Reviewer 2: Response

E. Harris et al.

We thank the reviewer for their positive comments regarding this manuscript. We respond to their comment:

My only remark is that the methods are purely statistical approaches. Timeseries data can also be tackled with dynamic, mechanistic approaches (based on differential equations), which typically have few parameters to be fitted and can ingest more diverse data sets, i.e. including concentrations. While I am not claiming that the authors should also discuss those methods at length, it would be desirable that they at least mention this -alternative- approach to stable isotopic data analysis for timeseries data.

We agree that this is an alternative approach to this problem that should be mentioned and we have added at L74:

Timeseries information can be added to isotopic models through statistical approaches using smoothing and other techniques to account for temporal autocorrelation and measurement noise, or through the application of dynamic approaches incorporating differential equations [1]. In TimeFRAME, we use the statistical approach as a natural extension to the implementation of FRAME; investigation of dynamical approaches may be challenging due to high uncertainties in all inputs and should be a focus of further research.

References

[1] W. Bonnaffé, B. C. Sheldon, and T. Coulson. Neural ordinary differential equations for ecological and evolutionary time-series analysis. *Methods in Ecology and Evolution*, 12(7):1301–1315, 2021.