Interactive comment on "Microscale model comparison (benchmark) at the moderate complex forested site Ryningsnäs" *by* Stefan Ivanell et al.

Anonymous Referee #2

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Review of "Microscale model comparison (benchmark) at the moderate complex forested site Ryningsnas" by Ivanell et al.

The model intercomparison study is poorly designed; in addition, the manuscript is quite poorly written. It reads as if different sections were written by different authors; the authors should have made a sincere effort to produce a "homogenized" manuscript.

1.The authors failed to understand that geostrophic wind is not a "tuning" parameter. It represents the balance between the synoptic-scale pressure gradient force and Coriolis force. The coordinators of this intercomparison study should have fixed the geostrophic wind values.

2.In addition, different participants used different roughness values. This is also not

acceptable in a model intercomparison study.

3.Furthermore, integration times of different models vary significantly. For example, the UUCG-Wind model was run for 400,000 seconds. Whereas, the PALM model was run for 10 h (36,000 seconds).

When Coriolis term is involved, the models produce inertial oscillation with a period of 2*pi/f. So, all the models should have been run for a fixed time-period in order to have an "apples-to-apples" comparison.

4.PALM model did not simulate a "truly" neutral boundary layer. Rather, they imposed a capping inversion and simulated a "conventionally" neutral boundary layer. Other models did not incorporate such a strategy.

5.Page 2, line 23: The authors wrote: "Using PAD data instead of estimated roughness lengths may be a way to reduce the uncertainties of site assessment..." However, in the intercomparison study different groups prescribed different roughness lengths. One participant did not use PAD data at all. The others used this dataset in a variety of ways. Again, an intercomparison study should not be conducted in this manner.

6.All the wall functions used by different models should have been properly described.

7.Caption of Figure 2: the subplot (d) is not described.

8.Page 6, definition of ustar (below Eq. 1) has a typo.

9.Page 6, line 18: "simplified version": a Reynolds-averaged (RANS) or Filtered (LES) version of the N-S equation is not a "simplified" version.

10.Page 6, line 20: "time averaged" should be replaced by "ensemble averaged".

11.Page 7, line 2: "fully resolved" -> atmospheric LES runs are rarely fully resolved. One has to demonstrate that everywhere in the domain, the subgrid-scale energy is less than 20% of total energy.

12.Table 1: PALM uses Deardorff's closure. This is a k_{SGS} closure.

13.Page 8, line 16: "limiting maximum length" -> change to "limiting mixing length" or "asymptotic mixing length".

14.Page 11, line 13: "et al (2016)" -> missing author.

15.Page 11, line 18: What is a "reactive term" in turbulence equations?

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