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Foraminifera and carbon stable isotope records during the Paleocene/ Eocene warm period in southern Tibet

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One of largest and most abrupt climatic warming events documented in the geologic record occurred at the end of the Paleocene epoch. Oceanic deep waters warmed to 10°C and high latitude surface waters warmed from ∼10°C to ∼20°C. This event coincides with 30-50% benthic foraminifera extinction in the oceanic realm and an abrupt drop in δ^{13}C in foraminifera shell. The dominant factors that have been considered from studies of oceanic realms as causing the extinction were decreased oxygenation and increased corrosiveness of deep and intermediate waters, changes in surface water productivity affecting deep ocean nutrient availability, an increase in bottom and surface water temperature and major changes in ocean circulation. Study of the Paleocene-Eocene boundary within a foreland basin of southern Tibet, dominated by carbonate ramp depositional environment, documents more complex environmental conditions than can be derived from studies of the deep oceanic environment. Extinction rates for larger foraminiferal species are 18% of the total number, and up to 58% of the larger foraminiferal taxa in the Zongpu section. The extinction rate in southern Tibet is similar to those in the rest of the world, but shows that the Paleocene fauna disappeared gradually through the Late Paleocene, with Eocene taxa appearing abruptly above the boundary. The δ^{13}C values show three negative excursions in the transitional strata, two in Late Paleocene and one in early Eocene, all broadly correlatable with changes to a more marly lithology. The second negative excursion of δ^{13}C which is located at the P/E boundary coincides with larger foraminifera overturn. A drop in δ^{18}O values just prior to the benthic foraminifera extinction suggest that it

could have been a delayed reaction to the sudden increase in ocean water temperature which led to the extinction of larger foraminifera. The evidence of increased fragmentation of foraminifera tests in the uppermost late Paleocene bed may be evidence for increased corrosiveness of intermediate waters. The top of Paleocene is 10 cm thick marl bed lacking large benthic foraminifera, overlain with sharp contact by thick Alveolina limestones. That the Palecene-Eocene Thermal Maximum and associated faunal changes occurred during culmination of Himalaya-Alpine mountain chain building along the northern boundary of the Tethys, strongly suggest tectonic causation of the event, not considered by marine researchers.