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The Energetics of Seamount Wakes BRAD PERFECT, NIRNIMESH KUMAR, JAMES RILEY, University of Washington — This work revisits the long-standing hypothesis that seamounts are the "stirring rods" of the ocean. Specifically, it has been proposed that the eddy motions generated by the interaction of underwater mountains with ocean currents might play a significant role in the broader field of ocean mixing. We report on the results of a series of numerical simulations for an idealized seamount in rotating, stratified flow at a range of Froude and Rossby numbers ($0.014 < \mathrm{Fr} < 0.14$ and $0.053 < \mathrm{Ro} < 0.21$). This parameter space is consistent with the strongly stratified, strongly rotating flow experienced by a large seamount. In each simulation, the seamount generates a distinctive wake and produces internal wave radiation. We explore the energetics of the wake and waves separately, and find that the wake is predominantly controlled by the Burger number, while the internal wave radiation has a more complex dependence that can be predicted by modifying pre-existing linear wave models. Ultimately, our results suggest that for low-Froude number flows, the wake of the seamount extracts more energy from the mean flow than the internal wave flux, supporting the stirring rod view of seamount energetics.

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