

The palaeobiogeography of trinucleid trilobites: patterns, processes and causes of change in the dynamic Ordovician world

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Trinucleid trilobites with their characteristic pitted cephalic fringes typify the Ordovician in many parts of the world and are used for regional correlation. During most of their history, individual trinucleid genera were very restricted in their geographical distribution and this high degree of endemism has made them important tools for recognising the rapidly changing distribution of the continents, microplates and oceanic terranes. Integrating the study of the evolutionary history of the family with the investigation of the changing patterns of geographical and environmental distribution of each trinucleid genus will throw important light not only on the Ordovician world but also on the underlying processes that drive biogeographical and biodiversity change at times of great plate tectonic mobility and climate change.

Trinucleids appeared in the early Ordovician on the margins of Gondwana, radiated rapidly as part of the Great Ordovician Biodiversification Event and extended to all the major continental plates and terranes. They occupied a wide range of environments across the shelf and onto the upper part of the continental slope and reached a peak of diversity during the early part of the Late Ordovician. They subsequently underwent something of a decline but they were still common and widespread prior to the end Ordovician mass extinction; sadly they did not survive into the Silurian.

It is over 35 years since the publication of an overall review of the morphology, classification and evolution of the Trinucleidae. During that time, the number of named genera has increased from 40 to over 50, considerably more is known about the representatives of the family in South America and China and our understanding of the complexities of Ordovician palaeogeography has increased enormously. The time is therefore ripe to re-analyse the evolutionary and palaeogeographical history of the family.

The student will compile a relational database of the temporal, palaeogeographical and, where possible, palaeoenvironmental distribution of all the described trinucleid species. The probable evolutionary relationships within the family will be determined using cladistic analysis. Patterns of geographical origin and migration of taxa and of ecological range expansion will be identified and linked to the established Ordovician palaeogeographical reconstructions. These patterns will be used to test hypotheses of the onshore-offshore expansion of evolutionary innovations, the replacement of incumbent taxa by immigrants during episodes of faunal province breakdown, the significance of intra-oceanic terranes to evolutionary and biogeographical change (stepping-stones or cradles or museums?), the degree to which patterns of migration are consistent (reflecting

ocean circulation patterns?) or random and the relative influences of climate change and plate tectonic movement on faunal migration in the marine realm.

Application procedure and deadlines

To be considered for PhD studentships to be held in the School of Geographical and Earth Sciences (GES), suitably qualified candidates should apply via the website of the College of Science and Engineering

(<http://www.gla.ac.uk/colleges/scienceengineering/graduateschool/prospectivestudents/essentialinformation/>). Closing dates for University and research council funded studentships will be in early in the new year, as stated on the GES studentships page:

<http://www.gla.ac.uk/schools/ges/research/postgraduate/>.

Non- English speakers must meet the University's English language requirements. Candidates for NERC studentships should also meet the NERC's requirements for both academic qualifications and residential eligibility. For more information go to

<http://www.nerc.ac.uk/funding/application/studentships> and please note that *non-UK European Union citizens will be awarded fees only by NERC.*

For informal enquiries about the research projects please contact the relevant supervisors. Information on the GES graduate school and the application process can be obtained from Mrs Jean McPartland, the assistant to head of the School (Jean.McPartland@glasgow.ac.uk).