**Response to Referee Comment 1 (RC1)**

Thank you for the constructive feedback on our manuscript. The comments and suggestions really help us to improve our manuscript. Please find our response to each of the comment below. We quote each of the comment and numbered it accordingly (i.e Comment 1) and our response (i.e Response 1) is right after the comment. Thank you.

**Major comments:**

**Comment 1:** The authors argue that with future sea level rise (and subsequent prolonged inundation), $CO_2$ net uptake might be lower in the future and the marsh will convert into a mudflat. I disagree with this: Many studies have shown that – while biomass production is important – it is not the only driver for the long-term stability of salt marshes with regard to sea level rise. Mostly it will depend on interactions between factors such as biomass production, sediment availability, tide range, rate of sea level rise as well as the possibility to transgress further inland (e.g. Morris et al. 2002, Kirwan et al. 2010, Kirwan et al. 2016).

**Response 1:** Thank you for pointing this out. In this study, we only report the short-term period of the data and discuss the data based on our findings. We do agree that biomass is not the key factor for the long-term stability of salt marshes and there are complex interactions between several factors. However, study on salt marsh is time-scale dependent. Depending on how long the model or prediction take place, the game could change. We will look into this matter and take into account the long-term effect on the ecosystem based on the existing reference.

**Comment 2:** My impression is that the description of the approach and the results are contradictory: From the results (Section 3.3, 3.4, Fig. 14, Tab. 4) I take it, that the August $CO_2$ fluxes were grouped in three classes based on the tide ratio and a light response curve was fitted to them separately as well as to 'non-flooded' conditions. This is not how I understood the methods (Section 2.4): I expected the light response curve to be fitted only to the $CO_2$ fluxes under non-flooded conditions (to get a reference value for non-flooded conditions). Afterwards, the modelled fluxes would be subtracted from the observed fluxes - independently from the tide ratio – to quantify the flux reduction. In a revised version of the manuscript, this should be explained better. It is not clear to me why the light response curve is fitted to $CO_2$ fluxes measured during partially or completely submerged conditions. I thought, the data coverage is so good that you know the magnitude of the 'real' fluxes, but you need to estimate how large they were if there was no tidal flooding (thus the reference value). Subsequently, I am not sure how to interpret the values for Fmea and Fmod in Tab. 4. Especially since the time series is not continuous (since the night time data are not used), I think the only time period that give us reasonable information is each single daytime flooding event. Thus, I suggest that the difference between Fmea and Fmod (only determined for non-flooded conditions) be calculated for each single daytime tide event and grouped according to tide ratio afterwards.

**Response 2:** Yes, we only use equation under non-flooded conditions to get the fluxes reference value for non-flooded conditions. Then we used this model to find fluxes reduction by subtracting modelled fluxes from the observed or measured fluxes which was done for each single daytime flooding event the. The values in table 4 was derived from this subtraction that was grouped into

different tide ratio. The reason why we separate the tide ratio into separate different class (partially or completely) was because, we could see how different level of flooding would impact the fluxes. We will explain in detail on this method in the revised version of the manuscript.

**Comment 3:** The comparison of neap and spring tide conditions in May and October is only descriptive and not connected to the fitting approach. I suggest to using the fitting approach for each month of the year and use these selected days to demonstrate the approach described above.

**Response 3:** In the revised version, we will add more months to give better explanation on our approach and use selected days as suggested.

**Minor comments:**

**Comment 1:** Page 1 ll. 22-25: Are all these numbers from the Chmura paper? Otherwise, they need references.

**Response 1:** We will insert the citation in the revised version.

**Comment 2:** Page 2 ll. 2 delete 'of'

**Response 2:** Deleted

**Comment 3:** Page 2 ll. 10-10-13: see comments above: There are biogeomorphic feedbacks between vegetation cover, tidal inundation and accretion rates, that are not directly linked to instantaneous $CO_2$ exchange but help marshes to keep their position relative to mean sea level.

**Response 3:** Noted. We will look further into it.

**Comment 4:** Page 2 ll. 29: I would rephrase that, do you 'hypothesize' this rather than 'believe'?

**Response 4:** Amended

**Comment 5:** Page 2 ll30: delete 'also'

**Response 5:** Deleted

**Comment 6:** Page 3 ll 6-9: Can you mention the height differences of the tall, medium and short plants? Which one do you use for the tide ratio? Also, how much variation is there during the entire growing season?

