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Role of dispersed particles on the dynamics of the umbrella cloud of a buoyant plume SRIDHAR BALASUBRAMANIAN, HARISH MIRAJKAR, AYAN KUMAR BANERJEE, Indian Institute of Technology Bombay — Particle-laden buoyant plume is a common occurrence in geophysical flows. We quantitatively study the modification in the plume behavior under the influence of low particle volume fraction, ϕ_v. Particles with mean diameter d_p =100μm, density, ρ_p =2500 kgm^{-3}, and ϕ_v =0-0.7% were injected along with the lighter plume fluid. A particle trough, characterized by radius, R, and depth, L_p, was observed and could be attributed to the phenomenon of "particle fall-out" and "particle re-entrainment". The trough either sustains or collapses depending on the plume conditions at the source.

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