Supplementary Material: Global plate model choice impacts reconstructions of the latitudinal biodiversity gradient

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# Supplementary Text

Here, we test the sensitivity of deep-time Latitudinal Biodiversity Gradient (LBG) reconstructions to the use of different Global Plate Models (GPMs).

GPMs use the Euler Rotation Theorem to reconstruct the motion of tectonic plates on a sphere-like structure–the Earth. Based on a compilation of geological data (see [1] for an extensive review), a GPM divides tectonic plates into smaller sub-units that will move relatively to each other in a hierarchical way. It therefore takes two main inputs: (1) a set of tectonic elements and (2) a tree-like structured framework in which these elements moved throughout the geological times, called reference frame [1–3]. Two classes of GPMs exist. ‘Continental-drift’ models are modelling the motion of present-day continental sub-units by treating them as static sub-units [e.g. 4,5], whereas ‘full-plates’ model describe in detail how plate borders have evolved through geological times [e.g. 6,7].

We chose three mantle reference frame models, as better-suited for reconstructing palaeolatitudes than other reference frames (see [1]).

# References

# Supplementary Tables

# Supplementary Figures

1. Seton M, Williams SE, Domeier M, Collins AS, Sigloch K. 2023 Deconstructing plate tectonic reconstructions. *Nature Reviews Earth & Environment*, 1–20. (doi:[10.1038/s43017-022-00384-8](https://doi.org/10.1038/s43017-022-00384-8))

2. Vérard C. 2019 Plate tectonic modelling: Review and perspectives. *Geological Magazine* **156**, 208–241. (doi:[10.1017/S0016756817001030](https://doi.org/10.1017/S0016756817001030))

3. Ross MI, Scotese CR. 1988 A hierarchical tectonic model of the gulf of mexico and caribbean region. *Tectonophysics* **155**, 139–168. (doi:[10.1016/0040-1951(88)90263-6](https://doi.org/10.1016/0040-1951(88)90263-6))

4. Wright N, Zahirovic S, Müller RD, Seton M. 2013 Towards community-driven paleogeographic reconstructions: integrating open-access paleogeographic and paleobiology data with plate tectonics. *Biogeosciences* **10**, 1529–1541. (doi:[10.5194/bg-10-1529-2013](https://doi.org/10.5194/bg-10-1529-2013))

5. Scotese C, Wright NM. 2018 [PALEOMAP paleodigital elevation models (PaleoDEMs) for the phanerozoic PALEOMAP project](https://www.earthbyte.org/paleodem-resource-scotese-and-wright-2018/).

6. Gurnis M *et al.* 2012 Plate tectonic reconstructions with continuously closing plates. *Computers & Geosciences* **38**, 35–42. (doi:[10.1016/j.cageo.2011.04.014](https://doi.org/10.1016/j.cageo.2011.04.014))

7. Seton M *et al.* 2012 Global continental and ocean basin reconstructions since 200 Ma. *Earth-Science Reviews* **113**, 212–270. (doi:[10.1016/j.earscirev.2012.03.002](https://doi.org/10.1016/j.earscirev.2012.03.002))