Environmental factors influencing calcareous nannofossil distribution over the past 96,000 years from the Panama Basin, Eastern Equatorial Pacific (EEP)

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Fully and accurately reconstructing changes in productivity and carbon export is critical to determining the efficiency of the biological pump and its role in the global carbon cycle through time, particularly in modern CO_2 source regions like the Eastern Equatorial Pacific (EEP). Sediment from Panama Basin, Site MV1014-02-17JC, was used to make smear slides by the drop method for identification of calcareous nannofossils through light microscopy. This study presents a new, high-resolution record of calcareous nannofossil assemblage changes together with previously published diatom assemblage data and geochemical proxy data including alkenone-derived sea surface temperatures (SST), ^{230}Th derived ^{232}Th wind-blown dust flux, ^{230}Th derived xBa, authigenic Uranium, ^{234}U:^{238}U, and opal flux, from the Panama Basin to assess environmental controls on the phytoplankton community.

The assemblages were well preserved and abundant through the 96 kyr record derived from this region. The assemblage was dominated by *Gephyrocapsa oceanica* and *Florisphaera profunda* with an additional 14 species present through the studied interval. Principle coordinate analysis (PCO) was used to assess variation in species abundance among samples. Each PCO was used as the response variable in a multiple linear regression with all environmental factors as predictor variables to determine which environmental factors best represented the changes observed in the floral composition. Phytoplankton community structure is driven by changing patterns of nutrient availability (most notably the Si:Fe ratio), which, in turn, is caused by variability in the position of the Intertropical Convergence Zone (ITCZ) and associated changes in biogeochemical cycling and circulation in the Southern Ocean. Silica-rich waters brought to the surface from the equatorial undercurrent favor a diatom dominated community, whereas when wind-blown dust brings an excess of iron in the absence of bio-available silica, the calcareous nannofossils thrive. Ultimately, this study aims to disentangle the effects of nutrient delivery regimes along an eastern boundary upwelling system and their controls on the structure of the phytoplankton community.