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Interactive comment on "Calculating the global contribution of coralline algae to carbon burial" *by* L. H. van der Heijden and N. A. Kamenos

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Anonymous referee #2

Review of the paper "Calculating the global contribution of coralline algae to carbon burial" by L.H. van der Heijden and N.A. Kamenos The paper by van der Heijden and Kamenos presents a compilation of studies/results reporting production and storage/burial of carbon by coralline algae. I admire the extent and detail of the work to gather the available information. Based on their data base the authors extrapolate to the global scale in order to estimate the role of coralline algae in the global marine carbon budget and relate their findings to other marine ecological environments. While there is doubtless need for such an endeavor, the paper appears closer to a data report, despite the fact that the global extrapolation reaches clearly beyond a pure

data report. I do not think that the paper as such is appropriate for publication in Biogeosciences. Dear reviewer, thank you for your comments on the paper. They will improve and clarified our manuscript. Coralline algae have a widespread global distribution and thus have the potential to store significant quantities of carbon. Here, we compile currently available data and then use meta-analysis to estimate global carbon storage by coralline algae. As the role of coralline algae in carbon storage remains poorly understood, our new analysis and interpretation of the existing data goes beyond data presentation and makes a significant advance in our understanding which was not available. We are confident that this approach provides key advances worthy of publication as a review in Biogeosciences.

Some more detailed comments: It remained unclear to me whether and if so, to which extent deep water corals do play a role here. I did not find (or overlooked) an explicit statement on those, although potential regions are depicted on the map? Please expand on this matter. In this paper we are not discussing cold water corals but coralline algae. Cold water corals are thus not relevant to our calculations. We will clarify this further in the revised paper.

Page 7847, line 1: please update this reference, atmospheric pCO2 has crossed the 400ppm mark. We will update this as suggested using (http://www.esrl.noaa.gov/gmd/ccgg/trends/).

Page 7850, line18: why "approximately" 1 mole? Why not 1 mole? The word "approximately" will be deleted.

Page 7851, line 11: please be clarify: Precipitation of 1 mole (!) CaCO3 .... We will change the sentence in line 11-12 to: "Precipitation of CaCO3 decreases DIC by 1 mole and total alkalinity by two mole for each mole precipitated:"

Page 7851, line 12: the unit for alkalinity is mole, "equivalents" have been decommissioned decades ago! As above, we will change the sentence in line 11-12 to: "Precipitation of CaCO3 decreases DIC by 1 mole and total alkalinity by two mole for each

mole precipitated:"

Page 7851, lines 20-21: this statement is unclear to me? What the relation between export, preservation and the given figures? The statement was not as clear as it could have been and detracts from the point being made. We will delete the statement in the revised version of the manuscript.

Page 7852, lines 1-2. what has temperature limitation to do with supersaturation? The surface oceans are everywhere supersaturated, except for in region where salinity is lower (brackish, or polar environments). Please delete or rephrase this statement. We will delete the statement as suggested in the revised paper of the paper.

Page 7855: it is not so much a question of pCO2 (or pH), it is the carbonate ion concentration with primarily matters here. Please reword accordingly. We will clarify this by adding the following sentence to the revised version of the paper at Line 15 in section 5: "The increasing atmospheric pCO2 will increase DIC and shift the equilibrium of the carbonate system to higher CO2 and bicarbonate ion-levels, lower carbonate ion concentration and lower pH (Feely et al., 2009)."

Interactive comment on Biogeosciences Discuss., 12, 7845, 2015.