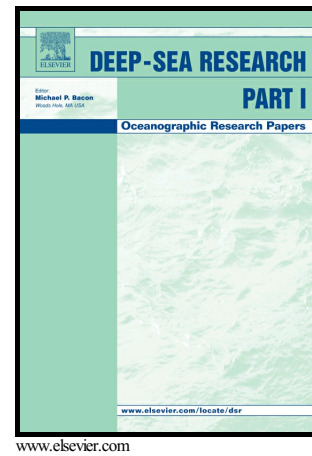


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Seasonal flux patterns of planktonic foraminifera in a deep, oligotrophic, marginal sea: sediment trap time series from the Gulf of Aqaba, northern Red Sea

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Abstract

Annual and interannual planktonic foraminifera (PF) fluxes, species assemblage composition, vertical distribution (0-600m) and shell-size-distribution (63-125, 125-500, 500-1000 μm) were characterized in the marginal oligotrophic Gulf of Aqaba (GOA), northern Red Sea, between January 2014 and February 2016 using a ~monthly resolved sediment trap time series.

PF fluxes in the GOA demonstrate strong seasonality, with low values observed during summer months, gradually increasing during the autumn-winter. This increase is coeval with decreasing sea-surface temperatures and deepening of the mixed layer depth in the GOA that drives the admixing of nutrient-replete subsurface waters into the mixed layer. This in turn, triggers an increase in primary productivity, expressed by enhanced chlorophyll-*a* concentrations.

Spinose species constitute the majority of the PF assemblage. The dominant shell size-fraction is between 63-125 μm (~86% of the total flux), which has generally been overlooked in previous studies, resulting in a significant knowledge gap related to the neanic stages and the small-adult-size PF. Indeed, the 63-125 μm size-fraction is dominated by the smallest species *Turborotalita clarkei* (36-92% of this size fraction). The 125-500 μm size-fraction (~13%) is dominated by the species *Globigerinoides ruber*, while less than 1% of the shells are in the range of 500-1000 μm , dominated by *Orbulina universa*.

Over the last few decades, the already low number of PF species decreased in the GOA from 13 to 10, including the disappearance of *Trilobatus sacculifer*, the most common species in the GOA during the 1970s. This finding could reflect the sensitivity of the geographic location of the GOA, at the edge of a >2000 km transect

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