

Interactive comment on “Carbon sources supporting benthic mineralization in mangrove and adjacent seagrass sediments (Gazi Bay, Kenya)” by S. Bouillon et al.

Anonymous Referee #1

Received and published: 20 September 2004

The manuscript “Carbon Sources supporting benthic mineralization in mangrove and adjacent seagrass sediments (Gazi Bay, Kenya)” by Bouillon et al. focuses on the mineralization of organic matter in mangrove and adjacent seagrass sediments. It moreover addresses the question, whether the mineralization processes in these environments are fuelled by carbon produced within the individual environments or by carbon being imported from adjacent areas. A reliable answer to these question is essential the carbon budgeting of these areas, which requires a proper identification and quantification of carbon sources and sinks. In the manuscript the authors applied stable isotope methods, applied to sedimentary carbon and notably to fatty acids, in combination with “classical” information such as C/N ratios of organic matter and sediment composition. Bouillon et al. complement their analysis by consideration of recent data from other studies and one of their main conclusion is that part of the carbon previously assumed to be mineralized in the seagrass community is trapped in the seagrass beds

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and thus can escape mineralization. Mineralization estimates thus might be overestimated in recent studies.

The manuscript is well written and all figures appear to be useful and clear and in general it deserves publication. However, in wide parts the manuscript is too short and difficult to understand for non-specialists. As explained a bit more in detailed in the below comments, almost each section would benefit, if the authors spend a few more words on the issue to be reported on. As a final recommendation, I should recommend publication of this work after serious clarification efforts, which should enable the ms. to be better communicated.

Detailed comments:

Abstract:

2nd para: It is not really clear, why the mineralization is overestimated. Does the carbon budgeting comprise a sink of carbon, which has been assigned to mineralization, which however rather should be assigned to a trapping of organic carbon? The last two sentences (starting from: Based on. . .) hardly tell, which carbon comes from where and goes where to. Please clarify.

Introduction:

P313, I10: . . .and a major fate of their primary production is its in-situ decomposition (or mineralization).

P313, I14/15: . . .exported out of the system (. . .).

P313, I19: This section is too short and this first sentence too long. What means “widespread”? distributed? Please clarify, what is meant with and happens with internal or external production.

P314, I12-15: Does this mean that the mineralization within the seagrass meadows was fuelled by organic carbon produced here or above? Or elsewhere? Is internal

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production meant here?

P314, I21-26: Similar to the abstract, it is not really clear, why there is an overestimation of the mineralization processes.

Material and Methods:

P315, I12: ...range between 710 and 1365 gC m⁻² y⁻¹. Capital C, not squarecentimeter?

Results:

The first paragraph of this section is a miracle to me. It might help to show the number in a table. Moreover, it is difficult to find out, which environment shows which delta C13 shift. To what are the per cent numbers related? Please expand and clarify this section.

P319, I18: seagrass (instead of seagass)

P323, I13: Please add a short comment here, what the (erroneous) implications of this overestimate would be and what the implications of a reliable estimate would be (beside the obvious fact that a reliable estimate better describes the system). Are there any consequences for other systems?

Figures:

Fig. 1: Please, insert a larger scale map to locate the sampling site. Please also add the latitude and longitude scales to the plot.

Fig. 2: Please, indicate in the plot the different types of samples.

The captions of Figs. 3 and 4 seem to be wrong or exchanged?

In the plot, which is now Fig. 4, please, indicate in the plot the different types of samples.

Fig. 5c: Please, indicate in the plot the different types of samples.

Interactive comment on Biogeosciences Discussions, 1, 311, 2004.

BGD

1, S201–S204, 2004

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