

***Interactive comment on* “Spatio-temporal variations of lateral and atmospheric carbon fluxes from the Danube Delta” by Marie-Sophie Maier et al.**

Anonymous Referee #2

Received and published: 24 September 2020

This paper reports results of a 2-year field study of carbon dioxide and methane fluxes from freshwater systems in the Danube Delta. The study focusses on 19 sites and provides insight in seasonally resolved fluxes and lateral carbon transport. This must have been an enormous effort. The authors find that lakes are the largest emitters of methane. Channels show a wide range of emissions and may be hotspots both for carbon dioxide and methane.

The paper is well-written and the results are well-presented. I do find the comparison to fluxes in other rivers rather descriptive. This is where a slightly more process-based comparison could increase the impact of the paper. I have only a few minor other

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comments, mostly editorial, see below.

Line 14. What is meant by “reference” systems in this sentence. Could you rephrase?

Line 94. Suggested change: “Station 16 was removed from the study because of limited access”.

Line 170. Suggested change: “stored in the dark”

Line 172-173: Suggested change: “production rates”

Line 174. Suggested change: “are underestimating respiration rate” => “underestimate respiration rates”

Line 177. Change to “rates”

Line 235. Specify that you are referring to the width of the channels here. Is there no estimate of the number of these old meanders? I realize you discuss the uncertainty in the channel width later in the manuscript, but this ten-fold difference in width is still rather substantial.

Line 350 “at 0.69” instead of ‘with 0.69”

Line 362: suggested change: “cause the” => “contributed to the”

Line 363: suggested change: “seems to be” => “appears to be”

Line 371: this sentence needs rephrasing: “A look into the contribution from the different waterscapes shows that the river branches the main source of CO₂ to the atmosphere were in both years”

Line 371: use past tense: “switched”

Line 388: It’s not clear what “it” refers to in “It mainly relates to”

Line 397: change to “in the case of”

Line 415. Change to “do not see”

Line 442. Longer when compared to what? Please specify

Line 445. “Seems to be reoccurring” raises the question what evidence there is for that. You might consider rephrasing to “This pattern may be due to the eutrophic state. . .” unless you can be more specific.

Line 514. “data. . .are treated”

Line 553: “and thus is the”

Line 565. The Black Sea has only a limited connection to the open sea. Is it meaningful to include it in the estimate of the DOC and POC flux to the ocean?

Line 565-570. In this section, you are comparing your DIC, POC and DOC fluxes to those of other rivers, but you are not providing any explanations for the observed differences. Adding that would make the comparison more useful.

Lines 572-575: This is again very descriptive. Are there any possible explanations for the observed differences between rivers?

Line 585. Change to “we therefore assess the potential role”. Your intentions are not relevant.

Line 599. What does “decal” refer to?

Table 3: typo in the heading of the right column “water-air flux from delta”

Line 632: change to “these”

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