Recent progress of Japan’s regional downscaling project (SI-CAT) and CORDEX Asia Empirical-Statistical Downscaling (ESD)

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As a Japan’s national project, SI-CAT develops reliable technologies to find climate change adaptation measures in collaboration with researchers of geoscience, social science and humanities, and officials of local governments from the beginning of the project to avoid and reduce various threats of climate change.

We conducted dynamical downscaling experiments with horizontal grid spacing of 5km and 2km to reproduce regional climate information. We examine the performance of the regional climate model (NHRCM) to represent severe precipitation events occurred around Gifu and Nagano region. To examine the performance in ungauged mountainous regions, the runoff analysis was conducted. It indicates the overestimation of precipitation. We conduct the ensemble downscaling experiments using database for Policy Decision making for Future climate change (d4PDF) to detect the climate change impact in this region.

Multi-model large ensemble regional climate scenarios over Japan and CORDEX Asia are developed by using CMIP5 GCMs (RCP2.6 and RCP8.5) and a statistical downscaling (Bias Corrected Spatial Disaggregation (BCSD)) to investigate uncertainty of projected change associated with structural differences of the GCMs for the periods of historical climate (1950-2005) and near future climate (2026-2050). Uncertainty range information of the regional climate scenarios support various regional adaptation measures and informed decision making. Based on the SI-CAT experiences, the CORDEX Asia ESD group enhances and integrates the science and application of downscaling activities in Asia by sharing and exchanging data, knowledge, and techniques.

Keywords: Dynamical downscaling, Statistical downscaling, Multi-model ensemble, CORDEX, Asia

