

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Generation of a buoyant jet by a sphere moving vertically in a stratified fluid** HIDESHI HANAZAKI, Kyoto University, KEISUKE SHIMOBATA, HIROYASU YOSHIKAWA — We consider the flow past a sphere moving vertically at a constant speed in salt-stratified fluid. Experiments have shown that vertical jets are generated even if the vertical mean density gradient is not large. At least seven types of wake structures have been found, including a thin jet with a surrounding bell-shaped structure. In this numerical study, we investigate the unsteady generation mechanism of buoyant jets with the focus on the diffusion effects of the density/salt. When a sphere descends in a stratified fluid, the density is initially conserved along the movement of the fluid and the originally horizontal isopycnal surfaces are simply deformed vertically and pulled down by the sphere. As time proceeds, diffusive effects become significant in the density boundary layer on the sphere surface and in the thin jet, and the density is no longer conserved. This violation of conservation would be the origin of the jet which is composed of the fluids which moves up to return to their original heights.

Hideshi Hanazaki  
Kyoto University

Date submitted: 05 Aug 2011

Electronic form version 1.4