

Interactive comment on “Seagrass meadows as a globally significant carbonate reservoir” by I. Mazarrasa et al.

Anonymous Referee #2

Received and published: 28 May 2015

Review of Mazarrasa et al. (Seagrass meadows as a globally significant carbonate reservoir) bg-2014-636

In this ms, Authors have compiled literature and unpublished data on carbonate content of worldwide seagrass meadows. As underlined by Authors, such review is presently missing as recent “blue carbon” studies focus mainly on organic carbon stored (or not stored) in the seagrass meadow. Therefore, I think this study interesting for BG readers and deserving to be published. Nevertheless, I have some concerns and regrets that should be taken into account before acceptance. 1. Methodology: A. Bibliographical research: Bibliographical approach seem rather basic and, in absence of reference list in the supplementary material, it is not easy to check if it is exhaustive of existing literature. Grey literature (such PhD thesis) is not targeted by such approach. More-

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over, a part of used data is unpublished (I have no problem with that) but we need to know who, when, how and where these data were obtained (to add in supplementary material). B. Data processing: Using their compiled data, Authors make up-scaled calculation of carbonates accumulation in seagrass meadow. I think the way these calculation are done is too general or global and does not reflect the variability and the importance of these processes at worldwide scale. It produced very unconstrained estimations. For example, to obtain PIC accumulation rate in seagrass meadow they multiply an averaged PIC concentration by an averaged accretion rate (from Duarte et al. 2013). This value is multiplied by the global distribution area of seagrasses to obtain a (very) rough estimation of PIC deposition quantity in seagrass meadow. Because they demonstrate all these parameters are variable according to latitude and/or seagrass ecosystem type, I regret that Authors do not make their calculation at a lower scale (by geographical area and/or ecosystem type), using also Duarte et al. 's data at this "scale" then, using estimation of respective ecosystem area, sum the contribution of each seagrass type/ecosystem to provide a more realistic estimation (which would not be a mean of mean of mean). In any case, Authors do not take enough into account variability around the mean of these calculated values for their discussion or range presentation and should be more critic in face of their results.

2. Production vs. accumulation: In many places of this ms, Authors stated that seagrass are carbonate producers. Such as, this review does not allow such conclusion. Indeed, Authors focus on carbonate stocks and calculate an accumulation rate using Duarte et al.'s review (but see above). This does not allow to separate between in situ carbonate production (calcification by epiphytes or other organism inhabiting the meadows) and carbonate importation. They do not assess carbonate dissolution. The fact that carbonate content of unvegetated sediment are in the same range than in seagrass meadow indicate that, contrary to Authors conclusion, seagrass meadow are not particularly important (or unimportant) carbonate producers which is very contrasted compared to their organic carbon production. In fact, I think that this "carbonate producers" status is probably very variable depending of the seagrass ecosystem, local sediment

nature, local hydrodynamism and seascape. For this last aspect, the role/presence of coral reef or carbonated sediment are probably of major importance to explain carbonate content in seagrass sediment, far more than in situ carbonate production. Here, I do not contest the fact that there is carbonate production in the seagrass meadow but its relative importance compare to carbonates import and its relative importance compared to other biota (such as coral reef or benthic soft habitats). Clearly for me, POC vs PIC producers status differ grealy and should be discussed more critically. Authors should at least be more rigorous in the terms they employ in some part of the discussion (production/accumulation/accretion). Importance of seascape (coral environment vs non coral for example) should be discussed.

Technical: L187: Thalassodendron not Thalassodendrum Literature: no citation of Champenois & Borges (LO) for seagrass ecosystem metabolism No supplement with references used to make the data bank No supplement with mat met for unpublished data or list of unpublished studies (with Authors/place,etc.)

Interactive comment on Biogeosciences Discuss., 12, 4107, 2015.

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12, C2460–C2462, 2015

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