

Interactive comment on “Carbon mineralization in Laptev and East Siberian Sea shelf and slope sediment” by Volker Brüchert et al.

Anonymous Referee #1

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General comments In the manuscript bg-2017-119 presents some important new data on early diagenetic properties and carbon mineralization in the Laptev and East Siberian Sea shelf and slope sediment. In my opinion, it should eventually be published but requires at least moderate revision. Generally, data set is interesting and solid, and conclusions are believable, but the discussion part is a bit unfocussed and manuscript needs to be more concise. In addition, I would suggest that the effect of physical activities such as resuspension and redeposition on pore-water solute concentrations in some shallow sites should be discussed in this manuscript.

Specific comments

(1) line 207 The boundary conditions of the reaction-transport model should be showed in 2.5.

C1

(2) Line 210 Generally, the diffusion process includes molecular diffusion and bioturbation, and is not related to bioirrigation. If the study area has evident bioirrigation process, the bioirrigation term $a(C_0 - C)$ should be added to the model (a is the irrigation coefficient).

(3) Table 2 showed that DIC fluxes are apparently lower than oxygen uptake rates, but as far as I know, oxygen uptake rates were similar or lower than DIC fluxes in many estuarine and shelf regions. Are there any important processes for removing the pore-water DIC in your study regions? Please explain more about the differences between DIC fluxes and oxygen uptake rates.

(4) Line 371 Pore-water DIC/NH₄⁺ ratios should be corrected by diffusion and adsorption process or at least the authors should demonstrate that these processes can be neglected.

(5) Line 639 In general, the net Corg settling rates equal to sum of 210Pb-based Corg mass accumulation rates and oxygen uptake rates if the sedimentary Corg changed little with depth, and thus 210Pb-based Corg mass accumulation rates can be lower or higher than oxygen uptake rates.

(6) Line 672 Some shelf stations which were influenced by bioturbation should be written, and these discussions about mixing process look like contrasting with the results of optimal fits of the concentration profiles (line 388). Please explain more about the mixing process.

(7) Line 747 It is difficult to build relationship with priming effect based on existing data in this paper unless you can find more relevant evidence.

(8) Conclusions are too long and not concise, which need to be modified. I would suggest some contents in conclusions could be incorporated into discussion part.

Technical corrections

(1) Line 119 'A fifth core' should be 'A fourth core'

C2

(2) I would suggest that r^2 and p should be showed in the Fig. 9.

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