Well-preserved calcareous nannofossils across the Paleocene–Eocene Thermal Maximum, International Ocean Discovery Program (IODP) Site U1580, southern Agulhas Plateau, southwestern Indian Ocean

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The Paleocene-Eocene Thermal Maximum (PETM) was an abrupt and extreme warming event associated with rapid input of light carbon into the ocean-atmosphere system at 56.0 Ma. These carbon cycle perturbations caused significant changes to marine plankton, including extinction of some benthic foraminifers and the appearance of malformed calcareous nannoplankton, possibly related to ocean acidification during the event. The PETM is now considered a potential analog for the effects of anthropogenic climate change due to its rapid onset and magnitude; thus, study of PETM records offers an opportunity to better understand the potential effects of rapid climate change on marine phytoplankton communities. Here we present calcareous nannofossil assemblage data across a newly recovered PETM section from International Ocean Discovery Program (IODP) Site U1580, drilled on the southern Agulhas Plateau during IODP Expedition 392 in early 2022. Water

depth at this site is 2560 m and it is presently located at 40° 47.15’S, although it has moved progressively northward since the Agulhas Plateau formed in the mid-Cretaceous when the site was located about 20° further south. The PETM interval was identified during the expedition by a change in sediment color, increase in magnetic susceptibility, and calcareous nannofossil assemblages. Low-resolution bulk $\delta^{13}C$ measurements conducted following the expedition confirm a negative isotope excursion and decrease in calcium carbonate content across the interval. The shipboard age model based on nannofossil and planktonic foraminifer biostratigraphy, together with magnetostratigraphy, suggests relatively high sedimentation rates (~2.5 cm/ky). Nannofossil assemblages are quite well preserved, with PETM-specific taxa present including *Rhomboaster calcitrapa*, *Rhomboaster cuspis*, *Rhomboaster bramlettei*, *Discoaster araneus*, and *Discoaster acutus*. Initial qualitative analysis indicates *Zygrhablithus bijugatus* is particularly abundant within the PETM interval, whereas *Fasciculithus* spp. decrease in abundance. *Discoaster* spp. are also more abundant in the earliest Eocene, as are *Neochiastozygus* spp. *Neococcolithes* spp., and *Ellipsolithus bollii*. The position of this new site between Maud Rise Site 690 and Walvis Ridge Sites 1262, 1263, and 1265 will shed new light on this event in the southern mid-latitudes, where PETM records are sparse.