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Development of a basic common library (SCALE) for future HPC and datasets created by the library

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A basic Common library named Scalable Computing for Advanced library and Environment (SCALE) is now being developed at RIKEN, Advanced Institute for Computational Science (AICS). The library is developed to solve the problems that come from the sophistication of numerical models and the recent trend of high performance computing (HCP). The library is downloadable from the web site of RIKEN, AICS (http://scale.aics.riken.jp/). The license of the SCALE is based on BSD 2 license.

SCALE-Large Eddy Simulation (LES) is now available as a component of the SCALE library. The SCALE-LES is based on fully compressible system, and it uses vertically explicit and horizontally explicit (HE-VE) scheme. Even ordered central differential schemes (2nd ordered central differential scheme for the terms relating to the density, 4th ordered central differential scheme for the other terms) are applied for spatial discretization. The 3rd ordered Runge-Kutta scheme is applied for the temporal discretization. Physical components implemented in the SCALE-LES are turbulent scheme, a radiation scheme, cloud microphysical schemes (1-moment bulk, 2-moment bulk, and spectral bin scheme), and surface flux model. The aerosol model, chemical transport model, urban canopy model will be implemented near future.

In future, the SCALE library will be extended to regional model with nesting system, global model. As well as the atmospheric component, the SCALE will be extended to the entire targets for numerical simulation (e.g. ocean, biosphere, molecular dynamics, or so).

We will introduce some examples of the results obtained from the SCALE-LES and some datasets. We aim to share and discuss about not only the model results but also the problem when we treat the big data (e.g. data handling, visualization or so) with the participants regardless of their background.