

Interactive comment on “From lidar scans to roughness maps for wind resource modeling in forested areas” by Rogier Floors et al.

Anonymous Referee #2

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The manuscript does an excellent job at tackling the issues of data availability in land use maps for the calculation of wind resources in forested areas. The scientific significance and quality of the manuscript are both very high; I believe some sentences should be rewritten to be made clearer, and there are some minor inaccuracies with the use of English. I therefore recommend that after some minor technical corrections that manuscript be accepted.

Some specific comments below.

page 1, lines 10–13 (p1110–13): While not unclear, sentence a bit convoluted and difficult to follow. Please rewrite.

p213: Please spell out WASP and add website p2113: substitute colon between refer-

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ences (Jackson (1981); Raupach (1994)) with 'and'. p2l24: In a later study, Dellwik et al. (2006) demonstrated...

p3l1: add website for WindPRO p3l7: ..impact of adding d to terrain data on model predictions. p3l18: ...about forest characteristics... p3l19: During the last decade, ALS... p3l26: ...based on standard land-use... p3l30: ...how WAsP handled... ...the speed of WAsP calculation. p3l34-35: replace'(Sec. 2) with 'Section 2 (i.e. no brackets, spell out Section). Also spell out Section in Section 3.

p4l5-8: Sentence not unclear but long and convoluted. Please rewrite. p4l24: Section 5.

p6l9:frequently p6l15: Why Carroll et al., 2010 while in Table 2 it's DiMiceli et al., (2011)? p6l7-16: Please add survey dates for the 4 land-use datasets. p6l17: WindPRO p6l18: Table 3 (i.e. capitalise 'Table') p6-Table 2: Suggested new title: 'Summary of the different land-use data sources used for creating the roughness maps' Capitalise all letters in CORINE; perhaps also add that it's European data Capitalise all letters in MODIS

p7-Table 3: Suggested new title: 'Land use category and prescribed values of roughness length for each land-use dataset' CORINE section. Last line: Broadleaved. What is complex cultivation under CORINE? Maybe add simple explanation to table. GLOB-COVER section. What is 'pen' mixed broadleaved? Global Land Cover section. First line: substitute 'needleleaf' with 'needleleaved'

p8l16: Figure 1 shows the tree heights (right panel) and elevation (left panel) derived... p8l18: This makes the site ideal for testing the difference... Please also state what difference. p8-Figure 1: Please use same ticks in axes X and Y. Also please specify that the units for elevation and tree heights are in m.

p9l15: ...and had their roughness set to 0.1m... p9l16: m (i.e. not mm) p9l24: 3.2.3 Changing map resolution p9l25: To investigate the impact of map resolution...

p10l6: ...file for compatibility with WAsP... p10l8: Maybe add example in brackets at end of sentence, e.g.: '(e.g. ORA20) ? p10l12-13: I would enclose in brackets the sentence: 'ORA maps that use...with and additional 'D'. p10l17: ...described above needed to... p10-Table 4. Suggested new title: Displacement height (m) determined from pixels...

p11l7: as for reference in page 2, substitute colon between references (Troen and De Baas (1987); Troen and Petersen (1989)) with 'and'. p11l10-11: 'This modelling chain is extensively described in Troen and Petersen (1989). Here we briefly summarise the steps:' p11l21: Please remove comma after roughness lengths p11l28: 'This is done by creating distance-weighted...

p12l1: Please briefly mention what the nodes are and what they represent. p12l4: as for references in page 2 and page 17, substitute colon between references (Semperviva et al., (1990); Floors et al. (2011)) with 'and'. p12l20: '...six of the seven masts, but at mast 6...' p12-eq.6: I take A is the scale parameter of the Weibull distribution. Please make that explicit in the eq. description.

p13l12: Please spell out Section p13l17-18: Sentence not unclear but needs to be improved. Also please conjugate in plural those verbs with data as subject (e.g. data have, not data has) p13l23: Please spell out Section p13l24: too many brackets for Fig.4 p13l26: is filtering the QC-filtering? Maybe worth specifying? p13l27: Please put ' < 0.2 ' in brackets, not between commas. p13l28: please remove 'flagged'

p14-Figure2. Suggested new title: Roughness maps from land-use datasets, and from ORA at 100m and 500m resolutions, colored by roughness values. Open circles...

p15. Figure 4: please remove 'the' before WAsP.

p17l12-13: Not unclear but should be made clearer. p17-Figure6. Suggested new title: a) Mean absolute error in wind speed (%) and b) power density...

p18l18: Please spell out Section p18l29: 'This shows that resolution is important...'

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p19l8: 'The displacement height...' p19l16: '..investigations of model behavior'. p19-Figure 7. The title describes the graph as mean absolute error, while the Y axis on the graph reads 'Relative error'. Please correct accordingly.

p20-Figures 8 and 9: Please remove 'The' at the beginning of titles.

p21l5: '...into two types. Horizontal predictions ...' p21l16: remove space between 41 and %

p22l10: Should it be RMSE rather than just RMS? p22l17: '...different descriptions of land use.'

p23l20-21: '...products with more detailed, but incorrect information (e.g. GLCC1000 vs GLOB300) when comparing only the commercially available maps.' p23l23: 'As argued by Jackson (1981) and Raupach (1994), forest density and forest height are likely to influence the optimal...' p23l24-25: '...Plant Area Index (PAI) can also be estimated from airborne data...'

p24l4: '...ORA maps was tree height, whereas...' p24l7: '...problematic since - in reality - the presence of clearings...' p24l8: '...the overall turbulence levels and thereby increase the...' p24l26-27: 'updated information on forest height and structure when evaluating...'

p25l18: '...appropriate site data that describe forest height, type, and density.' p25l19: I don't understand why spruces and pines are brought into the paper so abruptly (and at the very end of the manuscript!). Is it essential to talk about spruces and pines at this point? p25l24: '...DTU Wind Energy, where WASP is maintained, developed, and sold.'

p26: Check positioning of brackets in Acknowledgements: there seems to be a mistake: bracket required after '(Grant Number 6172-00004B', not at the end of the sentence.

References: Is it correct that the publication year is at the end? Please check the

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journal's suggested citation standard (I could not find it)

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