

***Interactive comment on “Filling-in of far-red and near-Infrared solar lines by terrestrial and atmospheric effects: simulations and space-based observations from SCIAMACHY and GOSAT” by J. Joiner et al.***

**Anonymous Referee #2**

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Joiner et al., AMTD, 2012, report on a new and potentially very important data product from SCIAMACHY: They analyzed the filling-in of a strong Fraunhofer line in the 866 nm spectral region, which provides information on chlorophyll-a fluorescence. They provide a very careful analysis based on simulations and analysis of real (multi-year global) data pointing out the challenges to obtain and interpret the filling-in signals from the weak signal at 866 nm. They indicate that the new data product has the potential to provide important new information on the functional status of vegetation and that the findings are also relevant for the design of future satellite missions aiming at

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retrieving information on (terrestrial) vegetation fluorescence: High spectral resolution is a major cost-driver for a satellite instrument and the results shown in this manuscript indicate that the 866 nm spectral region permits fluorescence retrievals even at quite low spectral resolution. The manuscript is very well written and covers an important topic highly relevant for AMT. I therefore strongly recommend to publish this manuscript in AMT. I only have two very minor recommendations for further improvements listed below. I congratulate the authors for this excellent work and I am looking forward to seeing the final version of the manuscript published in AMT.

Recommended improvements:

Section 5.2, page 176, line 20: Please consider replacing “we assume a constant wavelength dependence” by “we assume no wavelength dependence”.

Section 5.3, page 177, lines 12-13: The statement is only true if the instrument line shape (ILS) function does not change. Is this a reasonable assumption taking into account that the ILS likely depends on the slit illumination, which varies depending on the (in)homogeneity of the scene observed ? I recommend to add that the statement assumes that the ILS is (sufficiently) stable.

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Interactive comment on Atmos. Meas. Tech. Discuss., 5, 163, 2012.

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