

Interactive comment on “Chlorophyll fluorescence remote sensing from space in scattering atmospheres: implications for its retrieval and interferences with atmospheric CO₂ retrievals” by C. Frankenberg et al.

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A small part of this manuscript (the actual usage of space-based fluorescence data) seems to have been a trigger for an extensive discussion at AMTD. Despite the intensity of the debates, we enjoyed this discussion as it both shows general interest in our work and also helped improve the manuscript.

We tried to accomodate all comments in the revised manuscript but had to strike a

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balance here and there as some comments were not in-line with suggestions by actual reviewers. For instance, we saw the sensitivity with regard to the FLEX mission and refrained from comments about it in all but one position where we at least introduce and cite FLEX but at the same time provide a very fair statement.

The other issue was regarding the "usability" of the data as there are still uncertainties in the community regarding the interpretation of steady-state fluorescence (e.g. the PSI contribution to the total fluorescence emission). We added a small paragraph acknowledging this problem:

"However, there are still uncertainties regarding the contribution of Photosystem I (PSI, \citet{pfuendel_1998}) to the chlorophyll fluorescence signal in the 755–770~nm window under natural and stressed conditions. The primary driver of fluorescence is certainly absorbed photosynthetically active radiation but the inter-play between photosynthesis and fluorescence yield in steady-state conditions may require further research before fluorescence modeling \citet{Tol} offers a consolidated physiology-based link between NIR fluorescence and photosynthetic efficiency. A good correlation of space-based fluorescence retrievals with gross primary production on the coarser regional scale, however, was demonstrated in \citet{Frankenberg:2011p6380, Gartner_SVD_2012}."

Given the various and diverse input to our paper, we sincerely hope we didn't miss a critical issue in our revised manuscript and wish to thank all official reviewers as well as Wout Verhoef, Elizabeth Middleton and Albert Porcar-Castell for their comments.

Sincerely, Christian Frankenberg

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