

Interactive comment on “Experimental evidence of condensation-driven airflow” by P. Bunyard et al.

Anonymous Referee #1

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This is likely to be my last comment. The latest experiments do not really offer new insight, and their description is (as previously) insufficient. There is a competition now between heating at the bottom, and cooling at the top of the right side column, with the latter involving condensation, as usual. The authors state that the effect of cooling is dominating whenever it occurs, and conclude that this is due to the condensation effect. They reject the classical explanation that the motion is caused by density differences and gravitation. But to refute this explanation one needs to prove first that the effect of heating on density is smaller than the effect of cooling; but this has not been done, and the authors do not even give the power of the cooling (but only of the heating).

The interpretation of the experiment is also complicated by the difficulties to measure mean flow through a section. The anemometers only measure in a limited region of the (1 m²) section. This is clear from the observation that the flow speed (“kinetic energy”) differs between the columns when both heating and cooling is on: in reality the mean

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flow speeds should be equal “because of mass conservation”, unless substantial leaks are involved, and the observed difference points to heterogeneity of the flow (possibly with flow in two directions) in the right side column. This is to be expected, as the cooling from above is much more spatially concentrated than the heating from below (for which a heating mat is used).

However, what remains the greatest problem is the vagueness of the so called “Biotic Pump” mechanism which the authors want to defend. Its basis is the consideration that condensation should lead to a shrinking of the air (the opposite effect of expansion by latent heat release is neglected without good grounds). Several reviewers remarked that this would lead by itself to a one-directional flow towards the shrinking region, both in the laboratory and in the open air, and not to circular motions. The authors point to Newcomb’s atmospheric pressure engine, which produces motion in alternating directions. But that engine does not work on condensation alone, it requires alternating cooling and heating. This engine has little correspondence with both the set-up of the laboratory experiment (where continuous cooling causes circular motion) and with condensation in the free atmosphere. In the end, the mechanism which is needed for the Biotic Pump Theory is never made clear. The authors point to transfer of energy to already existing motions, but how does this work ?

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