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Numerical simulation of particle settling through a sharp density interface CHEN-YEN HUNG, YI-JU CHOU, Natl Taiwan Univ — An Eulerian-Lagrangian model is used to simulate sedimentation of suspended particles in stratified environments. Double diffusive convection is found when density stratification is due to heat. While suspended particles with infinitesimal settling velocities act as a slowly-diffusive agent, both the velocity and concentration profiles exhibit symmetrical patterns with respect to the density interface, as those found in the classical salt-finger problems. In the case of the salt-induced background stratification, a layer of reverse buoyancy forms, particularly when particles are coarse. This leads to Rayleigh-Taylor instability, while the resulting rising bubbles are dissipated due to the presence of the background density interface, which acts like a solid boundary. It further results in a significant horizontal flow near the density interface, leading to the sheet-like pattern of sinking sediment plumes.

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