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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Height of convective layer in planetary atmospheres with condensable and non-condensable greenhouse substances" *by* A. M. Makarieva et al.

Anonymous Referee #1

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This paper examines a predictive approach to convection height and OLR changes, using underlying physical methodology. It concludes that their are maximum height restrictions on the height convection can reach and this means that OLR eventually decreases in an atmosphere with increasing surface temperature and water vapour.

I find this result suprising and at odds with past radiative-convective model results. As referee 2 poins out, there could be problems with some of their underlying assumptions, and making sure these are all robust would be very worthwhile.

The idea that past models are incorrect because assume that the air is saturated at Tau=1, i find very confusing. Past radiative convective modelling studies by ramanathan etc. certainly do not assume this.

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I am also a little more than confused why accurate radaition models coupled to a physically-based convection scheme would get this relationship wrong, whereas there more idealised methodology gives different answers

To convice readers that the conclusions are valid I think the authors should

1) explain clearly what assumptions they are making and why these might or might not be robust 2) contrast their results with results of a more detailed radiative-convetive code and explain why differecnes arise (if possible). 3) look for any observational evidence that could refute or justify their claim, going further than the anacdotal evidence for convection heights on venus and at the equator of the Earth

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Interactive comment on Atmos. Chem. Phys. Discuss., 3, 6701, 2003.