Abstract Submitted
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Interaction between a vertical turbulent buoyant jet and a thermocline[1] EKATERINA EZHOVA, LUCA BRANDT, Linne FLOW Centre and SeRC, KTH Mechanics, Stockholm, Sweden, CLAUDIA CENEDESE, Physical Oceanography Department, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, USA — We study the behaviour of an axisymmetric vertical turbulent jet in an unconfined stratified environment by means of well-resolved large eddy simulations (LES). The stratification is two layers separated by a thermocline and the thermocline thickness considered is smaller and on the order of the jet diameter at the thermocline entrance. We quantify mean jet penetration, stratified turbulent entrainment and study the generation of internal waves. The mean jet penetration is predicted based on the conservation of the source energy in the thermocline. The entrainment coefficient for the thin thermocline agrees with the theoretical model for a two-layer stratification with a sharp interface. A secondary flow towards the jet top appears in the upper part of the thick thermocline. The jet generates internal waves at frequencies in agreement with similar experiments. We shall also report the results of LES of a turbulent plume in a stratified fluid modelling subglacial discharge from a submarine glacier in stratifications typical of Greenland fjords. We consider a free plume from a round source of various diameters with double the total discharge estimated from the field data. We quantify plume dynamics and compare the results for plumes and jets.

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