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# Relationship of benthic foraminiferal diversity to paleoproductivity in the Neogene of the Caribbean deep-sea

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Diversity trends in late Miocene to Pliocene, Caribbean deep-sea benthic foraminifera >63 ì m, as interpreted from the indices Fisher's á, Shannon-Weiner index, S and N, generally parallel paleoproductivity proxies (benthic foraminiferal infaunal/epifaunal species ratio, benthic foraminifer accumulation rates, flux of organic matter to the seafloor and benthic ä$^{13}$C). Paleoproductivity never reached a eutrophic threshold value above which we would predict opposite trends of high paleoproductivity and low diversity. Instead, results are similar to those from other oligotrophic settings in that a positive and statistically significant Pearson's Product Moment Correlation (r) is noted between paleoproductivity proxies and diversity. Increased relative abundances of *Epistominella exigua*, a proxy for seasonal phytodetrital flux to the seafloor coincides with increased diversity suggesting that pulsed paleoproductivity enhanced diversity or at least did not cause it to decrease. Additionally, even during the Late Miocene Carbon Isotope Shift (7.6-6.7 Ma, an interval of enhanced paleoproductivity experienced globally, including the Caribbean), Caribbean diversity increased while the more eutrophic setting of the Pacific displayed decreased benthic foraminiferal diversity. Thus, it appears that below eutrophic levels, diversity is positively correlated with diversity.

This pattern of Caribbean diversity and paleoproductivity was compared to the timing of the late Miocene – early Pliocene constriction and closure of the Central American Seaway, which separated Caribbean and tropical Pacific waters completely by about 4.2 Ma. Diversity and paleoproductivity in the Caribbean was high until about 7.9 Ma and sharply declined 7.9-7.6 Ma. Thereafter, until 4.2 Ma, both diversity and paleoproductivity generally increased until after 4.2 Ma, when they gradually decreased. A comparison between the deep-sea Pacific (DSDP Site 503) and Caribbean (ODP Site 999) for the interval 8.25–2.5 Ma reveals greater fluctuations in the Caribbean benthic diversity as compared to the Pacific, especially after 4.2 Ma, probably reflecting the greater effect of seaway closure on the Caribbean. Thus, it appears that constriction of the Central American Seaway generally increased both paleoproductivity and benthic foraminiferal diversity, and complete seaway closure caused their decline.