review comment on essd-2022-175
Anonymous Referee #1

Referee comment on "Near real-time CO$_2$ fluxes from CarbonTracker Europe for high resolution atmospheric modeling" by Auke Marijn van der Woude et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2022-175-RC1, 2022

General comments.

The manuscript presents a construction of surface CO2 flux dataset for European domain, designed for near-realtime updates and based on recent energy statistics and weather data. The flux dataset was evaluated via comparing the transport model-simulated timeseries to atmospheric observations and comparing fluxes to an urban flux tower data and demonstrated a reasonably good performance. The manuscript only requires minor revisions and can be accepted after implementing corrections and amendments based on suggestions provided below.

Detailed comments.

It is advisable to enhance the part on validation of the SiB4 CO$_2$ terrestrial biospheric fluxes (in terms as midday fluxes or daytime mean, where fluxes are more curtain) against data-driven products available at similar resolution (~0.1): eg FLUXCOMM (Jung et al. 2020), Zeng et al (2020) or others, which can be reported summarily by region or dominant vegetation type. It is mentioned that Smith et al. 2020 did evaluation, but they did not have advantage of using a downscaled product which makes matching resolutions easier.
Technical corrections.

L1 ‘We present the CarbonTracker Europe High-Resolution system’. General reader familiar with CTE would suspect the CTE-HR is an inverse modelling system like CTE, but here the name CTE-HR is given to a set of [prior] fluxes, so it is better to explain the difference in the abstract, eg write something like: ‘We present the CarbonTracker Europe High-Resolution system fluxes’, and note that these fluxes are unoptimized (either in the abstract or in the text, eg lines 115-118)

L49 For Paris example (Breon et al 2015), one can cite a recent paper by Nalini et al 2022

L54 N2 -> N2O. In case of Swiss methane emissions, Henne et al 2016 is more widely cited.

L86-89 As for high resolution, operational NRT biospheric flux products one can mention SMAP L4C (Jones et al 2017)

L96 CAMS is associated with a wide variety of products related to the topic of this paper, better give more specific name like CAMS-REG. Also, the paper by Kuenen et al 2022 appears to document CAMS-REG-AP (air pollutant) inventory, while GHG portion called CAMS-REG-GHG was set aside.

L168-184 It is not clear, what data is used for spatial emission patterns.

L215 Final revised paper for GFAS is Di Giuseppe et al. 2018 (https://doi.org/10.5194/acp-18-5359-2018)

L231 Can cite here the (Chevallier et al 2019) method as ‘poor man’s inversion’ as done by Chevallier et al. (2010, 2019)

L249 "Emissions by" can be omitted.

L255 ‘exact monthly growth rate’ may draw doubts, as the rate is not that exact, can write ‘exactly follow monthly growth rate’ instead.
L280 Need to add spatial/vertical resolution at which IFS winds are used, and STILT domain geographical boundaries.

L471 Suggest clarifying the text: “Currently, CTE-HR only provides CO2 fluxes”. Better be more specific: eg biogenic/biospheric/net ....

L524 Here, fluxes ‘will be made available ’, while on L518 same fluxes ‘are available’

References


