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Interactive comment on “Effects of seawater pCO₂ changes on the calcifying fluid of scleractinian corals” by S. Hohn and A. Merico

Anonymous Referee #2

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This paper, ‘Effects of seawater pCO₂ changes on the calcifying fluid of scleractinian corals’ by Hohn and Merico presents one of the first attempts at producing a kinetic model for the coral calcification process. Although such a model is much needed for improving our understanding of the calcification process, the model presented seems unrealistic and has failed to take into account much of the literature.

The model produces a continuous increase in tissue alkalinity and calcium – both of which should be tightly regulated. Cycling of these values in the tissue layer could be expected, but a continuous increase seems highly unlikely. Although the data may not come from the same experiment which Hohn and Merico seem to focus exclusively

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upon, there are a number of useful measurements which should be considered in constructing the model. I suggest looking at Marshall et al 2007 (and references there in) and Tambutte et al 1996. Further the tissue pH values used are unrealistic, please see Venn et al 2009 and 2011.

other comments: Methods are nowhere detailed enough – not even the software package for the simulations is given, some parameters are missing while others lack details as to how the values were assigned and whether or not they are close to any estimates based on the literature. Throughout the paper please use terminology consistent with the literature eg sub-calicoblastic = beneath the calicoblastic cell layer, calcification occurs in the sub-calicoblastic environment, not in the calicoblastic layer see Tambutte et al., 2011

intro line ~15 there is considerable variation between studies and between conditions in a given study in the response to CO₂ – eg Reynaud et al 2003, Holcomb et al 2011

intro line 20 or at least spontaneous precipitation is not a rapid process see Morse et al., 2003

concentrations of phosphate are not generally very high - see Burton and Walter 1987, 1990 for the effects of Mg and PO₄ on the precipitation of different species

clarify what is meant by growth medium when first used

Why has seawater entry to the subcalicoblastic medium been ignored?

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