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Sediment Resuspension and Mixing by Resonantly Generated Internal Waves

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ABSTRACT

The observation of internal solitary waves (ISWs) propagating upstream along a strongly stratified bottom layer on the California shelf is reported. An increased concentration of particulates in the water column accompanies the passage of these ISW packets. The estimated local Richardson number in the bottom vicinity is around 1/4, and a vertical coefficient of eddy diffusivity of order $10^{-2} \text{ m}^2 \text{ s}^{-1}$ is associated with the upstream propagating leading ISW. The leading ISW gave rise to reversed flow in an 8-m layer above the bottom. It is argued that the upstream propagating ISWs were generated by resonant flow over bottom topography. Internal waves generated in this way seem to be frequent in the record of a month-long experiment. Model results suggest that the ISWs can carry up to 73% of such generated long wave energy. The ocean conditions at the site are similar to those of other coastal sites, which suggests that the phenomenon described here may be common.

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