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Study of the Persian Gulf's and Oman Sea's Numerical Tidal Currents

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Abstract : In this research, a barotropic model was employed to consider the tidal studies in the Persian Gulf and Oman Sea, where the only sufficient force was the tidal force. To do that, a finite-difference, free-surface model called Regional Ocean Modeling System (ROMS), was employed on the data over the Persian Gulf and Oman Sea. To analyze flow patterns of the region, the results of limited size model of The Finite Volume Community Ocean Model (FVCOM) were appropriated. The two points were determined since both are one of the most critical water body in case of the economy, biology, fishery, Shipping, navigation, and petroleum extraction. The OSU Tidal Prediction Software (OTPS) tide and observation data validated the modeled result. Next, tidal elevation and speed, and tidal analysis were interpreted. Preliminary results determine a significant accuracy in the tidal height compared with observation and OTPS data, declaring that tidal currents are highest in Hormuz Strait and the narrow and shallow region between Iranian coasts and Islands. Furthermore, tidal analysis clarifies that the M_2 component has the most significant value. Finally, the Persian Gulf tidal currents are divided into two branches: the first branch converts from south to Qatar and via United Arab Emirate rotates to Hormuz Strait. The secondary branch, in north and west, extends up to the highest point in the Persian Gulf and in the head of Gulf turns counterclockwise.

Keywords : numerical model, barotropic tide, tidal currents, OSU tidal prediction software, OTPS
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