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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Numerical modelling of microburst with Large-Eddy Simulation" *by* V. Anabor et al.

Anonymous Referee #1

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General Comments:

This study presents results of an LES model for a 3-D simulation of a microburst with an idealized forcing. As would be expected, a microburst is produced that is similar in most respects to results of other studies. I would have liked to have seen additional experiments carried out that may have produced more significant scientific findings. Nevertheless, because this is a high resolution LES that is compared with observations I recommend publication. I think the discussion of the so-called "secondary core" is confusing. The second maximum in wind speed that occurs a few minutes after the first gust front is moderately interesting, but I am not sure it should be referred to as a secondary core. Furthermore, it is stated a couple of times in the paper that Doppler radar studies have observed this secondary core. I cannot find in the literature mention

of a secondary core. The specific studies that discuss a secondary core need to be cited. There is also quite a few explanations given for the results which I do not find convincing and should be omitted, unless prior theoretical studies that support these explanations can be referenced. As far as the methodology is concerned, this appears to be a solid study that lays the groundwork for more interesting numerical experiments that could be performed with this LES model in the future.

Specific comments:

1) P. 24353, line 20: "forming a secondary core (Fig 3D)". Its not obvious, looking at Fig 3D what is meant by a secondary core. In Fig. 3C near the center there is a strong outflow surrounded by a ring of strong outflow. In Fig. 3D near the center there is a strong outflow and the wind speeds in the surrounding ring have weakened. It is not obvious to the reader looking at Fig 3D, then comparing with Fig. 3C, that a secondary core has formed. What is meant, by the term secondary core needs to be made clearer at this point. 2) The following explanation, lines 21-25, of why the so-called secondary core does not produce a secondary vortex ring is an interesting theory, but is there a study that can be referenced, or is this something new that you are postulating? 3) P. 24354, line 1: It is bad practice to refer to Fig. 4, before you have described it. 4) P. 24355, line 1: "primary vortex ring". There is no secondary vortex ring, so why are you calling this the primary vortex ring? 5) P. 24354: I am not convinced that this argument explains why there are $\sim$2 min oscillations. 6) P. 24355, line 16: Close should be closely. 7) P. 24356, conclusions: the existence of a secondary maximum in wind speeds that trails the first maximum is quite interesting. You say that it is observed, but you should give specific references. Is it mentioned in other numerical modeling studies? On the other hand, if it is something new, then you should present it as a new result of this LES study. Possibly, other numerical modeling studies may have simulated it but not commented on it. 8) The title should probably say "a microburst" rather than just "microburst".

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 24345, 2010.