Four-dimensional Ocean ReAnalysis for the seas around Japan over 60 years (FORA-JPN60)

Realistic reproduction of long-term ocean variations around Japan is important for a wide range of scientific fields, including oceanography and climate science as well as air-sea interaction in the mid-latitude and fishery science. For those purposes, we have been producing a high-resolution ocean reanalysis dataset for the seas around Japan over 60 years, namely FORA-JPN60. It is a successor to FORA-WNP30, which was also produced under the collaboration between JAMSTEC and MRI. FORA-JPN60 is produced using the latest operation coastal forecasting system in JMA. The ocean model is based on MRI.COM v5.0 and the forecasting system consists of three component models for the seas around Japan (JPN; 2km), North Pacific (NP; 10km), and global (GLB; 100km). The three component models are coupled by a two-way on-line double nesting method. The models are driven by the atmospheric forcing derived from JRA-3Q. For realistic representation of coastal circulation variability, tidal forcing detailed river runoff based on JMA's river runoff index are incorporated into the model. Data assimilation based on MOVE-4DVAR and MOVE-3DVAR is applied to North Pacific and global analysis models, and the JPN, NP, and GLB models are corrected using analysis model results with an initialization scheme by Incremental Analysis Update. Assimilated observations include in-situ temperature and salinity profiles, sea surface temperature produced by JMA (MGDSST), and along-track sea level anomaly. Sea ice concentration data derived from satellite microwave radiometer (SSMI, SSMIS) and JMA's sea ice chart are also assimilated by a nudging method. The reanalysis period is from 1960 to 2020. In the presentation, we will show the overview of the reanalysis experiment and some early results.

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