Nickless et al review

This manuscript describes a sensitivity study of an inversion of CO2 fluxes in and around Cape Town based on measurements at 3 sites. Cape Town is a city with a strong influence from biogenic fluxes and so provides a good case study for separating the anthropogenic influence from the biogenic influence. The main results from the inversion were published in a previous paper (Nickless et al., 2018). This manuscript concentrates on sensitivity studies on various aspects of the inversion, including the priors used for the biogenic and anthropogenic fluxes and the period over which inversions are averaged. This type of sensitivity analysis is undoubtedly important since cities emit such a large fraction of the global CO2, and there is a need to have robust and well understood inversion methodologies.

The paper is however hard to read. This is partly because it is pretty technical material and partly because so much information is included. This makes it difficult for an interested reader, let alone a casual one, to extract the main points, even after a careful reading. I do not get a feel for the main results from reading the abstract and do not think that the introduction sets the scene for the rest of the paper. I should note that the current discussion and conclusions do a better job of this.

Overall, I think the manuscript could be publishable but only after major revision. I am not making many detailed suggestions as I think a considerable amount of work is needed and the first reviewer has made extensive and well thought out comments. My main comments are as follows:

1. The authors should clarify what the main findings are and then decide what material is needed to back that up in the introduction and in the main body of the manuscript. This should provide a firm basis on which to give a good understanding of the uncertainties and the implications described in the conclusions. That should result in a much tighter and probably shorter manuscript whose contents can be reflected in a clear abstract.
2. In deciding what the main points are, the authors should consider whether ACP or GMD is the more appropriate home for the work. The ACP description includes the statement "*The journal scope is focused on studies with general implications for atmospheric science rather than investigations that are primarily of local or technical interest.*" GMD "*is an international scientific journal dedicated to the publication and public discussion of the description, development, and evaluation of numerical models of the Earth system and its components.*" Models include "*geoscientific model descriptions, from statistical models to box models to GCMs.*"
3. I think that moving to GMD would allow the manuscript to be completely focussed on the technical aspects and might well make it easier to prepare.
4. The supplementary material largely consists of a series of plots which I am not sure are helpful, though I could be persuaded. I would think that some of the current paper could be put into a revised and reduced supplementary material.
5. The present tense should be used for all the new results presented here, and the past tense should be used for previous work and much of the description of the measurements. I am not sure if I am typical, but the mixed use of tense misled me on a few occasions.
6. Some comment should be made about the important differences are present in the emissions products in sections 2.2 and 2.3. As it stands, it is hard to know what to keep in mind for later in the manuscript.
7. It would help to have a short summary of the results from Nickless et al (2018) at the start of Section 3.
8. Can percentages be included in the discussion of the changes vs the reference case?
9. The aspect ratio in Figs 3, 4, and 9 should be increased. They are hard to read at the moment.