

Interactive comment on “Carbon isotope fractionation in developing natural phototrophic biofilms” by M. Staal et al.

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Staal et al present findings from two contrasting biofilms that show how biofilm apparent thickness and growth rate affect carbon fractionation. Freshwater and marine biofilms were cultivated under controlled laboratory conditions to simulate a range of flow velocities and light regimes. Using SI analyses, pH profiling and modeling, the authors found that the signature shift observed in the freshwater biofilms (more photoautotrophs) was due to increasing CO₂ limitation and to an increasing uptake of bicarbonate. The opposite was observed in the marine biofilms (more heterotrophs) with higher internal carbon recycling. These are interesting results per se and certainly worth publishing.

However, I feel that the paper as it is contains several flaws. First, the experimental design is rather poor with very low replication level making many of the used statistics

questionable. Second, conclusions are weak along several lines – mostly because of the weak design and data analysis. They could be more strongly supported if the authors showed actual data, for instance growth rates that are a putatively important factor in their study.

In addition, they should better emphasize the various nature of their biofilms, something they could state in the title already. A more detailed table with descriptors of the two biofilms (e.g. chla, heterotrophic and autotrophic PLFA indicators, thickness, growth ratio etc) would better prepare the reader to the story to come. In the discussion, the authors could then go back to that table to make the point for some of their arguments.

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