



Tracer transport by internal wave beams.

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Internal waves provide a source of energy for mixing in the deep sea. At locations with rough topography these internal waves often take the shape of oblique beams. We consider the question if these beams transport tracers and enhance mixing. We present proof, from theory and laboratory experiments, that internal wave beams indeed drive transport, first horizontally towards the beam and subsequently also vertically, along the beam. This vertical transport consequently contribute to mixing. The transport is caused by the decay of the localised shear motion in the beam and is in a direction opposite to that of the energy propagation. The discovery of this transport establishes that in stratified fluids enhanced vertical mixing takes place near internal wave beams, even when their amplitude is small. This is crucial for understanding of spatial inhomogeneities in vertical mixing in general and for the dynamics of sediments and nutrients near rough topography in particular.