



UNIVERSITY OF LEEDS

This is a repository copy of *The latitudinal diversity gradient of tetrapods across the Permo-Triassic mass extinction and recovery interval*.

White Rose Research Online URL for this paper:
<http://eprints.whiterose.ac.uk/161099/>

Version: Supplemental Material

Article:

Allen, BJ orcid.org/0000-0003-0282-6407, Wignall, PB orcid.org/0000-0003-0074-9129, Hill, DJ orcid.org/0000-0001-5492-3925 et al. (2 more authors) (2020) The latitudinal diversity gradient of tetrapods across the Permo-Triassic mass extinction and recovery interval. *Proceedings of the Royal Society B: Biological Sciences*, 287 (1929). 20201125. ISSN 0962-8452

<https://doi.org/10.1098/rspb.2020.1125>

© 2020 The Author(s). Published by the Royal Society. All rights reserved. This is an author produced version of an article published in *Proceedings of the Royal Society B: Biological Sciences*. Uploaded in accordance with the publisher's self-archiving policy.

Reuse

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

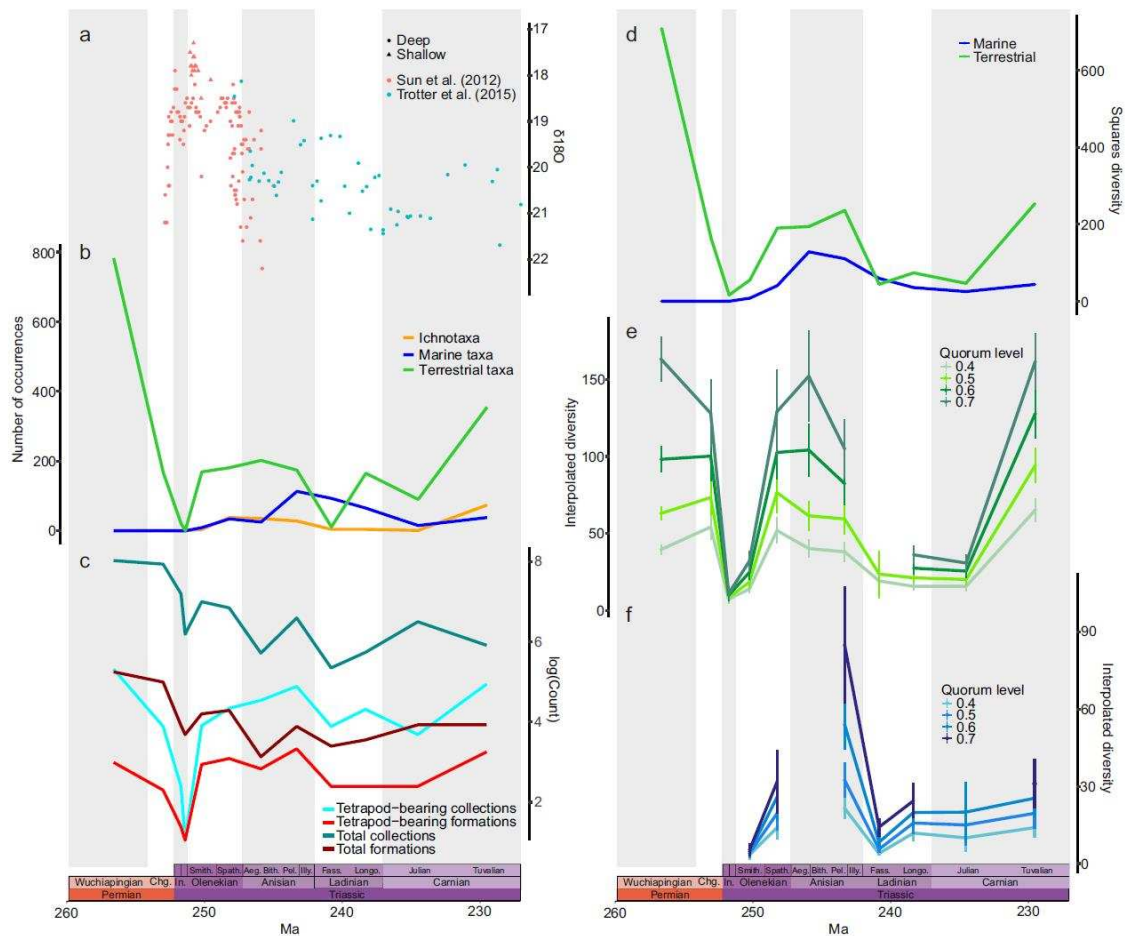


Figure S1

- Oxygen isotope ratio measurements, collected from conodont apatite, from Trotter *et al.* [42] and Sun *et al.* [44].
- Number of occurrences in each substage.
- Collection and formation counts in the Paleobiology Database; note log scale.
- Squares diversity for terrestrial (green) and marine (blue) tetrapods.
- Interpolated diversity through time for terrestrial tetrapods. Missing points indicate an estimated diversity of more than three times the observed value. Error bars indicate 95% confidence intervals.
- Interpolated diversity through time for marine tetrapods. Missing points indicate an estimated diversity of more than three times the observed value. Error bars indicate 95% confidence intervals.

Stages included in time interval are Wuchiapingian, Changhsingian, Induan, Olenekian, Anisian, Ladinian and Carnian, with grey bars indicating alternate stages. The Triassic stages can be split into the Griesbachian, Dienerian, Smithian, Spathian, Aegean, Bithynian, Pelsonian, Illyrian, Fassanian, Longobardian, Julian and Tuvanian substages. Due to their

Allen BJ *et al.* 2020 The latitudinal diversity gradient of tetrapods across the Permo-Triassic mass extinction and recovery interval. *Proceedings R. Soc. B.* DOI: 10.1098/rspb.2020.1125

comparatively short durations, the Induan was considered as a single time bin (Griesbachian + Dienerian), and the Anisian substages were paired (Aegean + Bithynian, and Pelsonian + Illyrian).

