

NUMERICAL STUDY OF A DESCENDING SPHERE IN A LOW REYNOLDS NUMBER STRONGLY STRATIFIED FLUID*

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Dedicated to Víctor Pereyra on the occasion of his 70th birthday

Abstract. The flow generated by a sphere descending uniformly in a linearly stratified diffusive fluid is investigated numerically for different Reynolds (Re) and Froude (F) numbers. The parameters used for the simulations were $10^{-1} \leq Re \leq 10$ and $10^{-2} \leq F \leq 10^2$, keeping the Schmidt number, $Sc (= 700)$, typical of sea water) fixed. The results demonstrate drag dependence on viscosity and stratification, suggesting that changes in these parameters would be intimately related to the phenomena of zooplankton vertical movement in the ocean.

Key words. stratified fluid, flow past sphere, low Reynolds number, MAC method, preconditioning, Krylov methods.

AMS subject classifications. 35Q30, 35Q35, 35K15, 35K20

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