We thank all reviewers for their constructive comments, which helped to improve the paper. Below, we address all comments point-by-point.

Comment1#,

Interactive comment on the manuscript "Full-physics carbon dioxide retrievals from the OCO-2 satellite by only using the 2.06 µm band" by Lianghai Wu et al. The manuscript "Full-physics carbon dioxide retrievals from the OCO-2 satellite by only using the 2.06 µm band" contains important new material and it covers the topics appropriate for Atmos. Meas. Tech. The presented results are of practical interest in terms of reducing computational costs as well as optimizing the configuration of the measuring tools for monitoring atmospheric carbon dioxide. The manuscript is well structured and written. The abstract clearly summarizes the paper and main results. I recommend the manuscript publication provided some minor comments would be considered.

1) The proposed algorithm modification (reduction of the input spectroscopic data from three bands to one 2.06 µm- band) has been implemented for RemoteC algorithm. Specific feature of this algorithm is using a priori (meteorological) surface pressure. The authors mentioned it ("We do not retrieve the dry air column but compute it using the ECMWF meteorological data", page 3, line 8). To my opinion, the importance of this feature for the implementation of 1-band version should be clearly noted in the discussion. In the similar algorithms (e. g., ACOS, NIES-GOSAT, and TANSAT) that retrieve surface pressure, the excluding the oxygen A band from the input spectroscopic data is hardly possible.

R1-Indeed, many XCO_2 retrieval algorithms need the O2-A band to retrieve surface pressure to derive XCO2 values. This has to be mentioned clearly. A new sentence "Clearly, a one band retrieval using only the 2.06 micron band is only possible if surface pressure information from meteorological re-analysis/ forecast is used in the retrieval algorithm. Retrieving this information, as is done by most algorithms (list references here rather than algorithm names) requires the O2 a-band. ." is now added in Page 3, line 20.

2) The modified (1-band) algorithm is supplemented by new cloud filtering procedure. The algorithm itself was previously tested on simulated OCO measurements. Has the filtering procedure been tested in the similar way?

R2- The new cloud filtering has not been tested with synthetic data yet. For three-band cloud filtering, we do non-scattering retrievals in weak and strong absorption band and the idea is that the difference is a measure for light path modifications (e.g. by clouds), as weak and strong absorption bands have different light path sensitivity. The new one-band cloud filtering is based on a similar idea as the three-band cloud filtering, namely dividing the 2.06 um band into one weak absorption band around 2.08 um and one strong absorption band around 2.05 um. With real OCO-2 data used in the paper, we see that one-band cloud filtering and three-band cloud filterings have similar overall throughputs with an overlap of 75%, as stated in the manuscript

3) As follows from table 4, light-scattering by aerosols for the collocated OCO-TCCON observations mostly reduces optical path-length both over ocean (quite predictable), and over land. This reduction is rather successfully corrected by 1-band algorithm in terms of XCO2 biases (table 3). To demonstrate algorithm accuracy under different aerosol conditions, it would be useful to show the XCO2 biases (in addition to SD values) for the Sahara region, where we can expect an increase in optical path-length by light-scattering.

R3- Indeed, it is useful to mention the biases as well. For the Sahara region, biases with TCCON for one-band and non-scattering retrievals are -0.23 and -2.46 ppm, respectively. The biases for the Sahara region are now included in the paper in page 5 line 23.