

Response to Referees

“TRACE-Python: Tracer-based Rapid Anthropogenic Carbon Estimation Implemented in Python (version 1.0)” (egusphere-2025-5793)

Sandborn et al. In review.

We sincerely thank our two referees for their continued feedback benefiting this work. We have included their comments below.

Referee text is reproduced verbatim as indented text.

Our responses are given below each point, with line numbers and section numbers where appropriate referring to locations in the attached revised manuscript.

Response to Referee 1

Lines 94-95 “optimized via ... from ...”: I suppose there is a cost function involved in the optimisation process. It would be useful to explain how the cost function is defined or add a reference. Is the OCIM age estimate only used as an initial guess here when solving the IG-TTD?

We have updated the optimization description with information from our previous work describing TRACEv1.

It now reads: “The neural network training data consists of solutions to Equation ref{eq:ig} optimized via the Nelder-Mead simplex optimization algorithm from paired CFC-11, CFC-12, and SF₆ observations in the GLO-DAPv2.2023 dataset (Lauvset et al. 2024) together with age estimates from the Ocean Circulation Inverse Model (DeVries 2014). The cost function was the sum of squared normalized errors in partial pressures and age.”

Line 291: This paragraph starts a different comparison than the previous one. I suggest adding a few sentences to introduce GOBM and RECCAP2 and to motivate the comparison.”

A transition sentence was added to better connect these two comparisons (L249)

Response to Referee 2

It would be nice if you could talk about ESPER in a bit more detail. There is a citation, but for someone who is not familiar with those products it interrupts the flow a bit.

We have added a sentence (L322ff) explaining the relationship of these property estimation routines better.

Can you add the citations for GOBM and RECCAP?

We have added a reference to a synthesis paper laying out elements of the RECCAP2 paper (L270):

DeVries et al. (2023). Magnitude, Trends, and Variability of the Global Ocean Carbon Sink From 1985 to 2018. *Global Biogeochemical Cycles*, 37(10), e2023GB007780. <https://doi.org/10.1029/2023GB007780>

The right parenthesis is missing at L166, at the end of the paragraph.

Thank you for catching this. A parenthesis has been added.

This is very pedantic, but there seems to be a lot of “may”s in the manuscript. I feel like there are many places you can use a bit more certain phrasing, though I am happy with the way it is.

We have eliminated approximately 1/2 of the appearances of “may” in the manuscript.