Yoshikane LAB.

[Development of regional earth system modeling]

Department of Human and Social Systems
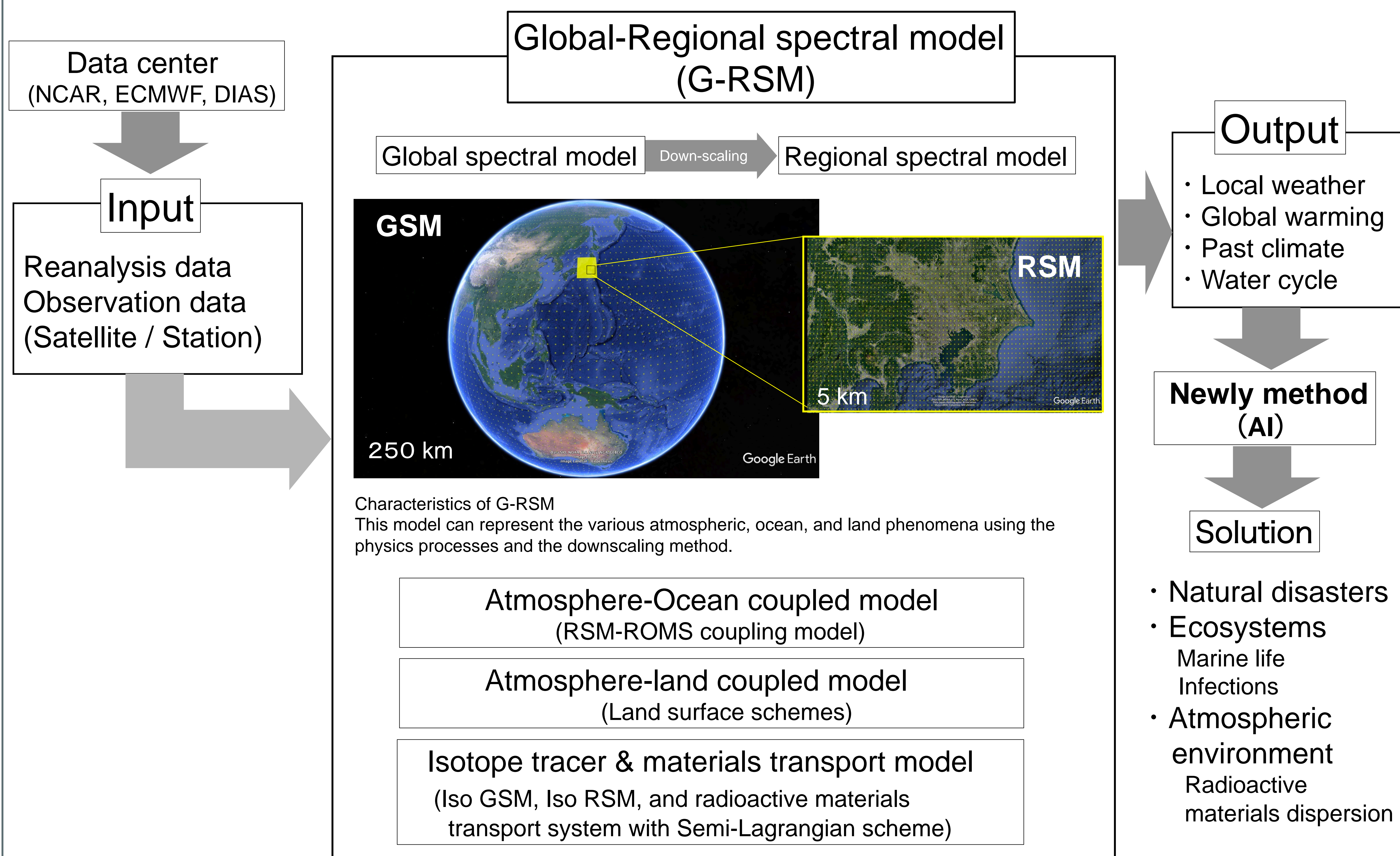
Meteorology and Climatology

Meteorology and Climatology   https://www.iis.u-tokyo.ac.jp/en/research/staff/yoshikane-takao/

Goal: Understanding the systems of nature and human activity, and contributing to reduce the disaster risks and promote safety and security of communities.
The balance of systems between nature and art is very important for SDGs. In our laboratory, the regional earth system model (G-RSM), which can represent the interaction between atmosphere, ocean, and land processes, and newly developed method using artificial intelligence are utilize to achieve the goal.

Data center
(NCAR, ECMWF, DIAS)

Global-Regional spectral model (G-RSM)

Input

Reanalysis data
Observation data
(Satellite / Station)

Global spectral model   Down-scaling   Regional spectral model

GSM

RSM

250 km   5 km   Google Earth

Characteristics of G-RSM
This model can represent the various atmospheric, ocean, and land phenomena using the physics processes and the downscaling method.

Atmosphere-Ocean coupled model
(RSM-ROMS coupling model)

Atmosphere-land coupled model
(Land surface schemes)

Isotope tracer & materials transport model
(Iso GSM, Iso RSM, and radioactive materials transport system with Semi-Lagrangian scheme)

Output

· Local weather
· Global warming
· Past climate
· Water cycle

Newly method （**AI**）

Solution

· Natural disasters
· Ecosystems
  Marine life
  Infections
· Atmospheric environment
  Radioactive materials dispersion

Prevention and reduction of disaster and risk management

Prediction of local precipitation using AI

Prediction of radioactive materials dispersion

Observation（Radar）   Estimation (AI)   Simulation