学 术 报 告

报告主题：A giant Arctic continent during the Early Mesozoic: its climatic, eustatic, and biotic implications

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报告摘要：

A huge, newly recognized landmass composed of Siberian and North and South China blocks stretched across the Arctic during the Early Mesozoic (252–175 Ma), shaping global climate and sea level during the Triassic–Jurassic transition. Lake ice rafted debris in Late Triassic and Early Jurassic strata of northwestern China shows that widespread seasonal freezing prevailed along the southern margin of this high latitude landmass, which was also home to dinosaurs based on footprints. Such a large polar continent would be expected to enhance continentality, promoting colder winters, mountain glaciation, and perhaps a modest ice cap sustained by surface albedo feedback, consistent with background glacioeustatic sea level fluctuations. An abrupt sea level fall stands out above this background; it was coincident with the end Triassic mass extinction at 201.6 Ma and the onset of Central Atlantic Magmatic Province volcanism, which plausibly produced “volcanic winters” that in turn triggered rapid ice sheet growth, forcing the abrupt drop in sea level. The resulting expansion of high latitude ice may have increased Earth System sensitivity to polar orbitally paced climate, producing a newly observed and unexpected ~400 kyr shift in tropical climate from precession to obliquity and back, and a transient hothouse to icehouse shift. These same volcanic winters selectively eliminated large, non-insulated terrestrial vertebrates, allowing already cold adapted, insulated dinosaurs, including ornithischians, in high latitudes to become ecological dominants globally. Vertebrate paleontological prospecting of Late Triassic and Early Jurassic paleoarctic strata, scientific coring for paleomagnetic records of latitude, quantitative records of lake ice rafted debris (and other geochemical/climate proxies) are key to testing these hypotheses.