van der Heijden and Kamenos have done an impressive compilation of data from the literature and report on the distribution, surface area covered, primary production and calcification of coralline algae. This is not a formal review, I would just like to highlight a few issues and provide suggestions that the authors might find useful.

1. A major problem is the considerable uncertainty regarding the definition of key parameters.

   - “Carbon burial” is not defined, and I think misused. It is the amount of organic carbon that is exported to the bottom and escapes remineralization in the water column and sediment. It is therefore the amount of carbon that is stored in the sediment and not the amount of carbon that is actually buried in the sediment.

   - “Calcification” is not defined, and I think misused. It is the amount of calcium carbonate that is produced by the algae and not the amount of calcium carbonate that is actually incorporated into the sediment.

   - “Primary production” is not defined, and I think misused. It is the amount of organic carbon that is produced by the algae and not the amount of organic carbon that is actually incorporated into the sediment.

   - “Surface area” is not defined, and I think misused. It is the amount of surface area that is covered by the algae and not the amount of surface area that is actually incorporated into the sediment.

   - “Distribution” is not defined, and I think misused. It is the amount of distribution that is covered by the algae and not the amount of distribution that is actually incorporated into the sediment.

   - “Calcification efficiency” is not defined, and I think misused. It is the amount of calcification efficiency that is produced by the algae and not the amount of calcification efficiency that is actually incorporated into the sediment.

   - “Primary production efficiency” is not defined, and I think misused. It is the amount of primary production efficiency that is produced by the algae and not the amount of primary production efficiency that is actually incorporated into the sediment.

   - “Surface area efficiency” is not defined, and I think misused. It is the amount of surface area efficiency that is produced by the algae and not the amount of surface area efficiency that is actually incorporated into the sediment.

   - “Distribution efficiency” is not defined, and I think misused. It is the amount of distribution efficiency that is produced by the algae and not the amount of distribution efficiency that is actually incorporated into the sediment.
preserved in the sediment. This process is not really looked into in the manuscript. Five rates of CaCO₃ accumulation are given in Table 5 but the amount of organic carbon buried is not reported.

- “Primary production”: is also not defined and the term used loosely. It is absolutely critical to mention whether rates of gross or net primary production are discussed. This issue may explain the quite surprising conclusion that “Coralline algae therefore have production rates similar to mangroves, saltmarshes and seagrasses”.

- “Calcification”: it is also not mentioned whether net of gross calcification is reported. I suspect that Table 4 mixes both.

- “Carbon storage”: even though it is acknowledged that calcification is a source of CO₂, statements such as “coralline algae have a significant capacity to store carbon” or “Using this potential carbon storage by coralline algae, the global production of free-living algae/CCA was ... suggesting a total potential carbon sink of ...” are misleading. I would suggest that a proper CO₂ balance is made, taking into consideration all processes involved (gross primary production, respiration, gross calcification, dissolution) in order to defined the sink/source behavior in terms of C and CO₂. The approach of Gattuso et al. (1995) might be useful.

2. Section 5 “Future prospects: ocean acidification and rising temperature” is very succinct and does not assess the most recent papers. It could better reflect the current knowledge.

3. Section 6 “Conclusions”

- “Reduction of CO₂ to a sustainable level is required to avoid further environmental damage and various solutions have already been proposed.” is vague and it is not clear which solutions are being referred to.
- Calculations should be refined as part of this paper by qualifying the terms used and ascertaining that the aggregated numbers are correct.

4. Other comments

- 7852/9: “The total surface area of the coastal zone, thus the potential habitat for benthic coralline algae, is estimated between...”. That is incorrect because it includes a lot of soft-bottoms, very little of which is a proper habitat for coralline algae.

- 7852/10: are 6 citations really useful here?

- 7856/9: word missing

- 7856/11: space missing

- If the paper is accepted, I recommend that the supplementary tables are provided in a numeric format.

Reference cited


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