Response to reviewer

We would like to thank the additional reviewer for their comments on the manuscript. The response is structured as follows, every comment got a number, which is matched by the number of the response. Text that is added in the manuscript is shown here in blue, *text that is removed is shown in* ~~red~~ *and all things in the text that have changed are indicated in the boxes underneath the response.*

1. In the graphical abstract, "gradient in marsh degradation" with an arrow doesn't necessary suggest to me if the increase is away or toward the bay.

    R1: We changed the graphical abstract to include the unvegetated-vegetated ratio (UVVR). Additionally, we moved the arrows 'towards the mainland' and 'towards the inland' to the other side, so that it is linked with the arrow of degradation.

    Line 34:
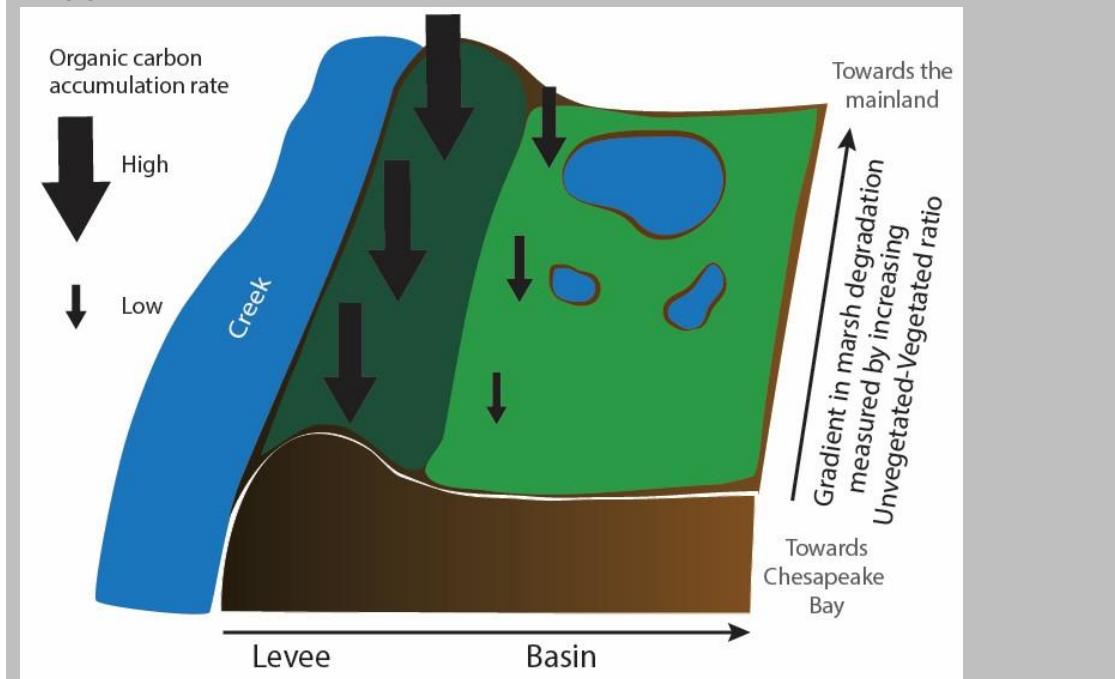
2. Further, I'm not sure if degradation in general is a concept that is clear to most readers as you've defined it.

    As someone not familiar with your study system, it took me until Ln 361 to know how degradation was defined in the study. I would put this information in the introduction, with the first presentation of the term.

    R2: We tried to define it clearly in line 64-70, but we tried to make it even more clear.

    Line 64-71: The resulting bare soil patches or shallow ponds that form inside marshes, and their surface area relative to the surrounding remaining vegetated marsh area (so-called unvegetated-vegetated ratio, UVVR), is considered here a proxy for the state or degree of marsh degradation (with higher UVVR indicating a higher degree of degradation), in line with previous studies (Ganju et al., 2017).

> An important question is how this degree of marsh degradation (measured as UVVR) in response to sea level rise affects the organic carbon sequestration efficiency in the remaining vegetated marsh zones.

3. Ln 50-55 Repeat of word choice makes it hard to read.
   R3: The feedback is indeed mentioned twice, so we tried to make it more readable by changing the sentence.

