

Abstract Submitted
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Diurnal respiration of a termite mound¹ HUNTER KING, SAMUEL OCKO, L. MAHADEVAN, Harvard Univ — Many species of fungus-harvesting termites build largely empty, massive mound structures which protrude from the ground above their subterranean nests. It has been long proposed that the function of these mounds is to facilitate exchange of heat, humidity, and respiratory gases; this would give the colony a controlled climate in which to raise fungus and brood. However, the specific mechanism by which the mound achieves ventilation has remained a topic of debate, as direct measurement of internal air flows has remained difficult. By directly measuring these elusive, tiny flows with a custom sensor, we find that the mound architecture of the species *Odontotermes obesus* takes advantage of daily oscillations in ambient temperature to drive convection and gas transport. This contradicts previous theories, which point to internal metabolic heating and external wind as driving forces. Our result, a novel example of deriving useful work from a fluctuating scalar parameter, should contribute to better understanding insect swarm construction and possible development in passive human architecture, both of which have been spurred by previous research on termites.

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