Geophysical Research Abstracts
Vol. 20, EGU2018-11114, 2018
EGU General Assembly 2018

Observation and modelling for long term sea-level changes around Korean Peninsula

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Sea-Level changes along the Korea coasts have been estimated based on the selected 18 tide-gauge records collected by the Korea Hydrographic and Oceanographic Agency during 28 years (1989∼2016). The sea level has risen 3.78 mm/yr in the eastern coast, 3.17 mm/yr in the southern coast and 1.47 mm/yr in the western coast, with an average rate of about 2.96 mm/yr. This result revealed that rising rate of sea level in the Korea is higher than global rate of about 2.0 mm/yr during 1971∼2010, but lower than global rate of about 3.2 mm/yr during 1993∼2010 (IPCC, 2013). Using ROMS, a regional climate ocean model (RCOM) with high-resolution of 6 km horizontally and 40 layers vertically has been established for long-term forecast of sea-level rise in the Northwest Pacific, including marginal seas around Korean peninsula. To produce optimal boundary values for the RCOM, we evaluated six variables (i.e. RMSEs and trend of upper layer heat content, SST, and SSH) of 41 global climate model (CMIP5) results. EC-EARTH and NorESMI-M showed best performance in the Northwest Pacific and global ocean, respectively. However, ensemble mean of top seven model results is better than the one best model in the performance. Our RCOM well reproduced the long-term change of sea surface temperature, the trajectory of the Yangtze River diluted water, transport in the major straits, and the formation of the Yellow Sea Bottom Cold Water. After evaluating RCOM performance on sea level change by comparing between the observation and the model result for last 30 years, detailed sea-level changes will be projected for the next 100 years according to the IPCC climate change scenario.