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# A Numerical Study of Circulation and Water Exchange in the Arabian Gulf

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Ocean circulation and water mass variability in semi-enclosed and marginal sea of the Arabian Gulf are numerically simulated using a three-dimensional model of Regional Ocean Modeling System (ROMS). The model is forced by relatively high-frequency of atmospheric forcing and tides. The numerical simulations are compared with a set data of moored and spatially distributed measurements of temperature, salinity, current velocity, and sea-surface height. The model results generally agree well with temporal variation of the observed current velocity during spring and neap tide, as well as seasonal variation of temperature and salinity in surface and sub-surface depths. Seasonal variability of water mass and circulation in the Arabian Gulf affected by the propagation of Indian Ocean Surface Water to the Arabian Gulf, air-sea heat fluxes, and mesoscale eddy activities are discussed. Sensitivity study using different source of atmospheric data for forcing of the model, as well as climatology data and global ocean model for specifying values in open boundaries of the model are conducted towards implementation of the model operationally. Further development of the model by coupling it with atmospheric model most likely will increase the skill of the model and provide better understanding on how the complex air-sea interaction affecting circulation and water mass exchange in this region.