

***Interactive comment on “Estimating carbon dioxide fluxes from temperate mountain grasslands using broad-band vegetation indices” by G. Wohlfahrt et al.***

**Anonymous Referee #2**

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This paper provides a statistical analysis of the relations between NEE and related variables (GPP, light response parameters, ecosystem respiration) with ground-based vegetation index for two temperate grassland sites.

It is well written and technically well designed, the figures are clear and useful, citations are relevant.

One may argue that the does not contribute much to the current understanding. Indeed, it does not address the broadband / narrow band issues, since the two kinds of data were not acquired over the same years. In addition, narrow bands would be suited to obtain clean satellite data or to derive well defined properties of the canopy, as

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Wohlfahrt et al recognize, which is not the scope of the paper. The study does not address either mechanistic understanding of radiation regime in plant canopies or plant physiology. Last, it does not address the differences noted between the two grassland sites, which would have helped to obtain general results. Rather, the authors honestly say in their discussion section that much of the results were expected: strong links between NDVI and assimilation, and Reco with other variables, like temperature.

The results presented in the paper may be of interest for gap-filling techniques.

Although it contains rather expected results, the paper honestly contributes to the world-wide effort to relate eddy covariance CO<sub>2</sub> fluxes to micro-meteorological variables, pointing possible use of routine radiation data in gap-filling techniques. Therefore I recommend publication in Biogeosciences with minor revisions.

In order to increase the impact of the paper, I would recommend to strengthen the light-response curve paragraph by estimating absorbed PAR and discuss light-use efficiency based on absorbed PAR rather than incoming radiation. Also, to really demonstrate the interest of ground-based NDVI data for gap-filling, the authors may want to perform some tests with their dataset and provide an estimation of the accuracy of the NDVI-based method compare to existing methods (fits, bins etc.).

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