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SOMAR-LES for multiscale modeling of internal tide generation VAMSI KRISHNA CHALAMALLA, University of California San Diego, EDWARD SANTILLI, Philadelphia University, MASOUD JALALI, University of California San Diego, ALBERTO SCOTTI, University of North Carolina, Chapel Hill, SU-TANU SARKAR, University of California San Diego — A novel modeling technique is developed to study baroclinic energy conversion when the barotropic tide oscillates over underwater topography. In SOMAR-LES, a Large Eddy Simulation (LES) model that resolves turbulence scales is coupled with a large-scale model, Stratified Ocean Model with Adaptive Refinement (SOMAR). Thus, we overcome the constraints posed by the wide range of temporal and spatial scales during tide and topographic interaction. Two-way coupling is developed: LES is driven with large scale forcing, and SOMAR receives feedback in the form of eddy viscosity and diffusivity. Numerical simulations are performed with SOMAR-LES for supercritical and subcritical ridges with ridge length scales of $\mathcal{O}(10 \text{ km})$ and barotropic forcing that corresponds to the regime of low outer excursion number, $Ex = U_0/\omega l \simeq 0.1$. Results from the coupled model are compared against ongoing high-resolution LES to ascertain the accuracy of this technique. The simulation data is analyzed to quantify baroclinic energy conversion and the change in modal composition from near to far field.

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