

Interactive comment on “Atmospheric boundary layer modeling based on mesoscale tendencies and data assimilation at microscale” by J. Sanz Rodrigo et al.

B. Holtslag (Referee)

Bert.Holtslag@wur.nl

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This paper uses the first 3 GEWEX Atmospheric Boundary-Layer Studies (GABLS) to develop a methodology for the design and testing of (some) atmospheric boundary-layer (ABL) models for wind energy applications. Overall, the authors did a good job in exploiting the GABLS results for model evaluation and they do provide additional and relevant information in addition to what is already covered in the cited GABLS papers, in particular because of their focus on wind energy. I propose to accept it after some minor changes: 1. To better advertise the methodology I suggest to update the title into: “A methodology for the design and testing of boundary layer models for wind energy applications”. 2. Systematically the name of Baas is misspelled in the paper,

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so use Baas et al (not Bass et al). 3. Page 5, Eq2. I think it is confusing to use U and V also for the various tendencies of the wind components. The subscript does not really help, use another symbol (or drop Eq 2 completely, it has not much additional value anyway compared to Eq 1). 4. Similarly, in the meteorology journals “e” is used for TKE (not k, which is mostly used for Von Karman constant). 5. Page 8, line 5. Strictly speaking this is not MOS but a result of using the well-established log profile for neutral conditions. 6. Page 9, line 13: Please refer to the original paper for Charnock, not your own earlier application unless you made an important extension. 7. Page 9, I like the idea of using off-shore site conditions to test the models for GABLS1 but the cooling tendencies used do not seem to be very realistic for ocean conditions. 8. Page 12, the authors in referring to Blackadar (1957) may also have a look at the more recent extensions by vdWiel et al (JAS, 2010) and Baas et al (QJ, 2012). 9. Page 13, I do not understand why and how the power law is needed to discuss wind shear results. Please explain. 10. Figures are very difficult to read (at least for my senior eyes), so please magnify or enhance otherwise. 11. Regarding Fig 2, it would also be instructive to show the hodographs (see Svensson and Holtslag, 2009) 12. I suggest no to use acronyms as Qol (it does not read well).

Good luck with the final version!

Bert Holtslag, 19 Nov 2016

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