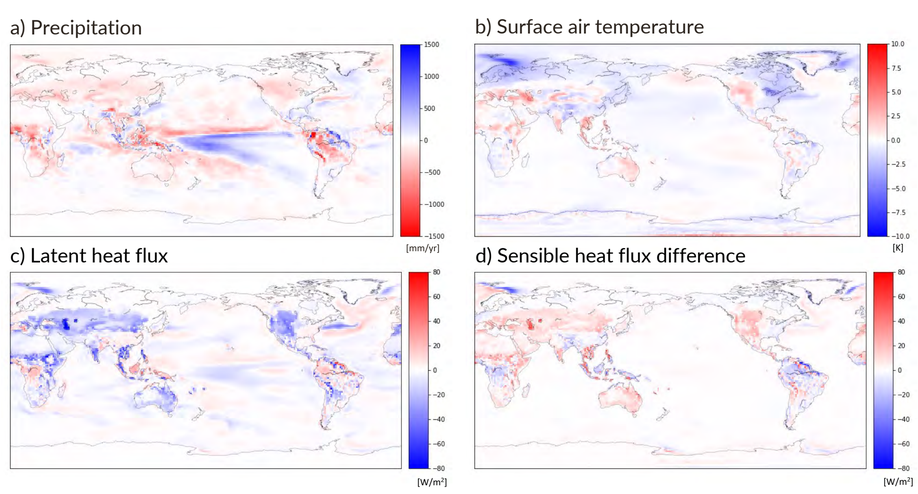
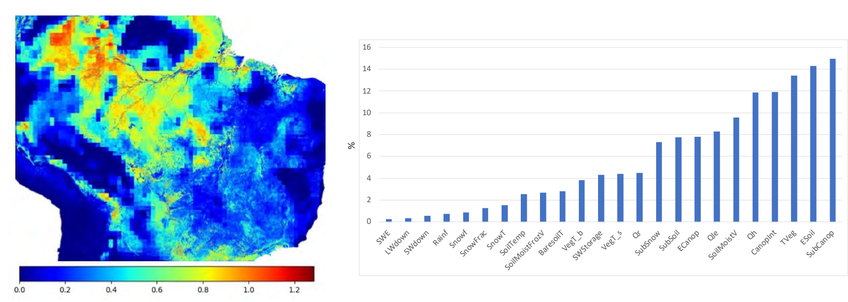
We are developing a terrestrial component of MIROC7 (Model for Interdisciplinary Research on Climate) in collaboration with domestic and international researchers studying terrestrial water, energy, and biogeochemical cycles. MATSIRO6, the terrestrial component of MIROC6, has improved the reproducibility of terrestrial processes by introducing a wetland scheme for high latitudes and a snow cover parameterization that considers the subgrid snow depth distribution. For historical reasons, however, MATSIRO6 was developed as part of an atmospheric model and had the same spatial resolution as the atmospheric model. Although sub-grid and tiling schemes were introduced to address land heterogeneity, they were only partially successful in capturing it. Therefore, we developed a new framework called the Integrated Land Simulator (ILS), which combines multiple land component models with MIROC's atmosphere and ocean models using general-purpose coupling software. It employs a basin-shape grid and a higher spatial resolution than the atmospheric and ocean models. The developed model will be used as the land model for MIROC7, and testing is underway.

Framework of ILS



Climate simulation with ILS



Hyper resolution hydrological simulations