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**Evaporation-driven convection observed in a suspension of non-motile bacteria** JOCELYN DUNSTAN, DAMTP, Univ of Cambridge, KYOUNG JIN LEE, Physics department, Korea University , SIMON PARK, Faculty of Health and Sciences, Univ of Surrey, RAYMOND E. GOLDSTEIN, DAMTP, Univ of Cambridge — We report a novel form of convection in a suspension of non-motile bioluminescent bacteria. The patterns appear like those of conventional bioconvection driven by oxygentaxis, yet the bacteria are observed to have limited if any motility. While the phenomenon also resembles chemo-convection, in which a chemical reaction (or metabolic activity) alters the local buoyancy balance at the air-water interface, the convention actually derives from evaporation of the salty bacterial growth medium. We corroborate this through control experiments using polystyrene beads in pure and salty water, and establish that there is a threshold of salt concentration needed to observe plumes. The dynamics of the plumes is rich, with striking coalescence events and a complex internal structure. A mathematical model is formulated for the process and studied analytically and numerically, reproducing most of the observed experimental features. Evaporation-driven convection on the millimeter scale has not been studied extensively and its effect may have been underestimated in a variety of contexts. It may naturally occur in marine settings.

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