Abstract Submitted
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Time-dependent ventilation flows driven by opposing wind and buoyancy I. COOMARASWAMY, C.P. CAULFIELD, BPI & DAMTP, University of Cambridge — We consider an enclosure containing an isolated heat source, ventilated by a windward high level opening and a leeward low level opening, so that prevailing wind acts to oppose buoyancy driven flow. By conducting dynamically similar salt bath experiments in a recirculating flume tank (Hunt & Linden, *J. Fluid Mech.* **527**, 27 (2005).), we investigate the initial value problem of "box filling" with constant opposing wind for a number of different opening sizes and wind strengths. We employ a novel method of flow visualisation (Dalziel, Patterson, Caulfield & Coomaraswamy, *Phys. Fluids* **20**, 065106 (2008).), backlighting apparatus with a panel of electroluminescent tape and employing dye attenuation techniques, allowing us to track the evolution of the stratification within the interior. Our findings demonstrate that some unusual transient phenomena can occur, as predicted by theoretical models we have previously developed for the system. We evaluate the accuracy of these models with regard to the types of transient and final states seen for each set of conditions, and also use our experimental data for the interior density distribution to examine the validity of the models' underlying assumptions.

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