

Comments on “Measurements of energy and water vapor fluxes over different surfaces in the Heihe River Basin, China” by S. Liu, Z. Xu, W. Wang, J. Bai, Z. Jia, M. Zhu, and J. Wang, (hess-2010-326)

The manuscript presents a detailed study of the energy and water vapor fluxes of three sites in the Heihe River Basin. The analyses are based on measurements by EC and LAS instrumentations and the data processing was clearly presented to the level that a thorough appreciation is possible of the seasonal magnitudes of these fluxes in the Heihe river basin.

The authors also determined the source areas of the EC and LAS measurements but it is noticed that only one dimensional footprint analysis was performed. While this type of the analysis has been used frequently in similar previous studies, the assumption used in 1-D analysis is often not valid in a complex landscape; in particular this could be the case for the YK site when the winds would come from either the east or the west directions as shown in Fig. 2a. Recently Timmermans et al (2009) have developed a 2-D method for footprint analysis of LAS measurements, which can deal with situations with both stable and unstable conditions occurring in the footprint of the LAS. They applied the method to the Barrax site using the data reported by Su et al. (2008) and have shown that such an approach would be necessary to explain the observed fluxes in complex terrains. It would be interesting to know if these situations also occurred in the Heihe data sets.

Additionally it may be pointed out that there have been several recent studies on the comparison of EC and LAS measurements for different canopies, in particular those appeared recently in the HESS special issue (see Su et al., 2010; Su et al., 2009). It would be interesting for the authors to have a brief discussion on the difference and similarities of the findings in the different studies compared to this present one.

Some minor issues may need some attentions in the manuscript. 1) P5L2 mentioned “Watershed Airborne Telemetry Experimental Research (WATER)” (Li et al., 2009)”, but the reference Li et al. named it “Watershed allied telemetry experimental research”. A consistent use of the names for the same experiment is desirable. 2) Some of the references may need some further attention, e.g. P23L24, and “Hurk, V.” should be “Hurk, B. J. J. M. v. d.” although it is understood that some of the names can be quite complex.

References

Su et al: Advances in land surface hydrological processes – field observations, modeling and data assimilation, *Hydrol. Earth Syst. Sci.*, 14, 1–3, 2010.

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Su, et al: Quantification of land-atmosphere exchanges of water, energy and carbon dioxide in space and time over the heterogeneous Barrax site, *Int. J. Remote Sens.*, 29(17), 5215–5235, 2008.