Based on the Coupled Model Intercomparison Project phase 3 (CMIP3) multi-model dataset, we investigate reproducibility of the summer monsoon over the Asian and western North Pacific (WNP) sectors and its future projections based on these evaluation.

We presented metrics on the reproducibility associated with the first transition of the Asian summer monsoon in the CMIP3 coupled general circulation models. By using these metrics, future projections of wind-derived summer monsoon onset dates are examined, by using weighted multi-model ensembles. Compared with the present climate, the onset dates are projected to delay by 5 to 10 days in the southern part of the Bay of Bengal, the Malay Peninsula, and the southern part of the South China Sea. Development of upper tropospheric easterly jet over India and its vicinity is also projected to delay, implicating that this change is related with the larger increase in upper tropospheric temperature over the equatorial regions compared with that over the northern mid-latitude regions.

We also evaluated the reproducibility of seasonal march of precipitation in boreal summer over central Japan. Based on the evaluation metric, future projections of the end of the Baiu rainy season in July are also investigated. The decrease of precipitation in the Baiu withdrawal is projected to be unclear under global warming condition, and it is implied that this change is associated with the displacement of the center of convective activities and the warming pattern of sea surface temperature over the Pacific Ocean.