

Generating a Database for Probabilistic Description of Future Climate Change (d4PDF)

Masahiro Watanabe¹ and Team d4PDF

¹ Atmosphere and Ocean Research Institute, University of Tokyo, Japan
(hiro@aori.u-tokyo.ac.jp)

Abstract

Projection of climate change on regional scales tends to be an imminent issue in the global warming studies. A number of impediments for reliable regional projection still exist in the coupled model intercomparison project phase 5 (CMIP5) simulations. One critical problem is the model errors that appear in mean sea surface temperature (SST) distribution, which distort regional patterns of circulation and precipitation. Here, we generate a large ensemble of the past and future climate simulation using a high-resolution (60 km mesh) Meteorological Research Institute (MRI) atmospheric general circulation model (AGCM) in which observed SSTs for the past 60 years have been prescribed to avoid SST biases. By comparing the 100-member ensembles with and without SST warming patterns taken from the CMIP5 multimodel simulations, we are able to identify probabilistic changes in regional temperature and rainfall. The data set will be open to public for extensive use not only in climate change studies but in impact assessments and adaptation policy making. Examples for the probabilistic estimation of regional climate changes under global warming are presented.