

GSA Connects 2024 Meeting in Anaheim, California

Paper No. 65-11

Presentation Time: 4:45 PM

A PALEOBIOLOGICAL ANALYSIS OF MISSISSIPPIAN TRILOBITES WITH SEGMENTATION ABNORMALITIES

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Trilobites are a well-preserved group of arthropods which have been documented from the Cambrian to the end of the Permian. Abnormalities, such as injuries or teratological (developmental) defects, have been observed and described in multiple individuals across a wide range of species. Due to the rarity of such individuals, population scale investigations into the rate and possible causes of such abnormalities have been largely overlooked. Mississippian trilobites of the genus *Kaskia* were collected from two fossil sites, and individuals with segmentation abnormalities were observed to be prevalent at both localities. Comparison with the well-known genus *Eldredgeops* indicates that *Kaskia* exhibits a greater rate of abnormalities. One possible explanation for the prevalence of abnormalities in the studied proetids is a genetic bottleneck that occurred as a result of the late Devonian mass extinction, which could have led to an increased risk of abnormal development. In order to make the claim that these abnormalities are biotic in origin, one must rule out abiotic influence. A common environmental cause of abnormalities in extant marine arthropods is heavy metal pollution. To determine whether heavy metals may have acted as teratogens in these trilobites, representative individuals from both sites were analyzed for signs of metal incorporation into their exoskeleton using a Bruker M4 Tornado Plus micro XRF. No evidence of heavy metals was found, supporting the assertion that the segmentation defects are biotic in nature. These specimens are currently being analyzed for signs of diagenesis through petrographic analysis and SEM imaging, to ensure that the XRF readings reflect paleoenvironmental conditions.

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Session No. 65

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Sunday, 22 September 2024: 1:30 PM-5:30 PM

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