

Interactive comment on “Anomalies in the Carbonate System of Red Sea Coastal Habitats” by Kimberlee Baldry et al.

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Baldry et al., report analyses of alkalinity and dissolved inorganic carbon along the main axis of the Red Sea and into some of the region’s coastal ecosystem. These measurements are used to assess the magnitude of changes in total alkalinity and dissolved inorganic carbon in the various ecosystems of the Red Sea. The Red Sea has an exceptionally long stretch of tropical coastal habitats that are under increasing pressure globally. The unique oceanographic conditions of this region, e.g. relatively simple flow regime, high salinity and high temperatures turn the Red Sea into a very relevant site for studying how changes in different environmental variables affect coral reefs, mangroves and seagrass meadows. It is also a region that was historically very poorly represented in oceanographic studies.

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This paper provides an important dataset which is an essential addition to the data currently available in the scientific literature. I think that the discussion of this data could be made substantially stronger if it will be better tied to previous publications and used to explain changes that were observed in the carbonate system of the Red Sea. As noted by the authors, there has been a large increase in the total alkalinity of the Red Sea surface waters in recent years (Steiner et al., 2018). Previous publications on this topic were limited in their ability to assess if this change was only due to changes in coral calcification and ecology or there has been a shift in other ecosystems as well, and whether or not these correlate with each other. The authors chose to ignore half of their dataset and focus exclusively on the older samples but I think that comparisons between old and new trends of ecosystem specific rTA and rDIC could be valuable. Together with comparison with past data regarding the change in DIC and total alkalinity of the central Red Sea axis, this can potentially provide a test for the various hypotheses previously suggested for the cause of the reduction in Red Sea calcification rates.

A few specific comments:

Please refrain from using the shortcuts OCP and D. They are not intuitive and had me going back to check their meaning several times.

Fig. 3: please indicate in the figure legend if these are surface waters only.

Fig. 6: I don't understand from the legend what A, B, C, AB etc. stand for. It needs to be explained in the paper, not in the appendix.

Fig. 7: From which year is the data presented here?

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