

Interactive comment on “Use of portable FTIR spectrometers for detecting greenhouse gas emissions of the megacity Berlin – Part 2: Observed time series of $X\text{CO}_2$ and $X\text{CH}_4$ ” by F. Hase et al.

Anonymous Referee #1

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This is part 2 of 2 papers in which five portable solar FT spectrometers were deployed around Berlin to measure total column CO_2 and CH_4 in the atmosphere over a 3 week campaign in summer 2014. In part 1 the intercalibration of the spectrometers before and after the campaign is described in detail. Part 2 describes the campaign measurements and their interpretation through a relatively simple Lagrangian dispersion model to estimate city-wide emissions of the target gases. This is an valuable piece of research and the papers are suited to publication in AMT. The work is thoroughly presented and I recommend publication, however I suggest a re-structuring of the work

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into a single, more concise paper. The splitting into two papers makes the publication longer than necessary and awkward to read either paper without referring to the other. Some material must be repeated in each paper, and some material in one paper better belongs in the other. While the need for tight intercalibration is essential for the purposes of the field campaign and is well justified, it does not justify a standalone paper as it does not have clear relevance without the context of the measurement campaign. Part 1 contains introductory material that better belongs to part 2 (e.g. 1. Introduction, and 3.2 describing the Berlin campaign). Part 2 relies heavily on part 1 to follow the measurements. I therefore recommend combining the two papers into one, merging the duplicated material in introductions campaign descriptions and conclusions, with a single introduction to the importance of the work, followed by (existing) sections on the instrumentation, (calibration, ILS determination, spectrum analysis and processing to total columns), Berlin campaign description, results and modelling. This is mostly a matter of reorganising existing sections rather than rewriting new material. The authors might consider placing some of the calibration material from part 1 into an appendix to the combined paper. It is important that this material be included, but for the less interested reader it can be summarised in the main text with details in the appendix to enhance readability.

Technical corrections – part 2

P2768 L11: Remove “unique” – there are other studies – see below

P2769 L10: The site locations and campaign details belong here in part 2 if the work is separated into 2 papers.

L14: form => from

P2770 L12: remove “applied”

L13: replace originally” with “initially”

L16: measurements => measurement

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L24: nicely => clearly

P2771 L 3: H₂O varies considerably

P2773 L15: inspired by informations => informed by information

P2774 L 2: “molecules” Descriptions of Lagrangian models usually refer to the more generic term particles, not in quotes, rather than “molecules”. I suggest replacing “molecules” throughout with particles.

P2775 L20 and figures 6-8: expand figure captions to include this information about background assumptions

L27: the peaks are “well captured” but much broadened in time – is this local sources or model resolution, or dispersion?

P2777 L1. Define MACC

L13: quality-filtered XCH₄ (add hyphen)

Figure 9: There are no scales or labels on X or Y axes

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 2767, 2015.