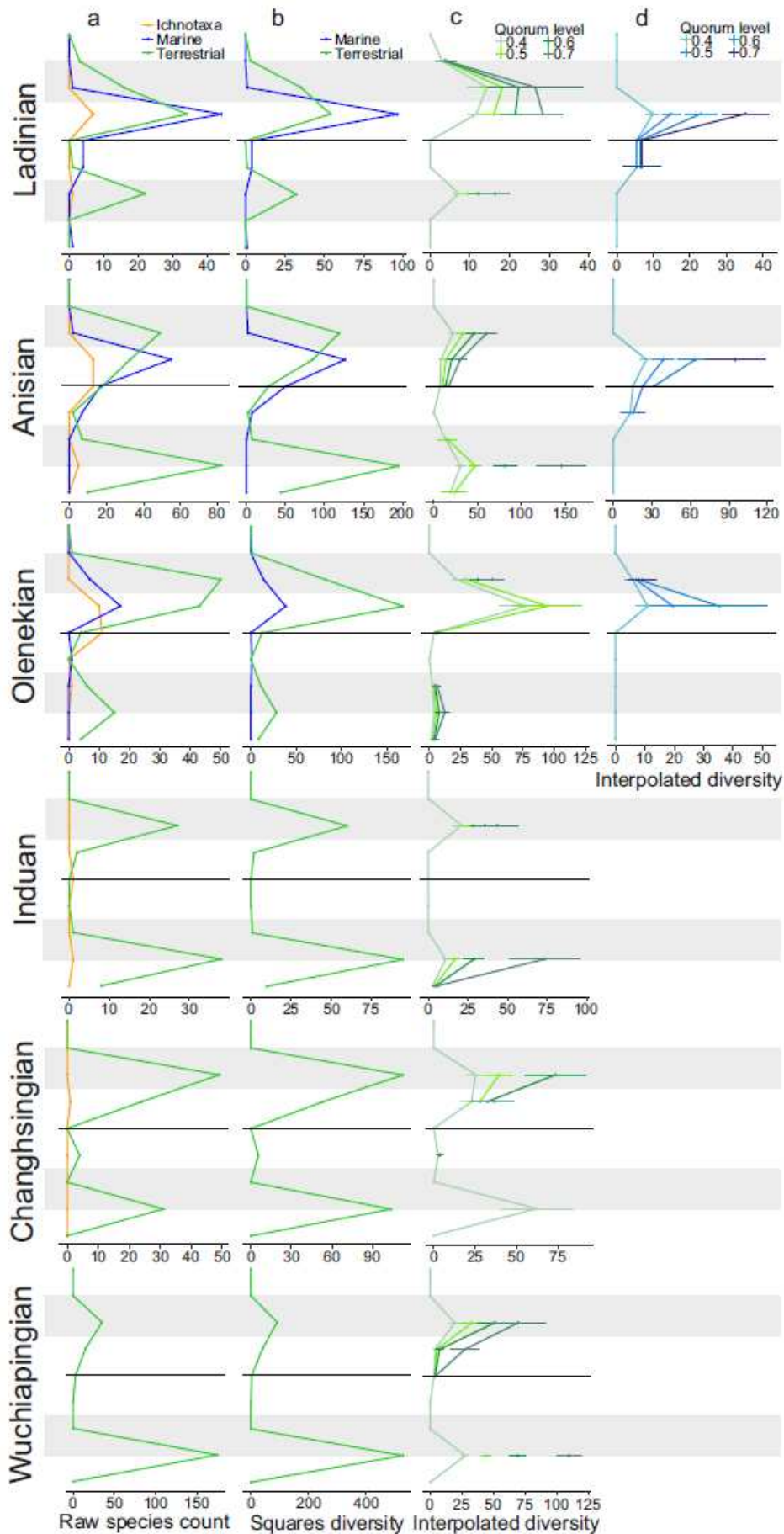


Figure S2

Tetrapod diversity by latitude, as in Figure 1, but with occurrences split into stages. Grey bars indicate 30-60°N and S.

- a. Raw occurrences within 20° latitude bins (e.g. central bin is 10°N-10°S).
- b. Squares diversity by latitudinal bin for terrestrial (green) and marine (blue) tetrapods.
- c. Interpolated diversity by latitudinal bin for terrestrial tetrapods. Bins with < 3 species have been plotted as '0', while missing points indicate an estimated diversity of more than three times the observed value. Error bars indicate 95% confidence intervals.
- d. Interpolated diversity by latitudinal bin for marine tetrapods. Bins with < 3 species have been plotted as '0', while missing points indicate an estimated diversity of more than three times the observed value. Error bars indicate 95% confidence intervals. The oldest marine tetrapod fossils are Olenekian (late Early Triassic; 251-247Ma) in age.

