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Interactive comment on "**Boundary-layer turbulent processes and mesoscale variability represented by Numerical Weather Prediction models during the BLLAST campaign**" *by* F. Couvreux et al.

Anonymous Referee #1

Received and published: 8 March 2016

Review of acp-2015-1042 After careful reading, my general impression is that the manuscript contains relevant and sound scientific findings as result of a massive analysis work, and deserves publication. It is a pity, though, that the exposure of such a wealth of results is rather poor. The reading is hard and fragmented, with too many inaccuracies and repetitions. The style needs improvement before the paper can be accepted for publication. To my opinion, the figures are simply not to the ACP standard and require a complete rethinking, not only for publication but even for review. I have struggled to get useful information out of the figures in their current format. I leave the editor the decision if they can be accepted as they are. The structure and 'paragraphing' used for the discussion of the results, on the other hand, seems appropriate, but

[Printer-friendly version]

[Discussion paper]

the text there also needs editing and proof reading. My suggestion to the editor is, therefore, to ask the authors to amend the manuscript following the suggestions given above and below, and have a second round of review about the scientific content once the necessary changes have been made.

Editing (some...)

Abstract. In general the abstract looks too fragmented. Please revise and try to make more concise. The results portion is too detailed for an abstract. Line 13. Three 'operational wheatear forecasting' models Line 16-17. Arome and ARPEGE are applied over France with a grid-size of 2.5 and 10km respectively, while ECMWF is a global model with 16 km grid-size. Line 19. Representation? Do you mean 'evaluate the models against measured fields'? Line 21 twelve Line 24 evaluated 'by using/against/...' Line 26 variability (or variables???) of cloud cover, temp, boundary layer depth (remove one-day to the next, is not necessary)

Introduction. The opening sentence needs improving and some references to your statements.

Throughout the text, please choose a tense and stick with it (see 'use' at line 27 and 'used' at line 32, etc.).

Not sure I understand the meaning of 'representation' used rather often.

Line 22...'those models'...you only evaluate three of them, which are not mentioned in the introduction but should be (see Line 15 of page 3!). Please make sure the introduction contains the case you want to study in a self-contained way. All the necessary info should be in the introduction: motivation, literature results, gaps in the knowledge you are going to fill with your work. Be precise, I don't personally see the need of being general. Give all the elements you have used and that you are going to develop to support your work.

Line 28 '...mesoscale variability' of what?

First two lines of page 3. I don't understand the meaning of the sentence. Can you please clarify? Second line of page 3. '...single-column runs ARE often used as a simplified configuration OF a full 3D simulation ...' . Also, define 'single-column' models.

Line 10 page 3. '...are quite rare compared to...'

Define tke the first time you introduce the turbulent kinetic energy (same for IOP). Remove 'days' after IOP.

Other suggested edits

Page 4, line 7.' ... all surface stations measuring turbulence...'

The first two lines of section 2.3 can be removed, or at least, rephrased. 'Due to the coarse grid spacing...' Page 6, line 15. '...the tke is below .... In the observations...'

Page 6, line 18. '...usually provides an estimate..., based on the vertical gradient of the relative humidity'

Page 7, line 5. '...at a given hour h correspond...'

The paragraph at the beginning of section 3 should be moved to the methodology section Page 11, line 12. '...variables indicating different...'

Page 11, line 26. '... the boundary layer depth estimated by the model with the boundary layer depth estimated by the observations'.

Page 11, line 29. Please provide reference

Page 11, line 30. '...the temporal variability in terms of maximum boundary layer depth from ona day to the other...' is not clear. Do you mean the variability diurnal cycle?

Page 11, line 34. '...the physics of the models respondS ...'

The end of page 8 is a left-over of some copy-paste?

The first sentence of section 3.3 is unnecessary (already said a few times)

In the Appendix the last words sounds strange..' A=3 would be a value too large'.

Table 2. The roughness length is measured in meters

Figures 2. I would suggest to keep only the mean curves and/or to replace the time series with box and whiskers, four for each IOP (obs plus three models) or three is you prefer to plot the bias (obs – mods). Add the legend to all figures if possible, to help the readers.

Figure 6. The choice of colors is unfortunate. Why not blue, red and green for example? The graph is anyway difficult to interpret, please try to make clearer (in the caption please use 'becomes' in place of 'goes').

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2015-1042, 2016.