Authors' response to Anonymous Referee #2:
MAMAP – a new spectrometer system for column-averaged methane and carbon dioxide observations from aircraft: retrieval algorithm and first inversions for point source emission rates

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The referee had two major and a few minor comments. We address all comments in detail below and used the suggestions to improve our paper.

Referee: *First the algorithm uses the light-path proxy technique usually utilised for CH4 (where the CO2 is assumed to be relatively homogeneous) for both the calculation of XCO2 and XCH4. It is not clear what the authors use here for the average mole fraction used in the calculations and whether this assumed value impacts upon the results. I suggest stating the values and providing justification for their use as well as assessing the effect of any uncertainty in this value.*

Authors: We added an additional paragraph giving the average mole fractions for XCO_2 as well as XCH_4 and briefly discuss the impact of this choice: *"For this study, the average mole fractions* $CO_2^{\text{aver. mole fraction}}$ *and* $CH_4^{\text{aver. mole fraction}}$ *were assumed to be* $\approx 380\,ppm$ *and* $\approx 1.7\,ppm$ *(with a surface value of 1.780 ppm), respectively. The corresponding vertical profiles determine the linearisation point for the radiative transfer model. The retrieval results are normalised prior to the inversion process. Hence, the choice of background concentrations has no direct impact on the emission rate estimates."*

Referee: *Secondly, as recognised in the text, the wind speed is a crucial variable in determining the XCO2 and XCH4 values and hence knowledge of its uncertainty is important. As this is such a critical parameter, a "rough estimate" of the uncertainty based on the monthly bias does not seem consistent with the rigorous nature of the rest of the paper. It may be enough to recognise this fact and account for it in the future (as the authors intend to do using on-site wind information).*

Authors: This was pointed out by both referees and we now elaborated a better estimate for the wind uncertainty. We repeat here the answer given to referee #1:
The difficulty with the wind uncertainty is that the error estimate we would need is not available as such. That would be the error between model and data at the respective location for the respective time. However, in the meantime we collaborated with the DWD (German Weather Service) to obtain an estimate for bias and root mean square error (rmse) for the morning of July 27 compared to the Lindenberg observatory wind profiler data which is close to the power plant sites. The rmse error turned out to be $\approx 0.9\,ms^{-1}$ while the bias is close to zero. We now used this rmse error for the error estimation.

Referee: *Technical (typographical/grammatical) corrections*
Despite the excellent scientific content, the language is awkward in places. A correction of some of the grammatical errors would help in the readability of the paper which is quite verbose and could be expressed more concisely.
The authors use US/UK spellings inconsistently, examples include (but not limited to): localized (US), minimizing (US), modelling (UK), characterised (UK), favourable(UK).
Typographical errors: P2210:L28 samling P2212:L5 refinerie P2218:L11 topograhpic P2226:L11 a priori P2228:L8 length P2236:L15 reasult P2236:L19 there is almost not systematic

Authors: The revised manuscript has been additionally spell checked and proof read by two native speakers. The inconsistencies between British and American English haven been accounted for in favour of the UK spelling.