Downscaling Experiments of Japan Coastal Seas under Ocean Past/Future Prediction Results: Preliminary Results

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Under the SI-CAT project (Social Implementation of Climate Adaptation Technology, funded by MEXT, Japan), we have developed a high-resolution (2km) model of Japan coastal seas covering 122.6E to 150E and 23.7N to 47.5N as a downscaling model from a coarser resolution (10km) parent model of the North Pacific covering 100E to 75W and 15S to 70N, which are based on MRI.COM_v4 developed at MRI/JMA. In this project, we have produced past/future prediction simulation results from 1960 to 2100 by the parent model under several atmosphere forcings from CMIP5 historical/RCP runs and an atmospheric reanalysis (JRA55) dataset. Using some of these past/future prediction results by the parent model, we conduct several pilot experiments of downscaling. We adopt 10-20 years as the downscaling period and pick up some past/future periods from the 140-year simulation of the parent model (e.g., 1990-2000 and 2040-2050). We examine basic reproducibility of important ocean structures around Japan (e.g., the Kuroshio current and surface/subsurface temperature and salinity) in the downscaling results by comparing these with the long term simulation results using an ocean reanalysis data (FORA) and the parent model results. We will also examine climate change impacts on Japan coastal areas by comparing the results of the different periods.

Keywords: ocean downscaling, Japan coastal seas, ocean past/future prediction simulation

