

Interactive comment on “Accurate mobile remote sensing of XCO₂ and XCH₄ latitudinal transects from aboard a research vessel” by F. Klappenbach et al.

Anonymous Referee #2

Received and published: 20 July 2015

The manuscript describes the measurement for column-averaged CO₂ as well CH₄ mole fractions performed onboard a research vessel on the Atlantic using a portable Fourier Transform Spectrometer (FTS). The retrieved mole fractions are compared to model data and satellite retrievals.

About 3 years ago it has been shown that portable FTIR-spectrometers are can measure CO₂ and CH₄ columns with high precision. Provided sufficient precision and long-term stability, such measurements can be highly valuable for complementing the TCCON and for emission measurements from localized sources. These kind of spectrometers can be easily employed in remote places and on moving platforms like ships.

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The present paper is the first one that describes the employment of a portable spectrometer for CO₂ and CH₄ solar absorption measurements on a ship. The paper is well written and describes the measurements as well as the retrieval (especially the employed corrections) in detail. It therefore represents a valuable scientific contribution and should definitely be published, provided the following two points are addressed:

1) In the current state of the manuscript it is not clear how much information is coming from the measurement and how much from the apriori. This should be investigated and included in the final paper. I regard this as very important. Carbon Tracker / TM4 simulations are used as the apriori for the retrieval. Although these model runs are for a different year (I assume the months March/April), the latitudinal pattern is probably similar. Hence even in the extreme case that the measurements do not contribute any information, a reasonable agreement with the MACC-model is expected. 2) The averaging kernels are neglected in the model comparison. In my opinion this should be changed.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 7413, 2015.

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