

Interactive comment on “Convective self-aggregation in a mean flow” by Hyunju Jung et al.

Anonymous Referee #2

Received and published: 26 October 2020

General Comments: This work uses the framework of a radiative convective equilibrium (RCE) experiment to investigate the effect of the wind-induced surface heat exchange (WISHE) mechanism on the moving speed of the active region of convection. By this unique approach, the authors found that the effect of WISHE to slow down the movement is very weak. Specifically, the quantification that the deceleration effect of WISHE is about 5% is valuable. The idea of the Galilean transformation to avoid difficulty in the discretization of the nonlinear term is interesting. Unfortunately, however, I cannot help recommending REJECTION of this work due to the inappropriate experimental configuration at this time. I am wondering if the authors really intended to include the momentum exchange between the surface and the atmosphere. As shown in this work, the surface drag acts to force the atmosphere to move with the ground, and the distinc-

Printer-friendly version

Discussion paper



tion between the transient response and the quasi-steady response becomes unclear. In my understanding, there is no positive reason to analyze the transient response. It seems that the authors already noticed this problem, and thus, they had performed the UB2_unius experiment. Would it be so difficult to include influence of the mean wind only in the surface enthalpy equation, but not in the surface momentum equation? One way may be to use two independent u_h values: one is the same as eq. (2) and the other is without u_b . If the coding is complicating and/or the computational cost is huge, analyzing the transition stage of the system may be acceptable. I think, however, that this is not the case. It would be desirable to revise the experimental settings and redo the whole experiments. After that improvements, the authors' arguments will be clearer, and it will make an essential contribution to the area of the RCE research.

Other Comments: 1. Abstract: "phenomenon found in..." may be replaced with "phenomenon seen in..." 2. It is desirable to review more specifically about the resemblance between the self-aggregation in RCE and the MJO. Since the pure RCE lacks the vertical wind shear, the resemblance between the MJO and the RCE is questionable. 3. Note the number of vertical levels in section 2.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-875>, 2020.

[Printer-friendly version](#)[Discussion paper](#)