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Internal tide convergence and mixing in a submarine canyon

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Observations from Eel Canyon, located on the north coast of California, show that elevated turbulence in the full water column arises from the convergence of remotely-generated internal wave energy. The incoming semidiurnal and bottom-trapped diurnal internal tides generate complex interference patterns. The semidiurnal internal tide sets up a partly standing wave within the canyon due to reflection at the canyon head, dissipating all of its energy within the canyon. Dissipation in the near-bottom is associated with the diurnal trapped tide, while midwater isopycnal shear and strain is associated with the semidiurnal tide. Dissipation is elevated up to 600 m off the bottom, in contrast to observations over flat continental shelf where dissipation occurs closer to the topography. Slope canyons are sinks for internal wave energy and may have important influences on the global distribution of tidally-driven mixing.