

Taphonomic controls on the Palaeozoic echinoid fossil record

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INTRODUCTION

- Understanding biological and geological factors driving fossil preservation are crucial for understanding ancient biodiversity (Smith, 1994).
- Despite this, large, global databases are rarely used in understanding taphonomic drivers and the conditions underlying fossil preservation.
- We used the Palaeozoic fossil record of echinoids from museum specimens and the literature to analyse factors controlling specimen-level preservation.

MATERIALS AND METHODS

- Dataset comprises 2037 specimens from 8 families in over twenty museum collections and from the literature.
- The taphonomic grade of specimen was scored using a semi-quantitative scheme from 1-5 as described below.

State 1

- Disarticulated single plates or spines

State 2

- Multiple disarticulated but associated Plates.

State 3

- Fragments of tests

State 4

- Articulated or semi-articulated tests without spines

State 5

- Articulated or semi-articulated tests with spines

- Associated age, grain size, lithology, and locality data was collected with each specimen (Thompson & Bottjer, 2019).
- Statistical analyses were carried out in R, and include Chi Squared tests, analyses of Jaccard similarity, and Ordinal Logistic Regression to attempt to understand differences and drivers of differential taphonomy.

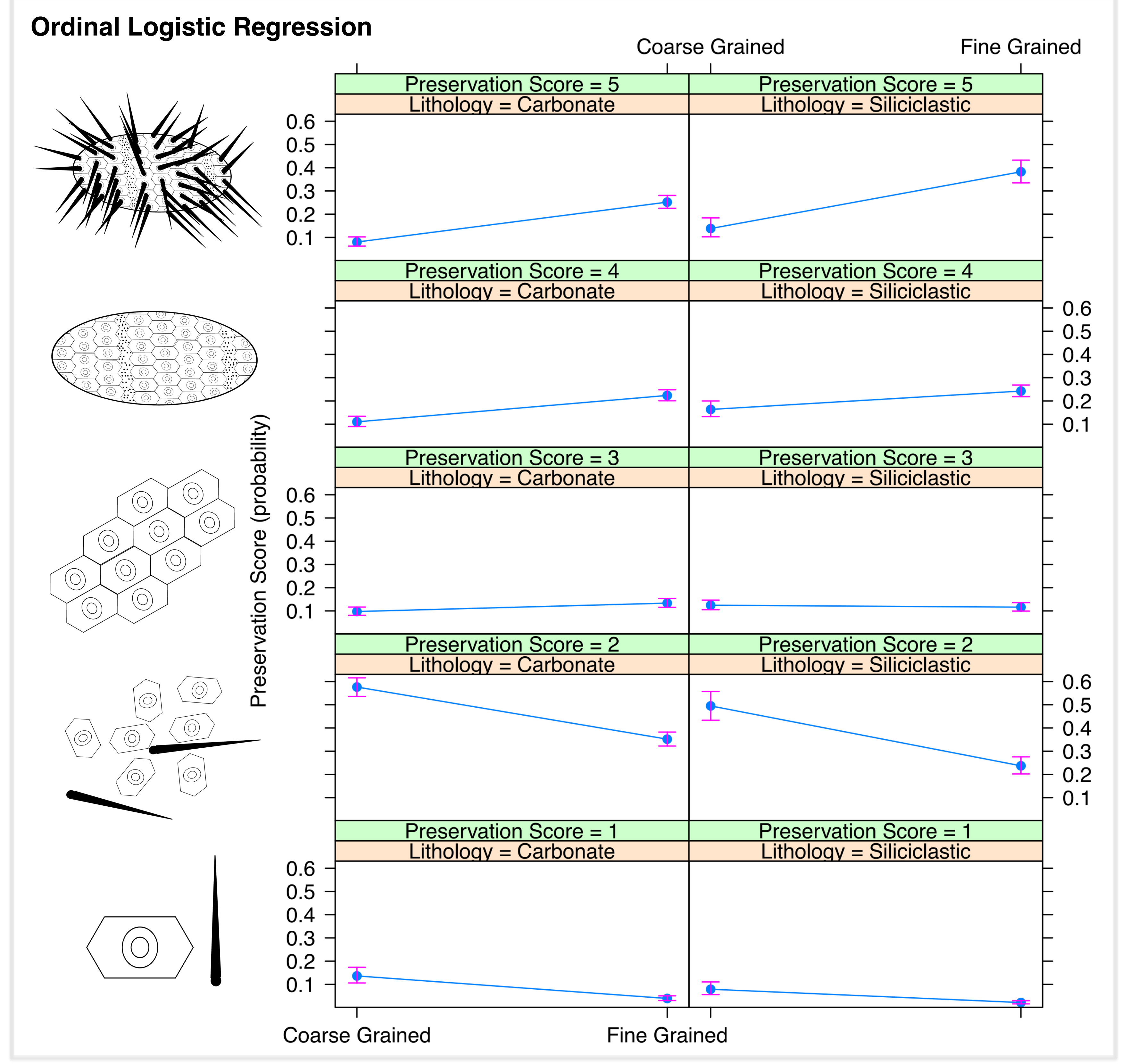
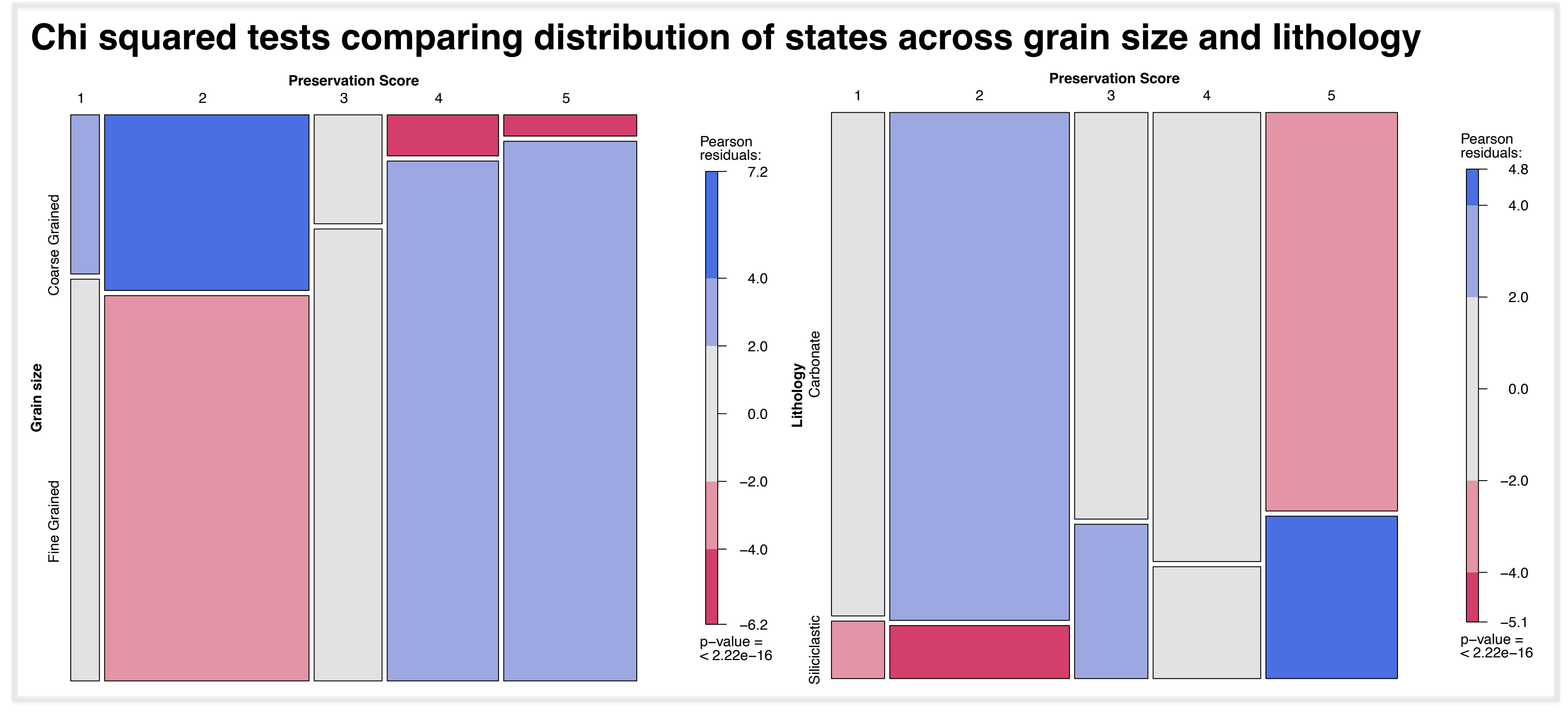
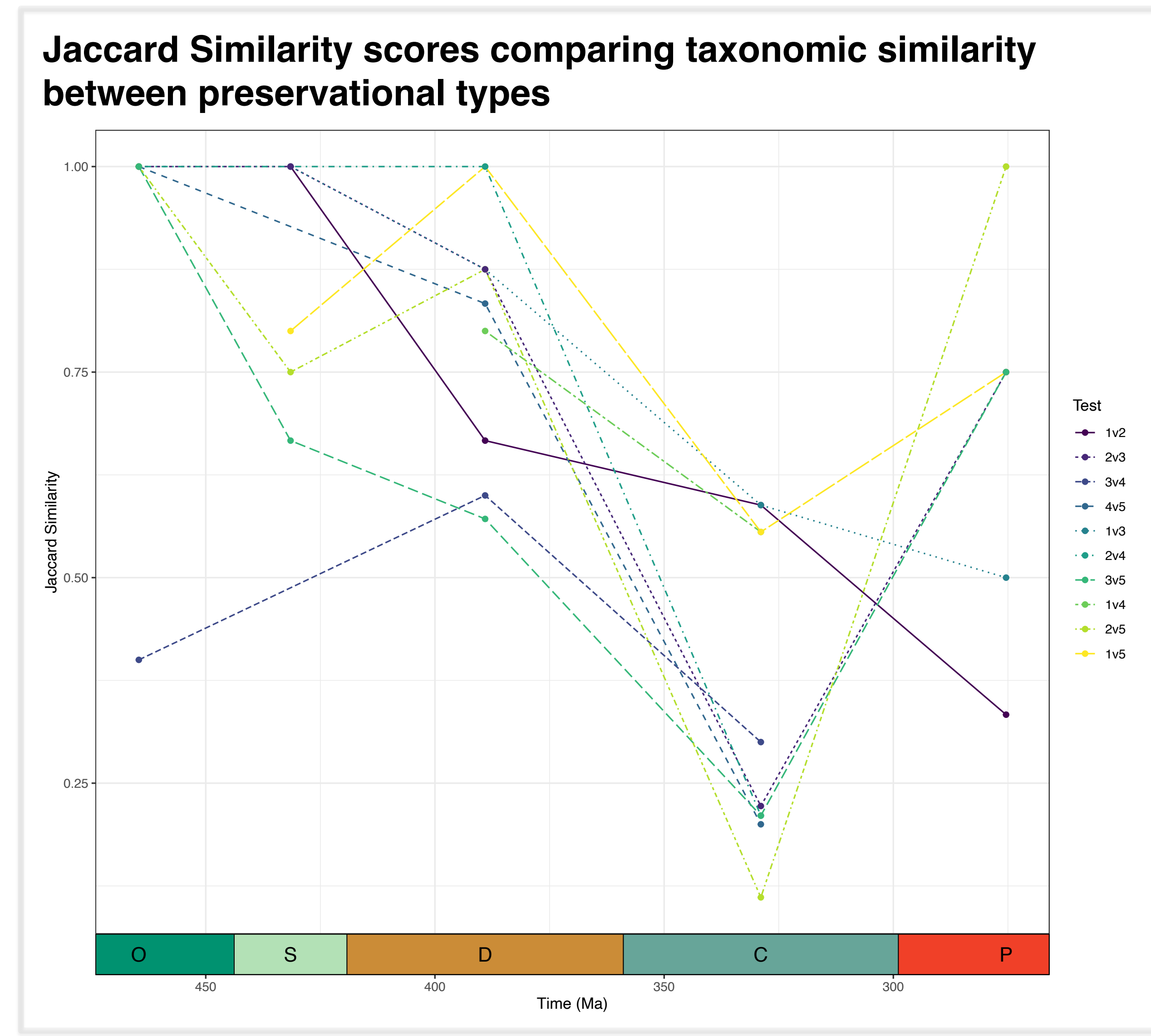
