

Interactive comment on “Using present-day observations to detect when anthropogenic change forces surface ocean carbonate chemistry outside pre-industrial bounds” by Adrienne J. Sutton et al.

Anonymous Referee #3

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Sutton and co-authors introduce a valuable, impressive dataset and provide a useful analysis of the range of seasonal variability across moored timeseries for pH and Omega aragonite. They compare across 12 open ocean, coastal and coral reef locations. In section 2, they carefully assess sources of uncertainty and clearly describe the reasonable choices made in the omega calculations. The figures are clear. It's a very nice contribution, and I don't see a need for much revision prior to publication.

I would suggest the authors add some additional discussion of the degree to which we understand how organisms respond to variability outside the preindustrial range, as

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this is a major focus in the analysis. They discuss a few oyster species with Figure 9 in section 3.2. I would suggest referring to this in the introduction, so as to better motivate the analysis. And also if there are other examples that could be used as motivation, that would be helpful. The motivation is presently termed primarily in terms of the general processes occurring in the coastal zone and the performance of numerical models.

A few additional, minor points:

Introduction, page 1, Line 32: Comment: 30% is not incorrect if one takes cumulative FF emission and cumulative land use emissions = cumulative anthropogenic emissions. However, with respect to land processes, this does ignore the fact that much of the cumulative terrestrial sink is, in fact, regrowth after previous land use clearing. And uncertainty is very large on the mean land use source. That the ocean has absorbed 41,48% of fossil fuel emissions (Ciais et al. 2013, Sabine et al. 2004) has less uncertainty. I suggest (but do not insist) the authors consider using either the 41 or 48% "of fossil fuel emissions" as this is better quantified.

Introduction, page 2, line 34: "is adapted" suggested phrasing

Figures 2-7: It would help to add some additional labeling for "Open Ocean", "Coastal", etc. This would help the reader to follow the discussion, as these figures do all look so similar otherwise. This information is provided already in the captions, so I am thinking of something bolder to stand out on the figure itself

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