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Paleocene Eocene Thermal Maximum and Eocene Thermal Maximum 2: hyperthermals of one kind?

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Superimposed on the late Paleocene through early Eocene warming trend, at least two prominent short-lived global warming events (hyperthermals) occurred: the Paleocene-Eocene thermal maximum (PETM or ETM1; $\sim$56 Ma) and Eocene thermal maximum 2 (ETM2, $\sim$54 Ma). The PETM and ETM2 are associated with the massive injection of ^{13}C-depleted carbon into the ocean-atmosphere system, but an open issue is whether these events and other potential hyperthermals (e.g., H2) are causally related. Lourens et al., (2005) showed on the basis of the completely recovered successions from the Walvis Ridge depth-transect that the PETM and ETM2 could both be triggered by orbital forcing. It remains uncertain, however, whether ETM2 shows a climatic response similar to the PETM. Here, we will present new high-resolution benthic stable isotope data of ETM2 from the Southeast Atlantic and the Southern Ocean and compare them in detail with PETM data from the same sites. Our results indicate that ETM2 is characterized by $\sim$3°C warming and a -1.4‰ CIE in the deep-sea. The H2 event that occurred $\sim$100 kyrs later, is associated with $\sim$2°C warming and a -0.8‰ CIE. The magnitudes of the δ^{13}C and δ^{18}O excursions of both events are significantly smaller than those during the PETM, but their coherent relation indicates that the δ^{13}C change of the exogenic carbon pool was similarly related to warming during these events, despite the much more gradual and transitioned onset of ETM2 and H2.