

Interactive comment on “Note on rotational-Raman scattering in the O₂ A- and B-bands: implications for retrieval of trace-gas concentrations and terrestrial chlorophyll fluorescence” by A. Vasilkov et al.

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The paper by A. Vasilkov, J. Joiner, and R. Spurr shows the impact of rotational Raman scattering on high resolution Nadir spectra in and around the oxygen A and B-bands. The in-filling by RRS is compared to the in-filling by chlorophyll fluorescence. As such, the manuscript is very timely and of scientific importance as it is of interest for a variety of researchers. My main problem is that the title is misleading: "Note on rotational-Raman scattering in the O₂ A- and B-bands: implications for retrieval of trace-gas

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concentrations and terrestrial chlorophyll fluorescence" as the paper shows only the impact on observed radiances but not how these actually propagate into errors in retrievals of trace gases and fluorescence. Ideally, the authors would obtain typical gain matrices from the trace gas retrieval teams (which can probably be provided by respective teams) and calculate the impact on trace gases and maybe also fluorescence for some selected scenes. At the very least, the impact of RRS should be discussed in a qualitative way (e.g. by judging from the impact of fluorescence on XCO₂ as in the Frankenberg 2012 AMT paper). The RRS impact can be expected to be lower than fluorescence. Also, it would be worthwhile to discuss the spatial coherence of potential biases. If the biases induced by RRS are smoothly variable as a function of viewing angle (as is shown), then even a bias would not be that problematic in retrievals as SZA dependent biases are anyhow potential biasing factors (e.g. due to spectroscopy) and will ideally be calibrated out. As such, the dependence on surface albedo might be of higher interest as this quantity has more spatial variations and can co-vary with "greenness". It would be good to discuss these factors.

Sincerely, Christian Frankenberg

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