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Variability of the Black Sea Dynamics During 1971-1993

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Regular observations of the Black Sea started at the end of 19 century. More then 150000 temperature and salinity profiles are collected up to now. Two time periods 1957-1965 and 1971-1993 years are rather dense with observations. Temporal and spatial distribution of observations permit to fulfill reanalysis of the Black Sea dynamics by means of assimilation of temperature and salinity profiles.
Reanalysis of the Black Sea dynamics period was performed by two regional models from1971 to1993. One model is based on the version of the POM with the so-called σ-coordinate and another one is z-level model developed at MHI. Both models have similar horizontal grid whereas the MHI model has better vertical resolution. Data assimilation algorithm is based on optimal interpolation and is the same for both models.
The reanalysis data collected every five days constituted an initial base for studying interannual and seasonal variability of temperature, salinity and kinetic energy. Interannual variability was investigated using behavior of yearly-, layers- and horizons- averaged temperature, salinity and kinetic energy. Both models provide similar patterns of the temperature, salinity and horizontal current velocity fields. Particular attention is paid to the upper mixed layer and CIL renewal, temperature, salinity and kinetic energy trends in the different layers and their connection to the inner forcing.
Separate attention is attracted to the of the vertical velocity. Analysis of simulations shows that the MHI model provides better estimation of vertical velocity probably due to better vertical resolution. Model simulations show that the annual mean vertical velocity in the deep part of the basin manifests significant interannual variability.
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