

Interactive comment on “An investigation of how radiation may cause accelerated rates of tropical cyclogenesis and diurnal cycles of convective activity” by M. E. Nicholls

Anonymous Referee #1

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This manuscript investigates the impacts of radiation on rates of tropical cyclogenesis rates and diurnal cycle of convective activity by examining several mechanisms that have been proposed for the role of radiation in some convective systems. By conducting several groups of idealized simulations, the author finds that the increased upward motion and relative humidity resulted from the clear sky cooling at night can accelerate the rate of tropical cyclogenesis.

Overall, this paper is well written and the author has done a comprehensive research on analyzing and evaluating the possible mechanisms that may play a role in tropical cyclogenesis. This study will make a nice contribution to our understanding of the

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influence of radiation on cyclogenesis. I have several mostly minor comments and suggestions to improve the quality of the manuscript.

Major comments

- 1) 6136-5-10: The description of Bu et al (2014)'s work is not precise. Their work only focused on the cloud-radiative forcing part. The comparison was between the storm with clear-sky radiation and the storm with clear-sky and cloud radiation. They did not look into the role of clear-sky radiation. Therefore, it would be less confusing if the author uses “cloud-radiative forcing” instead of “radiation” when describing their work.
- 2) 6168-5: Similar problem. There is not contradiction between the finding from the idealized experiments in this paper and the conclusion from Bu et al's work. Experiment 6 and experiment 10 focus on the impact of the environmental cooling on the system, trying to find out the difference between the system with and without environmental cooling, whereas in Bu et al's work both of the simulation with active cloud-radiative forcing and the simulation without cloud-radiative forcing include clear-sky cooling.

Minor Comments

- 1) 6145-5: Table 7 -> Table 4
- 2) 6148-5: where is eq 1?
- 3) 6149-10: which it is not offset -> which is not offset
- 4) 6155-15: Eliassen (1951) is not included in reference part.
- 5) 6158-20: radiatiive -> radiative
- 6) 6159-10: Fig.20d -> Fig.21d
- 7) 6160-25: Fig. 22b -> 23b
- 8) 6160-25: Fig. 22c -> 23c

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