Direct numerical simulation of Coriolis effects on cylindrical gravity currents[1] MARIANO CANTERO, Consejo Nacional de Investigaciones Cientificas y Tecnicas, JORGE SALINAS, Instituto Balseiro, UNCu-CNEA, THOMAS BONOMETTI, Institut de Mécanique des Fluides de Toulouse, ENZO DARI, Consejo Nacional de Investigaciones Cientificas y Tecnicas, Comision Nacional de Energia Atomica — Gravity currents are generated by the action of gravity (or other volumetric force) on changes in fluid density. When they appear in turbulent regime, gravity currents are of a non-linear nature and have a wide range of temporal and spatial scales. In these systems there is a strong coupling between turbulence and stratification effects, with important consequences in the exchange of mass, momentum and energy. At geophysical scale, the analysis of these type of flows is further complicated by the influence of rotation effects by the Coriolis forces originated by earth's rotation. In this work we address the rotational effects in gravity currents with cylindrical initial condition by means of direct numerical simulations (DNS). We report results on five three dimensional DNS with grid resolutions up to 166-million points, with different boundary conditions, Reynolds numbers (Re=4000 and Re=8000), and different conditions of rotation. The results focus mainly on the distance of propagation of the fronts, frequency of the successive outward fronts, and the turbulent structures present in the currents and their influence in flow dynamics.

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