**Response 6:** We used the average height (tall, medium and short) for our tide ratio calculation. We will address it in detail in the revised version. We will also show the variation of plant height for the entire growing season by using monthly average plant height values.

**Comment 7:** Page 3 ll12-14: You do not need to say here that tides affect $CO_2$ exchange greatly, just mention the tide range.

**Response 7:** Noted.

**Comment 8:** Page 3 ll23: Are the tide heights reported in NAVD88 or relative to surface?

**Response 8:** The tide heights is in NAVD88

**Comment 9:** Page 4 ll. 7: Which quality control steps were applied?

**Response 9:** The quality control involved in fluxes calculation are stated in Page 3 and 4 sub-section 2.3. We will explain in detail the quality controls that we used in our flux calculation

**Comment 10:** Page 4 ll18-25: See comments above

**Response 10:** Noted. Explained above.

**Comment 11:** Page 4 ll26 – page 5 ll 5: Considering the high quality of the data set, I am surprised that you pick only one month and a couple of days to assess the tidal influence. The data coverage especially during the day is high and it would be possible to do this over the entire year and not only restrict yourself to the same climatic conditions (i.e. high irradiation).

**Response 11:** As mentioned above, we will provide more data (monthly and selected days) in the revised version. We purposely find the same climatic condition which are clear sky and similar irradiation intensity, to eliminate the effect cloud. We will consider providing mo

**Comment 12:** Page 5 ll 14 and ll 20-21: Contrary to these statements, Fig 8 shows that the marsh surface IS flooded during spring tide?!

**Response 12:** Thank you for pointing this out. We admit that we overlooked these sentences and will amend them accordingly. There was no flood during neap tide days and flooded during spring tide days for both months as clearly shown in Figures 7 and 8.

**Comment 13:** Page 6 ll 2-8: Most of this is descriptive and shown in Fig. 10 anyway. However, the observation that plants suffered from heat stress in July and August is interesting and would merit more analysis and discussion.

**Response 13:** We will provide more insight on this condition in the revised version.

**Comment 14**: Page 6 ll 14 – Page 7 ll5: See comments above

**Response 14:** Noted.

**Comment 15:** Page 7 ll 7 – 11: See comments above

**Response 15:** Noted.

**Comment 16:** Page 7 ll12 – 18: Why do you compare two random days (September as opposed to May, October or August as previously used) to give an example for the flux reduction instead of describing the results from the fitting procedure?

**Response 16:** As mentioned in section 2.4 page 4 l. 26 – 26 and page 5 l. 1 – 5, only days with clear sky condition during spring tide and neap tide days were used. There were very limited days with such condition. Therefore, we only able to use days in May and October for neap and spring tide comparisons in our study. The two different months represent the comparison between neap and spring tide days. Meanwhile, August data was used to quantitatively estimate monthly $CO_2$ reduction. These are the two main objectives in our study.

**Comment 17:** Page 7 ll 21-24: I think this should go into 'results'.

**Response 17:** We feel that it is fit to mention it in the discussion (sub-section 4.1) because it give some idea what we want to discuss after that.

**Comment 18:** Page 9 ll 2-5: See comments above: $CO_2$ exchange might be reduced instantaneously during inundation but that cannot be extrapolated over long periods of time.

**Response 18:** We admit that our study only focusses on short term periods of time. However, the monthly fluxes reduction (daytime) was obtained from modelled and observed instantaneously fluxes, then was summed up to get the total daytime reduction for that month.

**Figures and Tables:**

**Comment 1**: Fig. 1 and 4 are not really necessary.

**Response 1:** Noted.

**Comment 2:** Fig. 3 and Fig. 6 could be combined.

**Response 2:** Will be combined in the revised manuscript.

**Comment 3:** Fig. 11: This would work better with days that have been analyzed or discussed before (e.g. May/October).

**Response 3:** We will reconsider this in our revised manuscript.

**Comment 4:** Fig. 12 and 13 are not really necessary.

**Response 4:** We will consider removing them in the revised manuscript.

**Comment 5:** Fig. 14 needs more explanation: E.g., the different symbols are not explained, only the fit.

**Response 5:** Noted. We will explain more in the revised version of the manuscript

**Comment 6:** Table 1: All the values are given in the text, so this table is a repetition. Either change the text or remove the table.

**Response 6:** Noted. We will amend it in the revised version of the manuscript

**Comment 7:** Table 4: See comments above.

**Response 7:** Noted. Explained above