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Analysis of the dynamics of porous particles settling in a stratified fluid FRANCOIS BLANCHETTE, MAC PANAH, SHILPA KHATRI, UC Merced — We study the settling of a porous sphere in a density-stratified ambient fluid. Simulations are compared to two mathematical models. We quantify the delay in settling due to lighter fluid becoming denser through diffusion and that due to ambient fluid entrainment. We study the effects of the Reynolds, Péclet, and Darcy numbers, as well as the thickness of the transition layer, and the ratio of the density difference between the lower and upper fluid layer to the density difference between the particle and the upper layer. Dominant effects are identified and a simple fitting formula is presented to describe the settling time delay as a function of each of those five non-dimensional parameters.

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