

Interactive
Comment

***Interactive comment on* “Improved determination of daytime net ecosystem exchange of carbon dioxide at croplands” by P. Zhao and J. Lüers**

Anonymous Referee #1

Received and published: 6 May 2012

The paper present a method to filter and fill gaps in eddy covariance data measured over cropland. Although the topic is interesting and new data processing technique developments needed to produce high quality data, the paper doesn't present really innovative approaches, without showing if the method proposed gives different results respect to the state of the art tools used in the eddy covariance community. For this reason the paper should be rejected in its actual form.

GENERAL COMMENTS:

1) It is true that when gap-filling is applied to crops the fast change of vegetation status must be considered. The authors propose to use LAI starting from the assumption that LUT and ANN are not adequate in these cases (Page 2886 Line2-4). This is not true, for example, in most of the methods proposed in Moffat et al. 2007 because the

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



models parameterization is done for short time windows (i.e. one week) where it can be assumed that the vegetation status doesn't change substantially.

2) The new QAQC procedure proposed (New Multi-Step Error Filter, 2.2.4) is not new. It is common procedure in eddy covariance data processing to remove data that are flagged as problematic according with the raw data screening procedures (Foken and Wichura 1996 or others), data that are out of physical limits, spikes and outliers, data coming from outside the footprint or acquired when the diagnostics of the sensors suggest potential problems. In addition, the authors are not applying any ustar filtering to increase the number of data available for the model parameterization, but they don't demonstrate that the ustar filtering is not needed or relevant for the site. In fact, the ustar filtering is not an alternative to the raw other QAQC filters applied but an additional tool needed to remove halfhours potentially affected by advection (see Aubinet et al. 2012) and for this reason it is impossible to just ignore it to keep more data available.

3) In the proposed model (eq. 9 page 2895) the authors normalize model parameters (alfa and beta) and GPP by LAI. In this way they assume that the three parameters vary all linearly with LAI but this should be checked because there are probably saturation levels that could be different for the parameters and GPP.

OTHERS COMMENTS:

1) The model evaluation should be done with gaps larger than 10% if the authors want to demonstrate that it is possible to "fill large data gaps" (page 2903 line 4) and the distribution of the gaps should be explained.

2) Page 2897 Line 10-11: are the difference found using 2, 4 or 8 days significant?

3) The comparison between the parameters estimated using the LAI factor scheme should be better evaluated and discussed to avoid circularities since both alfa and alfa prime are calculated from the same GPP.

4) In the temperature bibbing scheme (3.4) which time window has been used?

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

5) The discussion about VPD in the potato field is not relevant since as the authors say (Page 2902 line 20-23) when VPD was high the vegetation was basically not present, so it is obvious that it is impossible to see a VPD effect on GPP (shown by others, e.g. Lasslop et al 2010)

References

Aubinet, M., Feigenwinter, c., Heinesch, B., Laffineur, Q., Papale, D., Reichstein, M., Rinne, J. and Van Gorsel, E.: Nighttime Flux Correction, in: Eddy Covariance: A Practical Guide to Measurement and Data Analysis, M. Aubinet, T. Vesala and D. Papale (Editors), Springer, Dordrecht, Heidelberg, London, New York, 133-157, 2012

Foken, T. and Wichura, B.: Tools for quality assessment of surface-based flux measurements, *Agr. Forest Meteorol.*, 78, 83–105, doi:10.1016/0168-1923(95)02248-1, 1996.

Lasslop, G., Reichstein, M., Papale, D., Richardson, A. D., Arneth, A., Barr, A., Stoy, P., and Wohlfahrt, G.: Separation of net ecosystem exchange into assimilation and respiration using a light response curve approach: critical issues and global evaluation, *Glob. Change Biol.*, 16, 187–208, doi:10.1111/j.1365-2486.2009.02041.x, 2010.

Moffat, A. M., Papale, D., Reichstein, M., Hollinger, D. Y., Richardson, A. D., Barr, A. G., Beckstein, C., Braswell, B. H., Churkina, G., Desai, A. R., Falge, E., Gove, J. H., Heimann, M., Hui, D., Jarvis, A. J., Kattge, J., Noormets, A., and Stauch, V. J.: Comprehensive comparison of gap-filling techniques for eddy covariance net carbon fluxes, *Agr. Forest Meteorol.*, 147, 30 209–232, doi:10.1016/j.agrformet.2007.08.011, 2007

Interactive comment on Biogeosciences Discuss., 9, 2883, 2012.

BGD

9, C1029–C1031, 2012

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

