

Interactive comment on “Animal-sediment interactions: the effect of ingestion and excretion by worms on mineralogy” by S. J. Needham et al.

S. J. Needham et al.

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Final Author Comments

The authors are very grateful to both reviewers for their constructive and interesting comments that will certainly enhance the quality of this manuscript. This research area is difficult to explore due to its multi-disciplinary nature. Sedimentology, mineralogy, biology, geochemistry, ichnology and geology are all included within this research. Reviews from any of these areas are very useful and informative. Both reviewers have made constructive comments that will be incorporated into the manuscript, as well as suggesting useful ways that the authors can take the research forward. We would like to take this opportunity to thank the reviewers for their comments and suggestions.

The extra biological literature suggested has been consulted and added in some cases to the manuscript. In particular, the review of gut conditions amongst macrobiota has been extended in order to describe and highlight the variability that exists in geochemical parameters between different organisms. The summary of gut pH conditions has been changed and expanded in order to take account of the literature suggested by the

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reviewer. The manuscript now suggests that gut pH may be greatly variable between different annelids and is not ubiquitously low.

The analytical and experimental method sections have been expanded in order to add further clarification to certain aspects of the experiment. It has now been stressed that grain size separation was performed on all samples: faecal, control and original. This will hopefully help to show that any changes on the XRD traces are not artefacts of grain size. The small quantities of <2 micrometres clay separated from the faecal casts, and the even smaller quantity of new minerals produced, has now been stressed. This is a very important point and we thank the reviewer for raising our awareness to this subtle but important point. These small quantities are the primary justification for our analytical technique (XRD). The lack of other techniques (eg TEM) is based primarily on this sample size issue since it would be exceptionally difficult to identify the neoformed clays from the primary fine-grained material. The manuscript has thus been to changed in order to elucidate these problems.

The term proboscis; has been replaced by the term eversible pharynx at the suggestion of the reviewers. The morphological terms in the manuscript now conform to recent biological literature.

The discussion has been expanded in order to consider the possible causative mechanisms behind the mineralogical changes observed. The manuscript now addresses the difficulty in assigning a causative mechanism as well as speculating on the likely factors contributing to the mineralogical changes.

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