

Abstract Submitted
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Jets generated by a sphere moving vertically in stratified fluids HIDESHI HANAZAKI, SHINYA OKINO, SHOTA NAKAMURA, SHINSAKU AKIYAMA, Kyoto University — Unsteady development of buoyant jets generated by a sphere moving vertically at constant speeds in stratified fluids is investigated. Initially, the sphere simply drags light upper fluids or isopycnal surfaces as it goes down, as long as the molecular diffusion of density is negligible. In the succeeding period, molecular diffusion of density in the boundary layer on the sphere surface becomes increasingly significant, especially in the lower hemisphere. Then, the density is no longer conserved and a vertical jet starts from the rear/upper stagnation point of the sphere, since the fluid particle of altered but small density tends to go back to its original height. Strength and radius of those jets depend significantly on stratification (Froude number), as well as the Reynolds number and the Schmidt number. These mechanisms are investigated by numerical simulations and measurements by laser induced fluorescence (LIF).

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