A retrospective high-resolution numerical experiment of Japan Sea with a JCOPE2-ROMS downscaling system

Dai MIYAZAKI[1#+], Yusuke UCHIYAMA[1], Ryosuke KANKI[2], Yasumasa MIYAZAWA[3]

[1]Kobe University, Japan, [2]Kobe University, Japan, Japan, [3]Japan Agency for Marine-Earth Science and Technology, Japan

[#]Corresponding author: garigarioyaji@gmail.com [+]Presenter

Japan Sea is connected to other seas by five straits. All the straits are rather shallow with a minimal depth of the order of 100 meters or less. This hinders water exchange thereby isolating the water and aquatic life of Japan Sea from the neighboring seas and oceans. In addition, this sea area is important for many fishery and energy resources. In the present study, we conduct a detailed oceanic downscaling experiments using a three-dimensional model ROMS (Shchepetkin and McWilliams, 2005) in a nested configuration. The horizontal spacing is refined from about 10 km (JCOPE2; Miyazawa *et al*., 2009) that determines the outermost boundary condition to 3 km (ROMS). The surface forcing is provided by the JMA GPV-GSM atmospheric reanalysis and the COADS monthly climatology. This model is weakly restored with a three-dimensional T-S nudging towards the 10 day averaged JCOPE2 data of temperature and salinity in order to enhance the reproducibility of mesoscale currents such as Kuroshio (Uchiyama *et al*., 2012).

In the conference, we intend to introduce the multi-year reanalysis of the Japan Sea ROMS downscaling model. The model basically does a decent job to reproduce the major flow structure in Japan Sea consisting of the southwestward drifting Liman Cold Current along the Russian coast and the Tsushima Warm Current along the Japanese coast. Extensive model-data comparison is conducted to show a good agreement with satellite altimetry and SST, hydrographical surveys performed by JMA along some transects, and the parent JCOPE2 reanalysis. The ROMS model has much energetic submesoscale eddies shed around the Tsushima strait. We found that anti-cyclonic eddies are predominant over cyclonic eddies off the San-in coastline where the topographic effects are apparent in the turbulence field of the Tsushima Current.

Submitted to AOGS 2014 (OS18-A011)