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Experiments on point plumes in a rotating environment DARIA FRANK, JULIEN LANDEL, STUART DALZIEL, PAUL LINDEN, University of Cambridge — Motivated by the Deepwater Horizon oil spill in the Gulf of Mexico we study the dynamics of point plumes in a stratified and homogeneous rotating environment. To this end, we conduct small-scale experiments in the laboratory on salt water and bubble plumes over a wide range of Rossby numbers. The rotation modifies the entrainment into the plume and also inhibits the lateral spreading of the plume fluid which leads to various instabilities in the flow. In particular, we focus on the plume behaviour in the near-source region (where the plume is dominated by the source conditions) and at intermediate water depths, e.g., lateral intrusions at the neutral buoyancy level in the stratified environment. One of the striking features in the rotating environment is the anticyclonic precession of the plume axis which leads to an enhanced dispersion of the plume fluid in the ambient and which is absent in the non-rotating system. In this talk, we present our experimental results and develop simple models to explain the observed plume dynamics.

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