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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Influence of local air pollution on the deposition of peroxyacteyl nitrate to a nutrient-poor natural grassland ecosystem" *by* A. Moravek et al.

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Response to interactive comments of anonymous referee #1 (received and published on 11 September 2014)

The authors thank anonymous referee #1 for the review and throughout positive evaluation of the manuscript. Also, we are grateful for the valuable comments and suggestions.

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Interactive Discussion

Discussion Paper

Comment: *The authors use a Relative Humidity (RH) criterion of 60% for the application of the Penman-Monteith (PM) scheme. Is this fully justified? The PM approach is correct when direct evaporation from wet surfaces, including bare soil, is absent. This does not depend directly on the humidity present in air, but on the presence of liquid water on and inside the surface elements. You can have a RH-value of 90% in air and a soil that is perfectly dry. In this case, the PM approach is fully justified. So the authors should comment this aspect more in depth.*

Response: The PM scheme itself is able to calculate the complete evapotranspiration via the sum of both the aerodynamic and surface (canopy) resistance (see e.g. Allen et al., 1998, p. 19). In case referee #1 meant with "PM approach" the determination of the stomatal conductance from the PM equation ($g_{s_{PM}}$) as it was presented in this study, we agree that this approach is only correct when direct evaporation from wet surfaces, including bare soil, is absent. For this reason, we present final stomatal conductance values (g_s) which were corrected for these effects according to the method discussed in Lamaud et al. (2009): First, only data for relative humidity (rH) < 60% were retained. Below this threshold it can be assumed that all the liquid water at the leaf surface was evaporated (see Altimir et al., 2006). Lamaud et al. (2009) also show that $g_{s_{PM}}$-values were not suitable for rH > 60% when liquid water evaporation occurred. It is important to note here that rH is used as an indicator for the presence of liquid water at the surface and not for the presence of soil evaporation. Second, $g_{s_{PM}}$ was plotted against GPP for data with rH < 60%, and corrected for soil evaporation to obtain the final g_s-values (here we refer again to Lamaud et al. (2009) in the manuscript for further details on the method). Finally, g_s-values for rH > 60% were calculated as a function of GPP (function obtained from the previous step). This last step was stated more precisely in the revised version of the manuscript.

Comment: *There are a few typing errors: Page 20386, l. 26 : "leaf" (instead of "leave") ; Page 20391, l. 15 : Due to its (instead of is); l. 20 : replace "divers" by "different" or*

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"various".

Response: The typing errors were corrected in the revised manuscript.

References

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Altimir, N., Kolari, P., Tuovinen, J. P., Vesala, T., Bäck, J., Suni, T., Kulmala, M., and Hari, P.: Foliage surface ozone deposition: a role for surface moisture?, Biogeosciences, 3, 209-228, 10.5194/bg-3-209-2006, 2006.

Lamaud, E., Loubet, B., Irvine, M., Stella, P., Personne, E., and Cellier, P.: Partitioning of ozone deposition over a developed maize crop between stomatal and non-stomatal uptakes, using eddy-covariance flux measurements and modelling, Agr Forest Meteorol, 149, 1385-1396, DOI 10.1016/j.agrformet.2009.03.017, 2009.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 20383, 2014.