> **Line 49-55:** On the one hand certain marshes can keep up with sea level rise, due to positive feedbacks between tidal inundation duration, sediment accretion, and surface elevation gain, in particular macro-tidal marshes with high sediment supply (Kirwan et al., 2016). For such marsh sites previous studies have found an increase in organic carbon accumulation rate with increasing sea level rise rate, due to the earlier mentioned positive feedback ~~between tidal inundation duration, sediment accretion rate and hence increasing the~~ organic carbon accumulation rate (Herbert et al., 2021; Huyzentruyt et al., 2024; Suello et al., 2025; Wang et al., 2021).

4. Figure 1. I am assuming the orange square on the map is the whole map underneath – however, it seems that the bottom should have the Chesapeake Bay and it does not. I don't see the two lakes in the satellite image in the square. I assume the least degraded is closer to Chesapeake Bay since you say the Fishing Bay is a tributary, but I can't see that from the map shown.
   R4: We included an additional arrow on the map indicating the direction of the Chesapeake Bay.

> **Line 143:**

5. Ln 354 – I would be careful with a statement like this. It is always hard to know something is the fastest. I think it's good you tempered with "among the fastest" maybe also temper with "of known rates" since of course many are not measured.
   R5: We added it to the sentence.

Line 360: Based on our findings, marsh levees in a micro-tidal, organogenic marsh system appear to be among the fastest soil carbon accumulating environments on Earth of known rates (Fig. 7).

6. Minor comments:
   Ln 179: 25 cm x 25 cm
   Ln 180: laboratory not lab
   Ln 350: their not there
   R6: We made these small changes.

7. Figure – I'm not a fan of the lines across the figures or the Letters for significance so far above the data.
   R7: We have lowered the letters of significance, however we believe that the horizontal lines do improve the readability of the figures, so we decided to keep it like this. We give one example of a changed figure here, but we changed all of them.

Line 305:
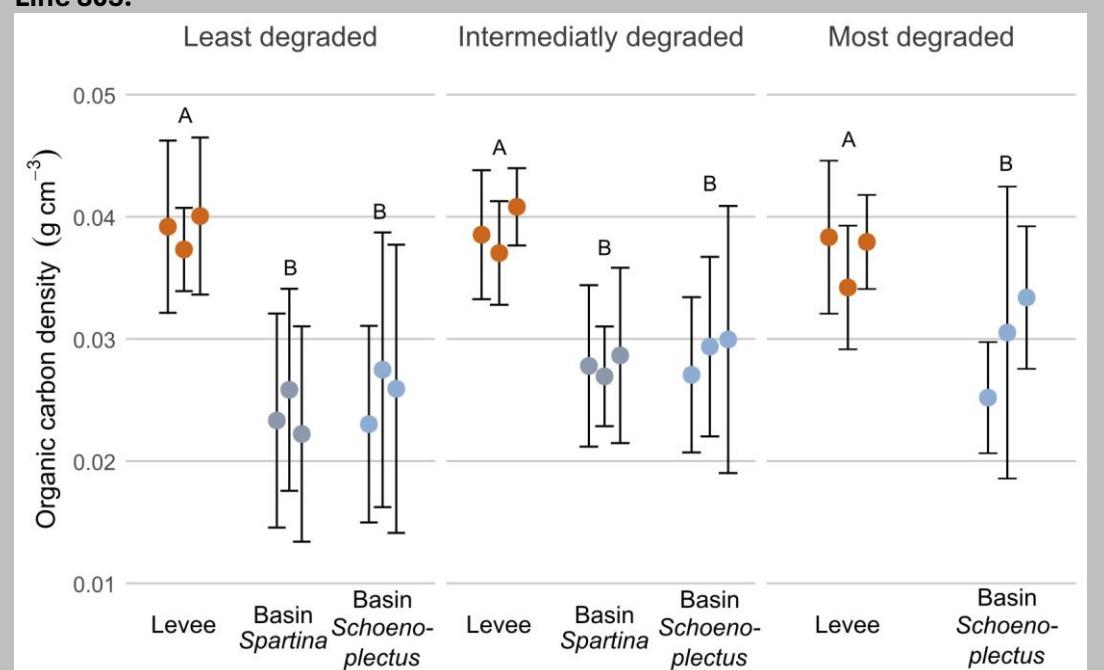
8. Figure 7 legend should have superscripts for units
   R8: Thank you for noticing, we made the units into superscripts.

Line 371-374:

Figure 7: Overview of the modern-day carbon sequestration rates (expressed in g C m^{-2} y^{-1}) in different ecosystems (adjusted from Temmink et al., 2022), including indications of the average rates measured on our levee and basin locations. Error bars indicate the standard deviation of measurements.