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Interactive comment on "Satellite-inferred European carbon sink larger than expected" *by* M. Reuter et al.

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We read with interest the manuscript by Reuter et al. on the European carbon sink. The authors present evidence to support the argument that the stronger sink derived using satellite observations is real and not just an artefact due to the inversion method, meteorological fields or biases in the satellite datasets. We would like to draw the authors' attention to previous work which also inferred a stronger European carbon sink from inversions using satellite observations of CO_2 from the Tropospheric Emission Spectrometer (TES) in Nassar et al. (2011).

The TES CO_2 inversion work in that paper focused on 2006, coincidentally the year of the strongest European sink according to the current manuscript. An ensemble

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of inversions using TES CO_2 with different bias correction methods, with or without surface flask CO_2 data, is shown in Figure 5 of Nassar et al. (2011), which yielded sinks of 1.17 - 1.35 PgC/yr (or GtC a^{-1}) for a region defined as "South and Central Europe". The largest sink (1.35±0.17 PgC/yr) was found when the flask data were omitted and only TES CO_2 was used in the inversion. The results in that paper were not provided for the TransCom land regions, but using the TransCom region definition for Europe for the TES CO_2 inversion gives only a slight change to 1.33±0.20 PgC/yr. These European CO_2 sink values from Nassar et al. (2011) are very close to the European sink of about 1.32±0.30 PgC/yr for 2006 that we estimate by visual inspection of Figure 1 in the current manuscript.

We think that the satellite-inferred European carbon sink in Nassar et al. (2011) supports the argument made by the authors and that this earlier work should be mentioned and cited in the present manuscript. We believe, however, that denser measurement coverage and improved inversion methods with a more rigorous accounting of error terms will likely be required to confirm or refute with greater certainty, the presence of a strong European carbon sink, as found in most satellite-based CO_2 inversions.

Reference

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