

***Interactive comment on* “Large-scale predictions of saltmarsh carbon stock based on simple observations of plant community and soil type” by Hilary Ford et al.**

Anonymous Referee #1

Received and published: 14 September 2018

General comments:

Blue C ecosystems show higher rates of C sequestration than many other ecosystems on the long-term. That is, these systems build up with rising sea level, their soils do not become C saturated (as terrestrial soils) and thus C sequestration in soils can be maintained over centuries or millennia. A central driver of C sequestration in these systems is therefore accretion, which I do not see considered in this manuscript. This needs consideration in the discussion part.

A related point is that only top soil (10 cm) C contents were assessed, so only a small fraction. “Carbon stock” is therefore misleading, particularly regarding the often several

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meters deep soils of high C density typical for blue C ecosystems. Also, several studies demonstrated sharp declines in C density/content with soil depth in tidal wetlands, so that little information about the total C stock can be inferred from the top-soil C content. The focus on top soils needs to be made clear from the beginning of the ms throughout, and the implications of the strongly limited data set (i.e. missing depth assessment) need to be discussed. The relevance despite this limitation needs to be demonstrated.

I am not sure if the application of the results (i.e the SCSP and the Salt Marsh App) are in the scope of this journal. These two parts of the work might be more appropriate for a Methods journal, but I leave this decision to the Editor.

Specific points:

42: add pioneer works, i.e. Chmura et al. 2003

77-80: So how deep do these plants root in relation to your sampling depth of 10 cm? How much of the belowground biomass stock can be captured?

101-103: check sentence

132: Craft et al 1991 (Loss on ignition and kjeldahl digestion for estimating organic carbon and total nitrogen in estuarine marsh soils: Calibration with dry combustion) demonstrate that the SOM-SOC relationship depends on soil type and that the use of a simple conversion factor (i.e. 55%) can lead to both strong under- and overestimation of SOC. This needs consideration.

161: This is R code not English. Please make it understandable for people using other software throughout your methods section.

178: It is unclear what is new about the SCSP tool in this manuscript that has not been described in Skov 2016?

308: deep-rooting would lead to a C allocation in the soil profile that you did not capture. It is possible that the C stocks under your different plant communities are not different

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but you could not capture this with your sampling design

352: please be more specific: long-term C sequestration (aka C burial) is higher than in forests.

356-58: You did not demonstrate that your data are applicable to other UK marshes outside Wales or even European marshes in general.

360: *Spartina* is also a dominant genus in many European marshes.

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2018-339>, 2018.

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