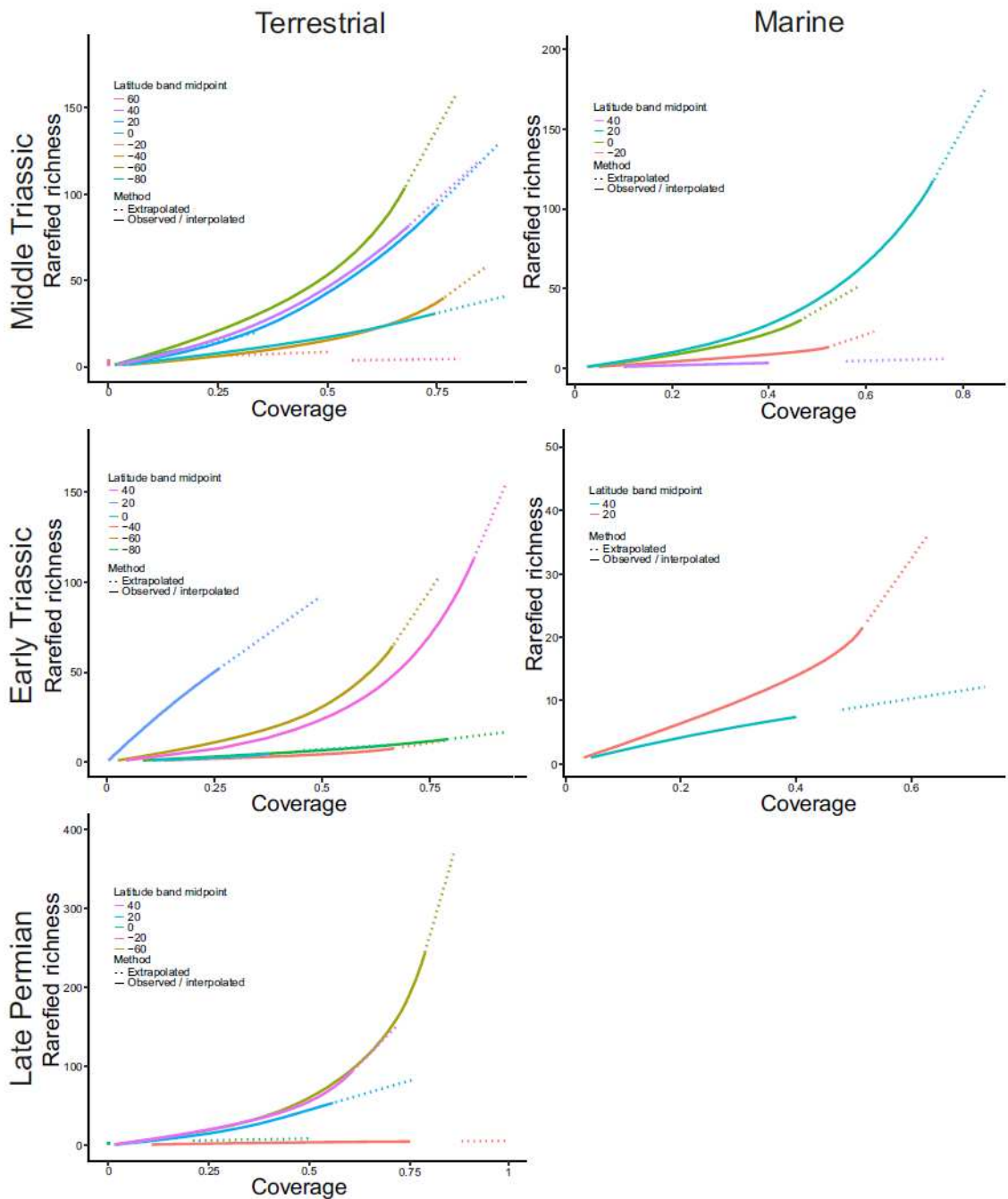


Figure S3

Rarefaction curves for each of the interpolation analyses in Figure 1, indicating the relationship between richness and sampling intensity for each bin.

