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Dynamics of anisotropic particles under waves MICHELLE DIBENEDETTO, NICHOLAS OUELLETTE, JEFFREY KOSEFF, Stanford Univ
— We present results on anisotropic particles in wavy flows in order to gain insight into the transport and mixing of microplastic particles in the near-shore environment. From theory and numerical simulations, we find that the rate of alignment of the particles is not constant and depends strongly on their initial orientation; thus, variations in initial particle orientation result in dispersion of anisotropic-particle plumes. We find that this dispersion is a function of the particle's eccentricity and the ratio of the settling and wave time scales. Experiments in which non-spherical particles of various shapes are released under surface gravity waves were also performed. Our main goal is to explore the effects of particle shape under various wave scenarios. We vary the aspect ratio of the particle in our experiments while holding other variables constant. Our results demonstrate that particle shape can be important when predicting transport.

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