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Impact of atmospheric forcing on heat content variability in the sub-surface layer in the Japan/East Sea, 1948-2009

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Based on numerical simulations the study investigates impact of atmospheric forcing on heat content variability of the sub-surface layer in Japan/East Sea (JES), 1948-2009. We developed a model configuration based on a INMOM model and atmospheric forcing extracted from the CORE phase II experiment dataset 1948-2009, which enables to assess impact of only atmospheric forcing on heat content variability of the sub-surface layer of the JES. An analysis of kinetic energy (KE) and total heat content (THC) in the JES obtained from our numerical simulations showed that the simulated circulation of the JES is being quasi-steady state. It was found that the year-mean KE variations obtained from our numerical simulations are similar those extracted from the SODA reanalysis. Comparison of the simulated THC and that extracted from the SODA reanalysis showed significant consistence between them. An analysis of numerical simulations showed that the simulated circulation structure is very similar that obtained from the PALACE floats in the intermediate and abyssal layers in the JES. Using empirical orthogonal function analysis we studied spatial-temporal variability of the heat content of the sub-surface layer in the JES. Based on comparison of the simulated heat content variations with those obtained from natural observations an assessment of the atmospheric forcing impact on the heat content variability was obtained. Using singular value decomposition analysis we considered relationships between the heat content variability and wind stress curl as well as sensible heat flux in winter. It was established the major role of sensible heat flux in decadal variability of the heat content of the sub-surface layer in the JES. The research was supported by the Russian Foundation for Basic Research (grant N 14-05-00255) and the Council on the Russian Federation President Grants (grant N MK-3241.2015.5)