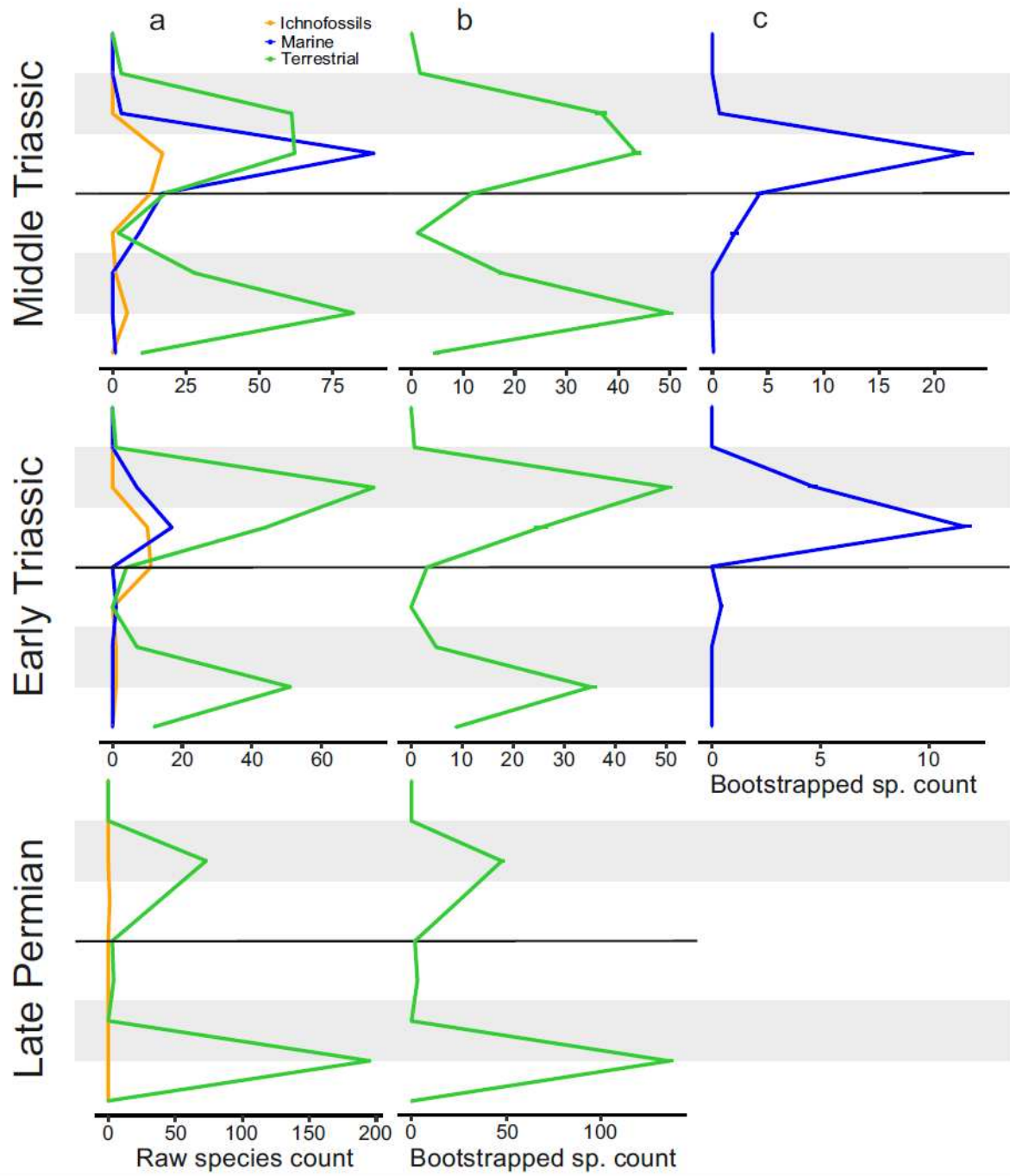


Figure S4

Raw species richness (a) compared with the mean of 100 bootstrap replicates of collection subsamples. The grey bars indicate 30-60°N and S. The terrestrial (b) analysis subsampled 250 collections, while the marine (c) analysis subsampled 30 collections. Error bars indicate 95% confidence intervals across the 100 replicates.

