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Biogeosciences Discussions

Interactive comment on "The distinct roles of two intertidal foraminiferal species in phytodetrital carbon and nitrogen fluxes – results from laboratory feeding experiments" *by* Julia Wukovits et al.

Anonymous Referee #2

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General Summary: This is a valuable contribution to our understanding of Foraminifera and their role in benthic carbon and nitrogen turn-over in the intertidal environment. The study is based on laboratory experiments, focusing on two species of intertidal benthic Foraminifera, with potential to inform and improve our understanding of their role in carbon and nitrogen cycling. One of these species (A. tepida) may be particularly prone to taxonomic confusion with closely related species (i.e. cryptic diversity) and both species are likely to adopt different feeding strategies, including kleptoplastidy (e.g. Austin et al. 2005; Jauffrais et al. 2016). As such, some challenges remain in

the translation of these experimental data to the real world (consider aspects of niche partitioning/differentiation and their significance in net annual fluxes), but the authors are to be commended on their experimental design in providing an improved understanding of the key processes of carbon/nitrogen intake/uptake. In my view, the work is original, shows innovation and makes a useful contribution to the field of study of benthic Foraminifera and their role within intertidal biogeochemical cycling.

Recommendation: I would recommend acceptance of the manuscript subject to some moderate revision. While the experiments are clearly described, I felt that the rationale to translate these experiments to field-based interpretations were rather limited – I suggest the authors strengthen this aspect of the manuscript, making it clear what the findings mean in terms of field-context by reference to a wider literature. If this is not possible, then the translation of these results from laboratory to field should be treated with greater caution e.g. tone-down statements such as those on line 311. Sections of the manuscript, such as 3.3, are very interesting but take a very linear approach – again, cross-reference to any extended literature might strengthen these arguments. The discussion leaves the reader with a sense of some "loose ends", so again – perhaps some editing of the discussion to focus on a stronger connection between experiments and field would be helpful. Try to avoid, as in the conclusion (section 5), open-ended discussion where the role for bacteria, for example, are never quite tied-down.

Specific Comments: there are quite a few minor grammatical errors; I would recommend a careful proof reading of any resubmitted material. Please ensure that you include a proper and complete review of the recent literature (e.g. Jauffrais et al. 2016) on kleptoplastidy – you can largely include this in the introduction/state-of-the-art; why not take the opportunity to highlight that "uptake" remains a critical feeding strategy and that despite these exciting new developments, the focus of your manuscript illustrates the critical role of benthic Foraminiferal feeding as a key component in the benthic biogeochemical cycle of the intertidal environment – can you say this? Personally, I think

you could develop the illustrations/figures – these can be helpful to the readership and I would be tempted to add more, including a location map and some supplementary SEM images of the species – as noted above the genus Ammonia is particularly problematic and displays cryptic diversity, does it not?

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