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Disentangling regional and global signatures from benthic foraminifera records during the Late Miocene-Early Pliocene Biogenic Bloom (IODP Site U1506 and ODP Site 1085)

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The Late Miocene-Early Pliocene Biogenic Bloom (~ 9-3.5 Ma) is a paleoceanographic event defined by anomalously high marine biological productivity and associated with changes in the marine carbon cycle. Marine sedimentary records in the Indian, Pacific, and Atlantic oceans, point to a significant increase in primary productivity across low-latitude oceanic regions maintained for several millions of years. Surface primary productivity is typically limited by the availability of nutrients; whose residence times are fairly short in the global ocean. Therefore, the global nature and the multimillion years duration of the Biogenic Bloom make this event a paleoceanographic puzzle. Two main explanations for these anomalously high productivity conditions have been proposed: a major redistribution of nutrients triggering an intensification of regional upwelling; or an absolute increase of nutrients delivery to the oceans. We investigated the Biogenic Bloom at IODP Site U1506 (Tasman Sea, southwest Pacific Ocean, 1505 m water depth) and at ODP Site 1085 (Cape Basin, southeast Atlantic Ocean, 1713 m water depth). For these sites we generated implemented age models and quantitative benthic foraminiferal records across an interval spanning from the Tortonian (Late Miocene) to the Zanclean (Early Pliocene). The benthic foraminiferal assemblage analysis shows that the Biogenic Bloom was a complex, multiphase event rather than a single uniform period of sustained high marine water productivity. Both sites record changes that can be interpreted in terms of modification of productivity conditions. Intervals with low diversity and abundant opportunistic and phytodetritus exploiting taxa (PET) are indicative of transient pulsed food supply, high oxygen levels, and oligotrophic conditions.

Intervals characterized by increased diversity, higher relative abundance of uvigerinids and buliminids, and relative lower abundance of PET instead suggest lower oxygen and /or more eutrophic conditions. However, the two sites show a different taxonomic composition of the benthic foraminiferal assemblages. The dominating PET comprise distinct species at different the study sites, with *Globocassidulina crassa* and *Globocassidulina subglobosa* displaying high abundance at Site U1506, and *Epistominella exigua* and *Alabaminella weddellensis* at Site 1085. While showing common features, the Biogenic Bloom is also characterized by unique regional responses at different study sites which highlight the need for further high-resolution records to provide global mechanisms and dynamics for the Biogenic Bloom event.

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