Development of a global water risk assessment tool to support investigation of adaptation to climate change in the private sector: Calibrating parameters of a global water resources model by Approximate Bayesian Computation

*Naota Hanasaki[1]

1. NIES National Institute of Environmental Studies

Private companies need to avoid the harmful impacts on their business and express their plans and actions toward climate change. To support climate change adaptation planning of private sectors, an open global water risk assessment tool is being developed.

The global hydrological model H08 can simulate not only natural hydrological cycle but also human water use simultaneously at a daily interval at a spatial resolution of 0.5 degree. By feeding future climate scenarios and socio-economic assumptions to H08, one can analyze the change in hydrological cycle and water requirement/use due to global change with spatiotemporal details. Although these features are useful to investigate the risks of flood and drought in the future, the uncertainty in the model hampers effective interpretation. In particular, the simulation performance at the places where production bases are located is crucial for private companies. Therefore, parameter calibration was performed which has been seldom carried out at a global scale.

In this study, we applied the Approximate Bayesian Computation (ABC) to calibrate four key hydrological parameters of H08. Altogether 5000 simulations were conducted by changing four parameters randomly. By identifying the range of each parameter that showed the best performance in reproducing the past, we systematically calibrated the ranges of four parameters. This approach was applied for 64 basins with more than 500,000km2 of catchment area in the world. The results showed that calibrated parameters produced reasonable simulation results for most of the basins in the world. In the presentation, the results for smaller catchments and daily simulations will be presented.

Keywords: Adaptation, Climate Change, Water resources

