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Mass extinctions, recovery and resilience

Biomarker evidence for the origin and crisis of early angiosperm during late Permian–early Triassic

Chunjiang Wang
College of Geosciences, China University of Petroleum, Beijing, China (wchj333@126.com)

Des-A-mono-aromatic oleanane (DAMAO) was detected and identified in the Changxing section bearing GSSP of Permian-Triassic boundary and GSSP of Wuchiapingian–Changhsingian boundary. This could be an important evidence for the early origin of angiosperm. DAMAO reaches its highest content at the top interval of the Changxing Fm. just below the Bed 25, but it becomes extremely low or under detection in the Yinkeng Fm. DAMAO also shows a stratigraphic trend that is highly consistent with phenol compounds diagnostic of woody plants. This indicates that the Changxing section well records the collapse of terrestrial ecosystem at the end-Permian, coupling with the marine mass extinction event. This means that the early evolution of the angiosperm must have been delayed by the end-Permian mass crisis.