



## Temporal variation of plumes with sudden reduction in buoyancy flux

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Experiments are conducted to determine whether an established turbulent plume pinches-off into individual rising thermals when the driving buoyancy flux is suddenly reduced. Some further theoretical predictions to those made in Scase *et al.* (*J. Fluid Mech.*, vol. 563, 2006, p. 443) are made to enable direct comparison with laboratory experiments. We also briefly investigate theoretically the important problem of the source of an established plume suddenly rupturing providing a much larger plume source.

A large number of experiments have been conducted to provide an ensemble with which to compare to theoretical predictions. We find that provided the source conditions are weakened in such a way that the well-known entrainment assumption remains valid, the established plume is not observed to pinch-off into individual thermals. Further, not only is pinch-off not observed in the ensemble of experiments, it cannot be observed in any of the individual experiments. We consider both the temporal evolution of the plume profile and a concentration of passive tracer and show that our model predictions compare well with our experimental observations.