

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 innovative 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 z_{0m} . 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 h_v the canopy height? What used in Lettau's eq. (2) should not be same. Please give a description at first as for λ_f 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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