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Biogeosciences Discussions

Interactive comment on "Wetland eco-engineering: measuring and modeling feedbacks of oxidation processes between plants and clay-rich material" *by* Rémon Saaltink et al.

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This manuscript examines the biogeochemical feedback between vegetation and soil, specifically in soft, dredged sediments. Ultimately, this paper and similar work will enable designers of these created wetland habitats to select plants that will aid in accelerating ecosystem development created using such soils. With the increasing desire world-wide to restore wetlands for their many natural benefits, and the potential to aid existing wetlands in the race against sea level rise, these results and results of studies using this methodology can have great benefit to the ecosystem restoration community.

Overall, the study is informative and well written, though a few language improvements and additional explanation on a couple points would enhance the reader's back-

ground and general understanding. A few questions/comments on specific points in the manuscript– *** Sentence spanning lines 64-66: Agreed that the roots may enhance consolidation processes by increasing drainage. Did you also consider increased consolidation through evapotranspiration? *** Line 115: Why was Dorsilit selected? Recommend providing a few additional details about its properties. *** Paragraph beginning on line 180: Were these timeframes identified through research and then used? Or were they identified during this study? Please clarify this point. If identified through the former method, make sure to cite references; if the latter, provide a few details on how the stages were differentiated. Recommend changing the word "used" in line 180 to "identified" which would be accurate whether it was identified through literature or during the study. *** Paragraph beginning on line 280: Do you feel the aeration occurring at D11 would also occur in situ, when the soil extends further from the plant roots, or is it possible that this occurred due to the close boundary with the container? Were any decisions made about the set-up of the experiment to reduce such boundary influences? *** Paragraph beginning line 286: You use the phrase "some differences" were noted, but then only mention one specific difference. Consider summarizing other differences you wish to highlight or referring to the differences discussed earlier in the section. *** Sentence spanning lines 399-401: For the additional studies/testing you recommend, would you recommend this be done in-situ or using the methodology developed during this study? Recommend including a few additional details to this point. *** Sentence spanning 420-422: Recommend emphasizing whether the impact was positive or negative. Also, do you feel the results show wetland creators should add sand or not? *** In Table 2, consider listing clay first so that its composition can easily be compared to the soft mud. *** In Figure 4, it appears the results for soft mud are significantly different from the results for clay–should soft mud still have both b and a indicators?

Additional language and typographical recommendations: *** Lines 19-20: Recommended wording of last half of sentence–"...is an example; here, dredging some of the... will soon begin." (More direct wording.) *** Lines 26-27: The subject of the

first part of the sentences is N:P ratios, and I believe this is not the subject of the portion after “and.” Insert appropriate subject between “and” and “were affected,” potential suggestions include plants, plant health, plant growth, etc. *** Line 27: Insert a comma– “...uptake of N, but by...” *** Line 35: Use “be used” instead of “are used,” or restructure sentence to read “Given these two feedback mechanisms, we propose the use of Fe-tolerant species rather than species that thrive in N-limited conditions.” *** Line 45: Insert a comma after “Nowadays.” *** Throughout, but noted on line 54: I was a little uncertain whether “soft clay-rich” was referring to a soil rich in soft clay or one that was rich in clay and also soft. If the former, consider using “soft-clay-rich,” if the latter, change to “soft, clay-rich.” *** Lines 54-55: Restructure sentence: “In the Netherlands, a soft-clay-rich lake-bed sediment is causing serious turbidity problems in the Markermeer (and artificial like of 691 kmˆ2).” *** Line 58: Recommend “plans are underway” instead of “it is planned.” *** Line 69: insert comma after “formation.” *** Line 69: Believe should use “signs” instead of “sign.” *** Lines 73-74: Recommend the following after the comma: “it is essential to determine which eco-engineer is most appropriate for accelerating ecosystem development in these protosoils.” *** Line 74: I am unfamiliar with “protosoils,” but that may just be my background, consider whether this is a common term for others in the industry and change or explain if appropriate. *** Lines 79-80: Recommend rewording last sentence as follows: “Two types of clay-rich deposits are the indented building material for the wetlands.” *** Line 80: Recommend changing beginning of the sentence use “their presence is” or “their composition is” in place of “they are.” *** Line 80: “Products” should be singular because it refers to “a combination,” which is also singular. *** Sentence lines 91-94: Recommend moving “We set up. . . pore water,” to the beginning of the sentence for added clarity. *** Line 153: add “content” after “Nitrogen.” *** Line 191: Delete “below” and begin the sentence with “First.” Also add a comma after “First.” *** Line 202: use “than” instead of “then.” *** Line 227: insert a comma between “without plants” and “the.” *** Line 234: Believe the reference should be to Figure 1g rather than Figure 2g. *** Line 242: Delete “it must be taken into account that” (More direct wording.) *** Lines 268 and 271: Con-

sider indenting the chemical equations. *** Line 272: Appears to be an unintended blank line after the equation (2). If line 273 is a new paragraph, indent it; if it is a continuation of previous paragraph, simply delete blank line. *** Line 284-285: Recommend moving this sentence up to be a part of the previous paragraph. *** Lines 292-293: Recommend providing clarity by rewording to say “While the pore water compositions did not show clear differences between unplanted and planted conditions during the initial stage of plant growth, . . .” *** Line 347: Add a comma after “the experiment.” *** Line 411: Add comma after “plant growth.” *** Line 412: Change to “. . .promotes P mobilization, enhancing plant growth.” *** Line 416: Delete comma after “P uptake.” *** Line 422: Consider whether using “of” rather than “on” would be more appropriate. *** Line 423: Insert comma after “detail.” *** I believe it is customary to eliminate the use of “we” and “our” in scientific papers, though I know it is difficult to do. *** Line 608: delete comma after “(a-c).”

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