We thank Dr. Baldocchi for his encouragement and bringing up several important challenges for the OCS community. There are three main issues:

(1) The OCS instrument is expensive, the measurement difficult, and is reserved for a few well-funded laboratories.

The power of this approach for estimates of GPP is that, for most plants that have been studied, OCS is only taken up in plant leaves and at a *relatively* stable ratio to CO2. This gives us information about carbon uptake and stomatal conductance with a different set of uncertainties than other methods. While the OCS community will probably never have the coverage and participation of FLUXNET, performing OCS-based partitioning at a few sites could show where the standard methods can be improved without having to install an instrument at every site. As to cost, perhaps in ten years there will be a QCL in every physical chemistry classroom.

This "boutique" measurement is similar to the isotope work currently underway at many flux sites. Ideally, this review will motivate longer-term datasets.

(2) The Global GPP estimate using OCS is higher than expected.

There is no global OCS dataset with enough near-surface values for a global inversion of OCS and CO_2 exchange. The Campbell et al. (2017) paper does not estimate the magnitude of global photosynthesis. Instead it estimates the percent change of global photosynthesis over the last century. The supporting online material explains that the optimization approach is not sensitive to the magnitude of global photosynthesis that is used as input (not output) to the analysis.

In the future, we hope to generate a *well-validated* global dataset with near-surface sensitivity that would allow us to estimate GPP. Such an effort will require considerable ground truthing. An OCS-based GPP number is probably years away, and currently using OCS as a regional tracer seems more tenable and perhaps more useful for model evaluation.

(3) The equation for leaf relative uptake does not take into account compensation points.

While the Ohm's law approach undoubtedly describes the process more accurately, the empirically-derived "constant" LRU appears to be sufficient in some applications. Theoretical LRU is not constant and true Ci is finite and variable. Our current progress is towards improving upon the admittedly simplistic LRU approach: we need more data from the field which the community is actively pursuing. In the text, we have changed the terminology we have used to make our use of LRU clearer: referring to it as an empirical constant and using the name LRU instead of depositional velocity notation.

For now, if we want to use OCS observations to improve our land surface models as in Hilton et al. (2017), using LRU circumvents having to use more complicated models with their own sources of uncertainty. On the regional scale, Hilton et al. (2015) found no difference for using the LRU approach or the Ohm's law approach when assessing spatial gradients in GPP. For important questions on the regional scale, both approaches can be sufficient, although it is important that this point is addressed in each different study.

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We thank Dr. Baldocchi for addressing these concerns explicitly and allowing us to clarify our future efforts.

Cheers,

Mary Whelan