

## Reply to Review 1

We would like to thank the anonymous reviewer very much for their helpful and constructive feedback, and we would be happy to revise our manuscript by accounting for their valuable points of criticism.

- 1) The reviewer would like to see a more quantitative, worked example with a specific model and sedimentary record. We understand that such an example would make it clearer how we envisage the actual application of our approach. However, we designed this manuscript as an “Ideas and perspectives” article with the purpose to propose a new concept for ecosystem model development that can be tested, refined, and applied by future research. We believe that a complete working example is beyond the scope of this article. However, we suggest refining the explanation of the actual application of our approach, e.g., by providing concrete examples of the different aspects of our proposed concept.
- 2) We suggest revising and extending our discussion of uncertainties in both models and proxies as recommended by the reviewer. In the revised version of our discussion, we will focus more on the effects of age model uncertainty, temporal resolution, and preservation biases of sedimentary archives on estimated rates of evolutionary change and relative abundance.
- 3) We agree that a clearer definition of what evolutionary ecosystem models are, as opposed to non-evolutionary ones, would greatly help our manuscript. Since many different approaches exist to include evolutionary processes into ecosystem models, it would be difficult to visualize them in a single diagram. Therefore, we suggest adding a text box to our manuscript, in which we explain the general idea of simulating evolution in ecosystem models, along with different state-of-the-art approaches.
- 4) Finally, we will address all the specific comments raised by the reviewer.