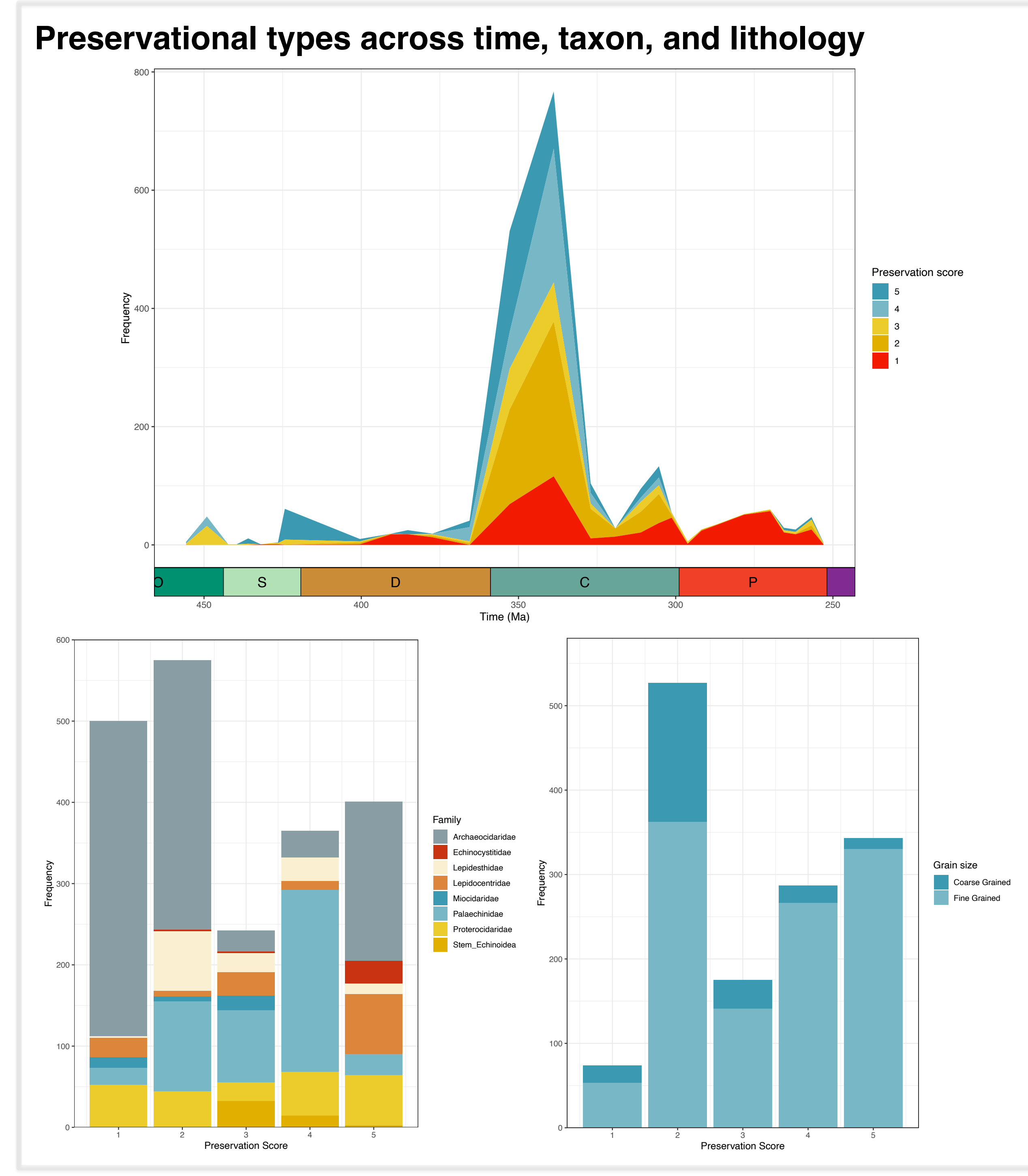
ACKNOWLEDGEMENTS AND REFERENCES

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Smith, A. B. (1994). *Systematics and the fossil record: documenting evolutionary patterns*. John Wiley & Sons.

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DATA ANALYSIS AND RESULTS



CONCLUSIONS

- Preservation of Palaeozoic echinoids varies by taxon, age, lithology and grain size.
- Better preservation is found in fine-grained rocks.
- Grainsize and lithology predict preservational types.