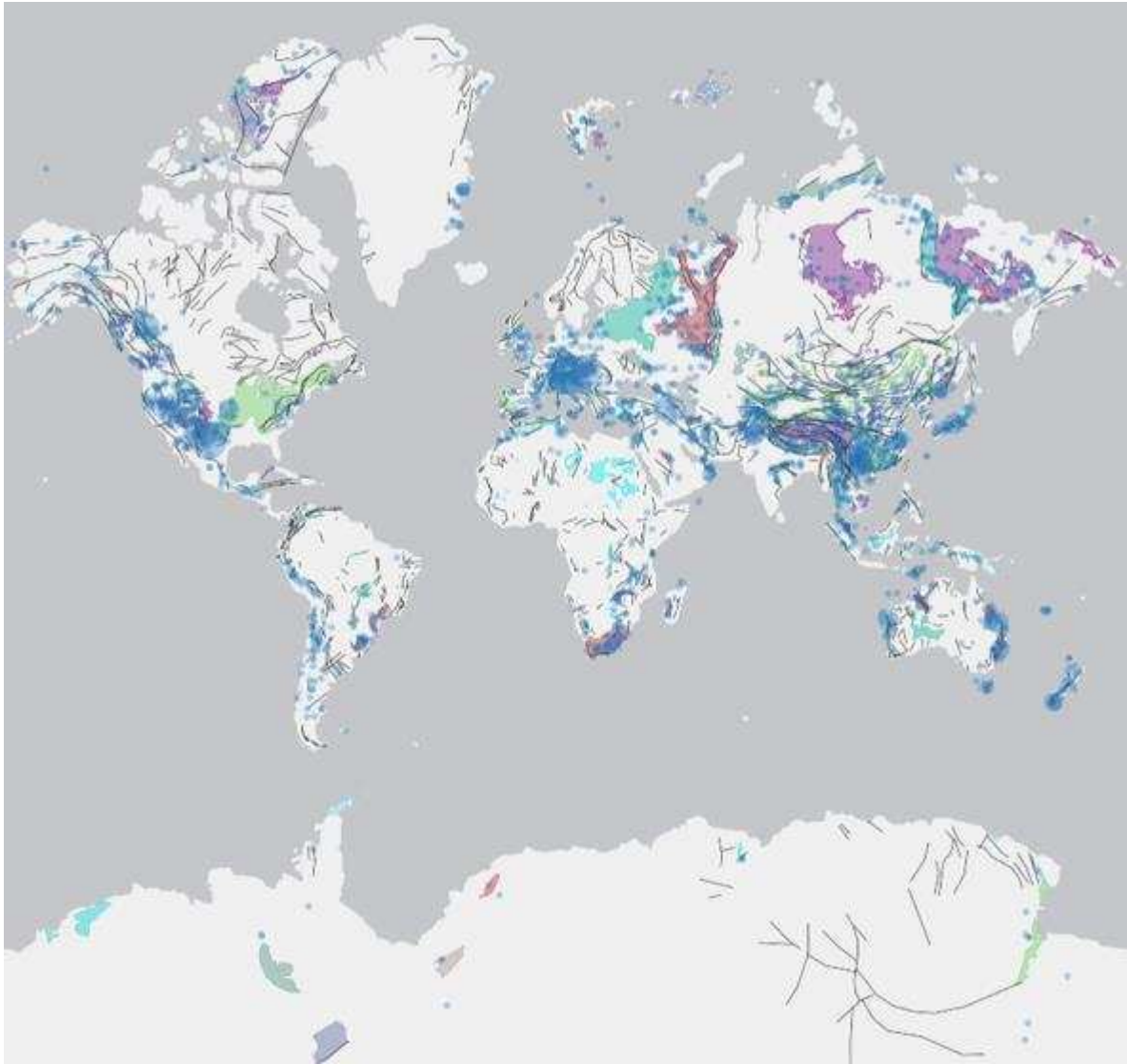


Figure S5

Screenshot taken from Macrostrat Map app, with Permian and Triassic rocks indicated in coloured patches, while blue dots indicate the localities of collections in the Paleobiology Database of the same age (<https://macrostrat.org/map/#/z=1.5/x=16/y=23/bedrock/fossils/intervals=75/intervals=63>)