

## ***Interactive comment on “Reviews and Syntheses: Carbonyl Sulfide as a Multi-scale Tracer for Carbon and Water Cycles” by Mary E. Whelan et al.***

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This paper reviews the current knowledge of OCS on various scales. The focus is on the coupling of the OCS and carbon budget. The water cycle (in the title) comes in only briefly through the stomatal conductance.

The paper brings a wealth of information about recent developments concerning OCS as a tracer to constrain gross primary production by the biosphere. However, it also clearly reveals the big gap in the OCS budget, which is quite worrying. Possible missing OCS sources mentioned are the oceans and underestimated anthropogenic emissions from Asia. However, the paper does not make entirely clear why the authors mainly discard the biosphere as source of OCS. Recent papers (e.g. Kitz et al. 2017) point to

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bare soil emissions, basically respiring OCS to the atmosphere.

Anyhow, as a review this paper is really very valuable and well written. I upload an annotated pdf in which I collected all my comments, always made with constructive intention. Note that I also spotted some mistakes, e.g. classifying ACE/FTS as an instrument measuring emission. Also, referencing to figures and tables is sometimes missing in the main text.

A few central points that are needed to further improve the paper:

- (1) The paper might benefit from a clearer structure, which is then also explained at the end of introduction. For instance, the ordering of section 2 with section 2.5: atmospheric OCS really does not make sense to me, since all other terms discussed in section 2 are exchange fluxes. See comments in the manuscript.
- (2) The conclusion section seems rather limited and does not give credit to the insight that is build up in the paper. I suggest to collect all recommendations (on measurements and modelling) made throughout the manuscript, and repeat these point by point. The “review” character of this paper really asks for a view on directions for future research.

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2017-427/bg-2017-427-RC1-supplement.pdf>

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