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Atmospheric Measurement Techniques Discussions

Interactive comment on "Performance of a mobile car platform for mean wind and turbulence measurements" *by* D. Belušić et al.

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The paper offers an interesting solution for measuring area-averaged fluxes near the ground and for studying horizontal fields of wind, scalars and fluxes. It is well written, but the main focus is on technical details and not so much on the application of the system. This is within the scope of AMT, but some more details are necessary to explain possible differences within some of the tracks of the car.

1. The turbulent eddies are much smaller near the surface than within the typical height range of low level aircraft measurements of 50 to 100 m. Furthermore, these small eddies make a significant contribution to the flux. Due to the speed of the car, these eddies can be found in the spectral range of up to 100 Hz or more. If you have

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no low pass filter with a frequency similar to the sampling frequency of 20 Hz, you probably have aliasing effects. The oversampling with 60 Hz probably has a low pass filter frequency that is too low. Please discuss this issue.

2. Recently, low-level aircraft measurements have been discussed in relation to the footprint of the fluxes (Hutjes et al., 2010; Metzger et al., 2013). For the interpretation of your car and tower data, such an analysis seems to be necessary. Furthermore, a road can heat up very much and free convection may be possible. Perhaps you can use both effects to explain some of the differences between car and tower data that you found for some tracks. But this is also important for the conclusions, where you give some hints for the application of your system.

3. I think that offset is not the right wording for the difference between the sonic and the thermocouple temperatures. The difference is clearly a function of the moisture and pressure (Kaimal and Gaynor, 1991). Furthermore, with the thermocouple you measure the sensible heat flux, and with the sonic temperature, the buoyancy flux. You can explain the difference between both with the SDN-correction (Foken et al., 2012;Schotanus et al., 1983). Therefore, the sentence p. 959, line 25-27 is wrong.

Minor remarks:

- Perhaps the paper by Li et al. (2012) could give you some hints for explaining problems with the momentum flux measurements.

- Because your paper is mainly orientated to the measurements of fluxes, the conclusion that the system can be applied for studying stable nocturnal situations could be misinterpreted. It is possible to detect horizontal fields, but fluxes under these situations are too small, are affected by intermittencies and the horizontal wind speed is much lower than the speed of the car, with the consequence that the momentum flux cannot be determined. Please separate between the possibility for measuring fluxes and that for measuring horizontal field structure.

AMTD

7, C233–C235, 2014

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