

Interactive comment on “Warming and ocean acidification may decrease estuarine dissolved organic carbon export to the ocean” by Michelle N. Simone et al.

Anonymous Referee #2

Received and published: 27 November 2020

This is a well described experimental case study that contributes to close an important knowledge gap concerning the modification of the carbon cycle under global environmental and climatic change. My biggest concern in the study is the upscaling to the global dimension. The authors are aware of the associated risks and that such an upscaling may be (at least) quantitatively quite problematic. Overall, this is a thoroughly made study and a useful addition in the field.

Suggestions for a revised manuscript:

Section 4.3.3: The authors are correct in being very careful when they provide a daring global upscaling here. It would be good to add a paragraph on detailing why such an

C1

upscaling can be risky and possibly incorrect (different hydrodynamic settings, different sediment composition, different delivery of dissolved and particulate matter from land and through aeolian deposition, etc.)

Line 54: It is not only the climate project models but rather the scenarios used for the projections. The scenarios are usually produced through simplified climate models and integrated assessment models.

Line 55: “increasing the partial pressure by 580 ppm” – relative to which reference year?

Lines 55-60: Though regionally primary production may be enhanced with temperature and pCO₂, climate change can lead to increased stratification and a decrease of mixing as well. It would be good to also discuss this aspect and cite a few relevant literature sources.

Line 140: “refit from Mehrbach et al. (1973)” – can you describe in more detail how and why you did this?

Line 277: “OA alone (at ambient temperatures)” – what is meant with ‘ambient temperatures’ exactly?

Section headings “4.2 OA increases DOC uptake” and “4.3.2 Warming increases respiration and DOC uptake” are unclear. Which component takes up DOC? Maybe use a different word for ‘uptake’?

Figure 1: Some fonts are so tiny that they are not readable. Please, increase them if relevant or delete unnecessary information.

Figure 5: The ‘bars’ within the grey and dotted areas of the plot are barely visible. What do these ‘bars’ show? Please, provide information in the figure caption.

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2020-335, 2020.

C2