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Paleoecological significance of two opportunistic benthic foraminiferal species Alabaminella weddellensis and Epistominella exigua

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Benthic foraminiferal species of Alabaminella weddellensis and Epistominella exigua are widely used in recent paleoceanographic reconstructions due to their wide geographic distribution and occurrence throughout much of the Cenozoic marine sediments. Both species are assigned as opportunistic «phytodetritus species» and display high abundance in open ocean zones characterized by oligotrophic conditions with seasonal or occasional pulses of phytoplankton bloom and well-oxygenated bottom waters.

Up to now, relative abundance of A. weddellensis and E. exigua is actively used to reconstruct seasonal variations of primary productivity by means of «seasonality index» (Sun et al., 2006; Smart, 2008). However, distribution of each of these species individually does not show any significant correlation with seasonality, according to the observations by Sun and others (2006) in the North Atlantic. Moreover, changes in relative abundances of A. weddellensis and E. exigua often demonstrate an opposite changes throughout the studied sediment cores (Thomas et al., 1995; Yasuda, 1997; Sun et al., 2006; Smart, 2008). This might suggest different ecological preferences for each of these species.

In this study, a detailed analysis of foraminiferal assemblages was carried out from core AI-3321 (30°56.85’ S, 38°02.45’ W, 2969 m water depth, 293 m length) retrieved from the western slope of the Rio Grande Rise in the western South Atlantic. It was found that A. weddellensis and E. exigua were the most abundant species controlling the major trends of foraminiferal variability during Middle Pleistocene–Holocene. To clarify the species distributional features in the sediments over the last 300 kyr, we compared the obtained micropaleontological and statistical data with published benthic foraminiferal records from the cores collected in oligotrophic deep-sea regions: NGC102 (Ohkushi et al., 2000), BS-A and BS-D (Ferreira et al, 2014), core tops (Mackensen et al., 1995; Fariduddin, Loubere, 1997; Sun et al., 2006).

It was shown that unlike E. exigua, the maximal content of A. weddellensis corresponds to the intervals of increased species diversity and, probably, indicates relatively productive conditions. A significant decrease in percentages of E. exigua occurring within the subpolar regions might be linked to a weak competitiveness of this species, despite of the favorable conditions of seasonal sea-surface bioproductivity for opportunistic fauna.

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