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Biogeosciences Discussions

Interactive comment on "The composition and flux of particulate and dissolved carbohydrates from the Rhône River into the Mediterranean Sea" *by* C. Panagiotopoulos et al.

Anonymous Referee #3

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General comments

Carbohydrates of both particulate and dissolved forms in the Rhone River which flows into the Mediterranean Sea were investigated in regard to their origin, diagenetic status and flux. Overall the manuscript appears to be written well. The data quality is likely high and the discussion is also appropriate. As mentioned by authors, there seem to be not so much previous studies on carbohydrates dynamics in river systems. However, the present study, against these studies, hasn't made special progresses in the research approach and techniques. And basically the conclusion obtained here is just to confirm the previous findings. Therefore it is strongly expected that more unique and

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creative points of the present techniques and/or knowledge could be emphasized. In addition, there are some doubtful points as specified below. Especially the estimation of flux and the discussion about categorizing POC and DOC into labile and refractory fractions should be described more carefully. It is also recommended that background data such as temperature, conductivity, chlorophyll and nutrients could be added (If they are not available in this study, related literatures could be cited).

Specific comments

1. P.1172, L.10: The present filtration method missed part of dissolved (colloidal) fraction in the size range between 0.2-0.7 um. Why was the sequential filtration through a 0.2 um membrane after a GF/F filter used ? Is the missing fraction completely negligible?

2. P.11172, L.18: Doesn't CaCO3 degenerate partly under high temperature (450 C) into CaO ?

3. P.11178, L.4: Why didn't only DCHO load correlate with Q. As far as we estimate from the uniform relation between POM and DOM that is shown in Fig.6., DCHO might have indicated the same relation as PCHO.

4. P.11178, L.14: The intention of this correction should be explained in further detail.

5. P.11180, L.10: The method for estimating LPOC should be explained in further detail.

6. P.11181, L.25: It is no surprise that the LDOC estimated from multiplying DOC by DCHO/DOC ratio correlated with DCHO. LDOC should be estimated only using the ratio of LDOC/DOC ratio (15%) in the literatures.

7. P.11182, L.23: POC was measured with a CN analyzer. In this case, the data of C:N ratio of POM is generally available. If so, C:N data should be included in discussion. If not, why ?

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8. P.11184, L.19: It should be clarified if cellulose could be hydrolyzed with the method used in this study.

9. P.11184, L.25: It should be clarified why fructose was not detected. It was not truly existing or due to any analytical problem ?

10. P.11186, L.25: The unit "uMC" should be removed from the equations. The multiplying symbol "X" should be added to the equation. The correlation among the other sugars should be presented.

11. P.11186, L.11: For "Fig.5C" read "Fig.5b"

12. P.11188, L.11-18: This paragraph should be moved to the next section "5.5".

13. P.11188, L.19- : This description needs some evidences such as chromatograms of LC. Otherwise, it is better to remove the whole of this paragraph.

14. P.11192, L.10-13: Importance of the glucose flux should be discussed in further detail with comparing to something (such as other substances flux).

15. Relative abundance (%) of individual sugar was calculated relative to total amount of sugars, but sometimes it was calculated on a glucose-free basis. In the latter case, it should be confirmed that glucose % is not significantly changed. And it should be clarified why the calculation on a glucose-free basis is useful.

16. The term “carbohydrate” and “sugar (or monosaccharide)” should be chosen appropriately.

17. Fig.1: A few bars of POC and PCHO indicating extreme high values should be replaced by a broken bar and the vertical axis should be also splited.

18. The lower panel in Fig.2 could be deleted because it is repeated in Fig.1.

19. Fig.3&4: It should be explained in the caption how to estimate LPOC.

20. Fig.6: What is the dotted line drawn in the graph?

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