EGU23-10492, updated on 19 Apr 2024
https://doi.org/10.5194/egusphere-egu23-10492
EGU General Assembly 2023

Projection of local sea-level rise under CMIP6 scenarios (SSP1-2.6, SSP5-8.5) in the Northwestern Pacific marginal seas using dynamical downscaling.

Yu-Kyeong Kang[1], Yang-Ki Cho[1], Yong-Yub Kim[2], Bong-Kwan Kim[1], Gwang-Ho Seo[3], Seok-Jae Kwon[3], and Hyun-Ju Oh[3]

[1]Seoul National University, School of Earth and Environmental Sciences, Seoul, Republic of Korea
[2]Center for Climate Physics, Institute for Basic Science, Busan, Republic of Korea
[3]Ocean Research Division, Korea Hydrographic and Oceanographic Agency, Busan, Republic of Korea

The global mean sea level has been rising with an acceleration since the twentieth century. Sea level rise is not spatially uniform but shows large regional variation. Local sea level can change due to various physical processes like changes in ocean circulation, atmospheric pressure, and mass redistribution. Projections of global sea level changes are available from the Coupled Model Intercomparison Project Phase 6 (CMIP6) database. However, Global climate models (GCMs) are limited in simulating spatially non-uniform sea level rise in marginal seas due to their coarse resolution and the absence of rivers and tides. High-resolution regional ocean climate models (RCMs) that consider tides and rivers were used to address these limitations in the Northwestern Pacific (NWP) marginal seas through dynamical downscaling. Four GCMs were selected for dynamical downscaling based on a performance evaluation of SST and the SSH along the RCM boundaries. A regional model with high resolution (1/20°) was simulated to project spatially non-uniform changes in the sea level under two CMIP6 scenarios (SSP1-2.6 and SSP5-8.5) from 2015 to 2100. Sea level rise in the NWP marginal seas was ~82 cm under SSP5-8.5 scenario and ~47 cm under SSP1-2.6 scenario, respectively. Under both scenarios, the predicted local sea-level rise was higher in the East/Japan Sea (EJS), where the currents and eddy motions are active, than in the Yellow and East China Seas.