

Interactive comment on “Aerodynamic roughness length estimation from very high-resolution imaging LIDAR observations over the Heihe basin in China” by J. Colin et al.

Anonymous Referee #1

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Major comments:

This is a very innovate and significant study. A majority of atmospheric/hydrological and remote sensing models needs aerodynamic roughness in the areal perspective. This paper gives a new approach. By using Lidar observation and compared with CFD wind profile computations, the results are basically good. However, the paper was a little rough written. Moreover, because of rather large differences of the roughness results by Raupach and MacDonald, also that from CFD, if a validation with surface observations (as from tower & Eddy-covariance) could be done, it would be more sig-

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nificant.

Minor comments:

1. P. 3400. DSM is not as familiar as DEM for readers. Please explain with a few words on its surface relevant parameters.
2. Eq (1) is basic for this paper, esp. in using CFD wind profile in deriving z0m. However, it is valid only in neutral conditions. For some time in this analysis (mostly early afternoon), the stratification were very unstable.
3. P.3401. Is hv the canopy height? What used in Lettau's eq. (2) should not be same. Please give a description at first as for λf by eq.(3)?
4. P.3401-02. It is rather confusing for many readers to understand eqs. (4)-(9). There are many parameters and/or expressions that need a little more explanation. The value for $(u^*/U)_{max}$, '0.193,0.003,0.3,and 7.5a', and the description in last paragraph of these pages, are not clear.
5. P.3405 & related. Some comparison with surface observation is more reliable. e.g., the area for dense vegetation can be get from surface information.
6. P. 3408 & related. Uncertainties seem more in using CFD-Windstation approach.
7. There are many places with careless English writing or typing. Please have a careful check.

For instance:

P. 3400, line 20-21

P. 3401, line 3.

P. 3402, line 7-8

P. 3403, line 18

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P. 3404, line 19 & 21

P. 3405, line 18

Table 2 & 3: Month-dates are not consistent.

Fig.5: Roughness in 'cm'? etc.

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