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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Are mean vertical velocities from PMSE a good representation of mean vertical winds?" *by* Nikoloz Gudadze et al.

Anonymous Referee #2

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The authors use observations by the MAARSY radar at Andenes, Norway, to investigate the vertical wind velocities and to shed light on the problem of the downward bias. The observations are done through reflections at mesospheric cloud particles, and applying a newly developed wind analysis method. If ice sedimentation is taken into account, an upward mean flow is found, qualitatively consistent with modelling results. An upward/downward bias at the upper/lower edge of the measuring volume is observed, which is explained by wave motion and uneven sampling connected with melting of ice at lower altitudes. The authors also analysed possible dependence of vertical winds on PMSE brightness and wind uncertainty. While the results do not completely support earlier observations at shorter time scales, the authors conclude that the results of short-time measurements cannot be extrapolated to a climatological

behaviour.

The observations and results are interesting and relevant, and the paper should eventually be published after some revision.

The paper needs a thorough revision of English language use. While most of the text is understandable, sentence structure and grammar is partly not acceptable.

The description of the measurements is insufficient for readers not familiar with the topic. More details, and even basics of the MAARSY radar; e.g., the geographic coordinates are only provided in the abstract. More information is necessary here. Few more information on the experiments would also be helpful. Have the experiments been run continuously during both seasons? Which is the grid size for binning (page 2, line 5)? This and more information would improve the paper.

Specific issues:

P2 l 17: "...considering the Bousinesq approximation..." delete this part of the sentence. Continuity equation does not require incompressible fluid.

P3, ll 22-24: The mechanism is described later, but should be outlined here.

P3, l 28: This sentence requires information that is only provided below or missing, namely the latitude of the observations, and an explanation what "PMSE 5 beam radial velocity" means.

P4, l 2: What does MAARSY stands for? It should not only be provided in the abstract.

P4, l 22: more homogeneous than what?

P7 l 17: Jacobi, 2011 shows midlatitude winds, not polar ones. If you want to add more references, you may wish to refer to radar based wind climatologies like Portnyagin et al., 2004.

P8, l 16: ".. but not in certain circumstances associated with a target parameter." I do

not understand what this means.

P9 l5 /Figures 5 and 6: I did not understand what the red points mean.

Figure 1: The blow-up on the right panels is not necessary in my opinion. The vertical resolution is 500 m and the effect is visible on the left panels also.

Minor comments

P2, l 29: admitted -> considered

P6, l 7: excluding the -> except for a

P6 l 25: "We have also. . .“ something went wrong with this sentence

P8, l 22: downward the -> the downward

P9, l 4: remove “relatively”

P 16, l 28: Stober et al., 2018: refer to the final revised paper

Reference

Portnyagin, Yu., et al., 2004: Mesosphere/lower thermosphere prevailing wind model. Adv. Space Res., 34, 1755-1762, https://doi.org/10.1016/j.asr.2003.04.058.

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