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Estimation of Sea Surface Topography Using Orthogonal Functions Over Persian Gulf and Oman Sea

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In this paper we will illustrate the result of our attempt to construct a set of orthogonal functions over the Persian Gulf and Oman Sea ($24^\circ \leq \phi \leq 27^\circ$, $51^\circ \leq \lambda \leq 62^\circ$) and compute Sea Surface Topography (SST) for this area. For this reason three methods are used: Spherical Helmholtz equation, Shwarz-Christoffel Conformal Mapping and Gram-Schmidt method.

In the first method we developed spherical harmonic over Persian Gulf and Oman Sea as a spherical cap using combination of Bessel functions and Spherical Harmonics.

In the second method, first the irregular test area is transformed onto a unit disk. In this new regular area a set of orthogonal functions can be found easily and then using relationship between two domains (i.e. mapping function) orthogonal functions over the Persian Gulf and Oman Sea are estimated.

In the third method Gram-Schmidt method is implied to construct the orthogonal functions over the desirable area.

In the final section of our paper, the results of the above mentioned methods for expansions of SST over the Persian Gulf and Oman Sea are presented and compared.