

Interactive comment on “Photosynthetic activity buffers ocean acidification in seagrass meadows” by I. E. Hendriks et al.

Anonymous Referee #1

Received and published: 28 August 2013

This manuscript reports on the connection between seagrass LAI and the variability of the carbonate chemistry of water overlying the seagrass bed during two periods of observation in June and Sep. Significant correlations between max pH or saturation state and LAI and the range in pH or saturation state and LAI are reported. However, this is to be expected based on past work. Of more interest is whether the mean pH or saturation state correlates significantly with LAI. The authors find that average saturation state and LAI is not significantly correlated ($P=0.42$). To my mind that finding argues against the significance of this particular seagrass bed altering the chemistry of the water passing over them in a way that is likely to be significant to calcifiers in the bed or down stream of the bed. I am not saying the seagrass bed production is not an important buffer just that this study fails to convincingly bridge the gap between theoretical studies and actual observation in the field. It is possible that a short term

C4616

max in saturation state in the afternoon will confer some benefit to the calcifiers but I think that this case would have to be made and not just assumed to be important. It is possible that an increase in the min pH that is reached during the night could cause certain pH sensitive organisms to not exceed a critical minimum but again I think the existence of such a sensitive response to short term fluctuations in the environment needs to be demonstrated before it is claimed the seagrass production is creating a refugia from the impacts of ocean acidification. In order to make a stronger case I think that the authors need to show that the photosynthetic activity of the seagrass causes saturation state to be elevated relative to an appropriate nearby reference state for a significant number of hours each day and that a benefit to the calcifiers in the community can be quantified, for example, in terms of their numbers or biomass. Fig 6 would be more convincing if calcifier standing stock was plotted against LAI and a positive and statistically significant relationship was demonstrated.

Interactive comment on Biogeosciences Discuss., 10, 12313, 2013.

C4617