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Ventilation of two rooms interconnected thorough a bottom opening. RAMON TOVAR, Centro de Investigacion en Energia UNAM, Mexico, PAUL F. LINDEN, Department of Mechanical and Aerospace Engineering UCSD, USA, LUIS P. THOMAS, Instituto de Fisica Arroyo Seco, Universidad Nacional del Centro, Argentina — Spaces are often cooled by the addition and extraction of cold air at the ceiling. As a model of this processes, we study experimentally the transient ventilation of two interconnected rooms with a buoyancy source located in the forced room and an exit vent in the unforced room. The two rooms connect through an opening located at the bottom of the interior wall. Initially the average density inside the model increases linearly with time. As the forced room ventilates through the unforced one, mixed fluid enters the unforced room causing a two-layer displacement flow. After the dense layer in the unforced room reaches the exit vent, the average density increases exponentially towards the source density. Thus, on the long term, as the buoyancy difference in the forced room becomes weaker, a dominant jet-like flow develops and the stratification decreases in both rooms. Two flow regimes develop through the communication opening depending on its vertical extent: a unidirectional flow develops for small openings, while an exchange flow develops for openings with larger vertical height. We analyze these flow regimes in terms of the neutral pressure level and discuss its implications for optimizing the cooling of the two rooms. R. Tovar acknowledges the support of UC-MEXUS-CONACYT, grant 6925.

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