

Interactive comment on “Atmospheric CO₂ inversions at the mesoscale using data driven prior uncertainties. Part2: the European terrestrial CO₂ fluxes” by Panagiotis Kountouris et al.

Anonymous Referee #2

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The authors estimate the European terrestrial carbon budget with atmospheric data at relatively high resolution. The study comes without surprises or great findings, but rather expresses a mature domain with sophisticated scientific tools. The paper is very clear and will likely serve as a useful reference both for its methodological synthesis and for its results. I recommend publication provided the following minor comments are addressed.

- P. 2, l. 9 (also p. 4, l. 2): the actual quantity behind “uncertainty” should be defined.
- P. 3, l. 4: “since” -> “for”

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- P. 3, l. 7: Gurney et al. is an outlier in the list.
- P. 3, l. 10: “makes” -> “makes it”
- P. 3, l. 25: “of” -> “in”
- P. 9, l. 24: do the authors assume linearity in the variances or in the standard deviations? I guess variances are more likely to be linear than standard deviations.
- P. 10, l. 13: first mention of sampling times here. Needs to be explained.
- P. 11, l. 4: a normal distribution extends to infinity: how is the uncertainty range defined?
- P. 11, l. 10: a reduced chi-square only suggests something when the inversion upstream hypotheses are satisfied: are the authors confident that this is the case?
- P. 13, l. 3, 5: the authors should change the unit to something more appropriate.
- P. 13, l. 11: “shown” is not the right word since there was at least Broquet et al. before Ko16.
- P. 15, l. 21: this note of caution comes too late.
- P. 16, l. 3: the authors should insert “of Ko16” after “inversion” for clarity.
- P. 16, l. 6: why not transport errors as well?
- P. 16, l. 17: the authors should change “from”.
- P. 16, l. 23-24: “to mention”-> “mentioning”.
- P. 17, l. 15: EVI is still undefined.

- P. 19, l.8: the authors should insert a comma after “Typically”.
- P. 22, l. 16: the authors should end their main text on a wider perspective.

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