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Atmospheric Chemistry and Physics Discussions

Interactive comment on "An examination of two pathway to tropical cyclogenesis occurring in idealized simulations with a cloud-resolving numerical model" *by* M. E. Nicholls and M. T. Montgomery

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Thank you for reviewing this manuscript and your helpful comments.

1) It has indeed been hard to summarize 17 numerical experiments, and do it in a way that maintains a reader's interest. The idea of moving some of the details of the individual experiments to an appendix for interested readers is a good suggestion. We were struck by the significantly different ways an SSCV could form in these experiments and this in itself seems to be an important result. We will contemplate moving some of

the details of the individual experiments to an Appendix.

2) We agree that there appears to be significant stochastic aspects of the SSCV formation that could have an influence on the pathway taken. For some initial conditions that for all practical purposes are identical this stochastic aspect could lead to either pathway one or pathway two occurring. On the other hand, for some initial conditions, say Experiment 2 for example, small perturbations are unlikely to change the pathway taken, for this given model configuration and physics. Thus we agree that the stochastic aspect of the deep convection might also perturb the eventual pathway chosen. In the revised version of the mss. we will acknowledge this issue, but leave a systematic examination for future work if we can find suitable research funding to pursue this work in the current uncertainty of U.S. basic research.

3) This is an interesting point regarding the phasing of the radiation and boundary layer recovery. We have not explored using a different surface layer scheme for this particular problem, although we have used an alternative scheme based on new CBLAST results for different problems. The new scheme gives significantly different magnitudes for the surface fluxes at high wind speeds. For the relatively low wind speeds typical during tropical cyclogenesis, the differences should not be very significant. This aspect is certainly worth exploring as winds start to exceed 15 m s-1. If the phasing of the boundary layer recovery coincides with the diurnal cycle in a positive sense, then this could conceivably lead to a convective burst. Better resolution of boundary layer eddies is another aspect that should be examined, since this could also have an effect on surface fluxes. At this stage of our research, we believe it behooves us to obtain a deeper understanding of the current simulations and even simpler ones rather then embark on yet more and more sophisticated simulation experiments

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 765, 2013.