

**Timing and selectivity of the Late Mississippian mass extinction of brachiopod
genera from the Central Appalachian Basin**

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ABSTRACT

The seventh largest mass extinction of the Phanerozoic Era occurred in the Late Mississippian and coincided with the onset of the late Paleozoic ice age. Analyses of brachiopod genera from Mississippian strata of the Central Appalachian Basin reveal that the regional expression of the mass extinction occurred after the development of high-amplitude glacioeustasy by several million years and occurred instead during low-latitude cooling and the expansion of glaciation near the Mississippian-Pennsylvanian boundary. The Late Mississippian mass extinction was even more severe for genera in the Central Appalachian Basin than global metrics would predict; in addition to the genera of this basin that disappeared globally, many others disappeared regionally but survived elsewhere. The Late Mississippian mass extinction did not select against genera because of their environmental breadth, number of regional occurrences (a proxy for relative abundance), species diversity, or body size. Nearshore genera suffered very slightly higher rates of extinction. The mass extinction did, however, strongly select against genera with narrow global latitudinal ranges. These patterns of selectivity closely resemble those reported for the five largest Phanerozoic mass extinctions (Late Ordovician, Late Devonian, end-Permian, end-Triassic, and end-Cretaceous). This selective regime also underpinned the whole of the late Paleozoic ice age because genera that survived the Late Mississippian mass extinction dominated the global brachiopod fauna until the ice age ended in the middle Permian.