

NITTA LAB.

Development of Integrated Land Simulator



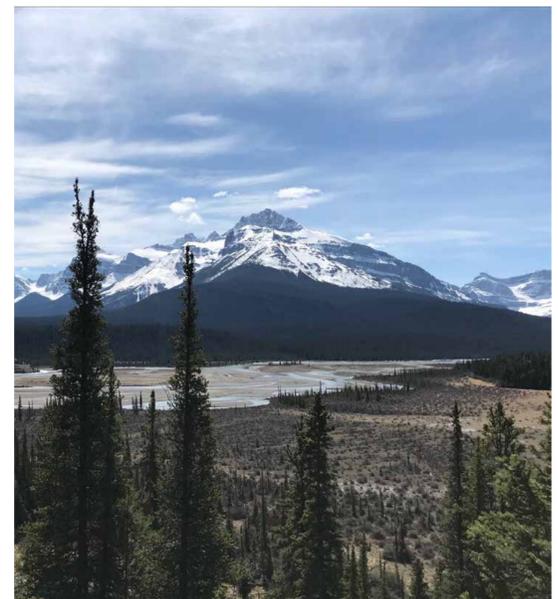
Department of Human and Social Systems

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

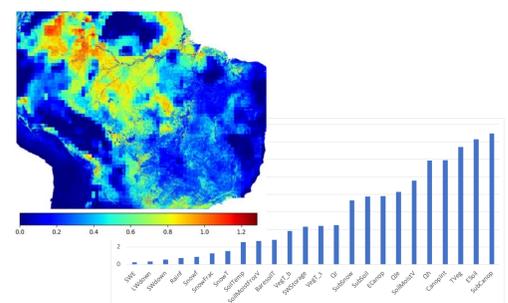
<https://isotope.iis.u-tokyo.ac.jp>

Development of a new land simulator

In the global climate system, land includes complex processes in the cryosphere, hydrosphere, and land surface that interact with the climate system. Therefore, modeling land processes is important in climate modeling. Also, accurate hydrological simulations are crucial for flood or drought predictions. Our team is developing a new land simulator called Integrated Land Simulator (ILS). ILS consists of multiple component land models, which are coupled by a general-purpose coupler. This framework makes it easier to couple an atmospheric or oceanic model with different grid systems, as well as models representing different land processes (e.g., vegetation dynamics, human activities, etc.), and to conduct numerical experiments. Currently, ILS includes a physical land model, MATSIRO, and a hydrodynamic model, CaMa-Flood. The inclusion of additional land models is ongoing. By coupling with an atmosphere-ocean general circulation model, we aim to improve the accuracy of the overall climate model.

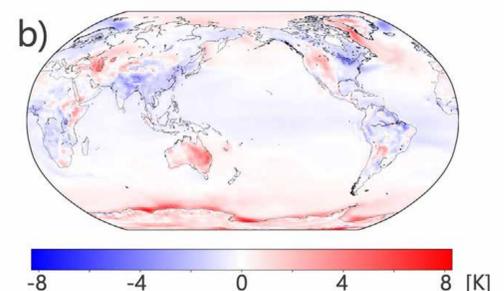
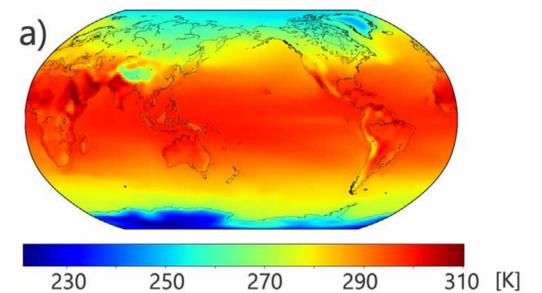


Hyper resolution hydrological simulations



Test simulation results: global 1 km hydrological simulation

Climate simulation with ILS



Surface air temperature from a MIROC-ILS coupling experiment

