Referee #1

I appreciate that the authors have made an effort to clarify some of my concerns. I believe the results are worthy of publication, and I don't need to see the manuscript again. I have only two remaining minor comments that I would recommend the authors to consider.

1. I still have some doubts whether treating bed level change as a "scaling factor" according to Eq. (8) is justifiable, since delta rho_OC and delta d are mechanistically linked. Varying the value of P_crd from 0 to 1 do help to gauge the uncertainty arising from this approach. The new results (Table S2) are much more sensitive to the erosion effect, which the authors acknowledge and have partially adapted the manuscript to reflect. I was therefore puzzled by the newly added lines 372-377 stating that thickness changes play a minor role compared to density changes. Comparing the first and last rows in Table S2 (P_crd=0 vs P_crd=1) indicates to me that the impact of bed changes accounts for roughly half of the effect even in mean and high impact scenarios (as also indicated in l.312-314). I recommend the authors clarify, rephrase or delete this part to avoid confusion.

Reply: *We agree that this paragraph does not fully reflect the results. We have therefore reworded it. It now states that thickness changes make a minor contribution to reductions in stocks only when assuming that 87% of the resuspended sediment resettles (Sala et a., 2021). We also point out that this value is associated with considerable uncertainty.*

Action: *The paragraph reads now: "In addition, changes to the sediment thickness due to erosion of the top layer of seabed sediment by mobile bottom fishing need to be considered when investigating fishing impacts on organic carbon stocks (eq. 8). Assuming P_{crd} = 0.87 (Sala et al., 2021). Our results indicate that, with the notable exception of the low impact scenario, the estimated reductions in organic carbon stocks are largely due to reductions in organic carbon density, while thickness changes only play a minor role. However, changes to the sediment thickness are sensitive to the choice of P_{crd}, which is poorly constrained."*

2. My other comment refers to the newly added subsection "2.2 Definitions". In general, I found it very useful - having definitions to refer to will be useful to the community and may promote more consistency in terminology. However, I found the definition of organic carbon stock as "the mass of organic carbon within a known volume of sediment" unclear, since this definition (a mass within a sediment volume) seems more applicable to the "organic carbon reservoir", reported as mass in kg, and not in kg/m^2 as stock is defined here. I would therefore suggest rephrasing to something like "Organic carbon stock is the mass of organic carbon per area in a defined depth interval

within the sediment." It may also be useful to define "organic carbon reservoir" hereafter, since the terms "stock" and "reservoir" are also often used interchangeably.

Reply: *We agree with these comments.*

Action: *We have adopted the definition of stocks given by the referee and added a definition for reservoirs:*

"Organic carbon stock is the mass of organic carbon per area in a defined depth interval within the sediment."

"Organic carbon reservoir is the mass of organic carbon in an area and a defined depth interval. Typically, reservoirs are calculated for larger areas such as a sea basin and expressed as Tg C or similar."

Referee #2

This is an interesting and valuable study. The author evaluates the impacts of demersal fishing on organic carbon stocks and maps the OCS in unfished areas. This work provides important insights for assessing marine carbon storage and serves as a good example for broader application at the global scale. Although I was not one of the first-round reviewers, I have carefully read the revised manuscript, compared it with the previous reviewers' comments and the authors' responses, and I believe that the authors have satisfactorily addressed most of the earlier concerns. Therefore, I recommend that the manuscript be accepted for publication.

Action: *None*