

Interactive comment on “The consolidated European synthesis of CO₂ emissions and removals for EU27 and UK: 1990–2018” by Ana Maria Roxana Petrescu et al.

Anonymous Referee #2

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As described in the title, this manuscript provides a comprehensive overview and summary of the various estimates of CO₂ sources and sinks in Europe over the last several decades. This synthesis includes estimates from inventory data, process-based models and inverse models and are further sub-divided into those from fossil fuel emissions and land-based emissions, as well as broken down by sector/industry as well as by land-use types. The paper devotes most of its attention to land-based CO₂ fluxes, owing to their complexity and large uncertainty. The various datasets presented in the manuscript often show some significant differences and the authors have done a good job providing explanations for the most likely underlying reasons for these discrepancies. In fact, this is a real strength of this manuscript, highlighting all the many ways

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in which data that attempts to measure and quantify the same specific CO₂ fluxes can vary due to differences in definitions, which underlying processes are included, and how those processes are represented. The authors provide useful suggestions for further reconciling and harmonizing the multiple datasets. The paper is well written and organized. I recommend it for publication, subject to some minor changes and suggestions, as highlighted below.

1) The Reference section contains three different references for “Petrescu et al. 2020” (which are also cited in the text). To avoid confusion, it would be helpful to relabel these as “Petrescu et al. 2020a” etc.

2) The LUH2 dataset is cited with “Hurtt et al. 2011”, but that paper refers to the LUH1 dataset. LUH2 should be cited with Hurtt et al. 2020 (which is already included in the Reference list), or potentially with both Hurtt et al. 2011 and 2020.

3) Line 432: change “emission” to “emissions”

4) Line 431: change “taking into account of the” to “taking into account the”

5) Line 457: change “except a daily” to “except for a daily”

6) Line 461: change “extend” to “extent”

7) The section around line 490 describes how the ESACCI-LUH2v2 dataset assumes that shrublands are equivalent to forest. A rough estimate of the impact of this assumption for the representation of forest area in Europe is included. However, it seems like this could be explicitly quantified from the data, rather than just estimated – is that possible?

8) The description around line 496 about the forest area data from FAOSTAT could use some additional clarification. If FAOSTAT provides the current forest area, not just the FL-FL category, then would it not consider both afforestation and deforestation? Also, line 497 states “This area is based on the same land use/land cover maps”, but it is not clear to me what these maps are the same as.

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9) Line 657: change “emission” to “emissions”

Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2020-376>, 2020.