

# ***Interactive comment on “Atmospheric CO<sub>2</sub> inversions at the mesoscale using data driven prior uncertainties. Part 1: Methodology and system evaluation” by Panagiotis Kountouris et al.***

## **Anonymous Referee #1**

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General comments: The paper is quite well written. The inversion system seemed to do its job pulling the posterior fluxes toward the true flux. However, how accurate is the “true” flux? Perhaps, the author can add more information on how reliable the “truth” was.

Specific comment: P12, L14-15: what was the purpose of setting the bias term according to the annually averaged VPRM respiration only? P19, L10: Specify the Figure number. P19, L10 and 12: gCm2y-1  $\Rightarrow$  gCm-2y-1 P34, Table 2: At some sites, the model and the measurement heights are significantly different. What was the reason for that? And at some sites, the measurement heights were not specified (“-”). P36, Table 3: I noticed that the statistical values of B1 and S1 are quite close except at PUY

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site r2 (0.97 and 0.15 for B1 and S1, respectively). I am wondering what happened there. P40, Figure 3: I cannot clearly see the “true” flux line (light green). Perhaps, make it more visible. P42, L4: Usually see gCm-2y-1 instead of gCy-1m-2 P44, Figure 7: Why in many months posterior flux values are not in between prior and true fluxes?

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