Geophysical Research Abstracts
Vol. 19, EGU2017-814, 2017
EGU General Assembly 2017

Reconstruction of Paleoceanographic Conditions in the Rio Grande Rise Area, western South Atlantic: Evidence from Benthic Foraminiferal Data

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Sediment core AI-3321 (30°56.85' S, 38°02.45' W, 2969 m water depth, 293 m length) collected from the western slope of the Rio Grande Rise was studied to count and identify benthic foraminifers in the >100 μm size fraction. Available information of the ecological preferences of benthic foraminiferal assemblages was used to reconstruct sea-surface bioproductivity and oxygenation conditions near the bottom during warm periods: Holocene, MIS 5e and MIS 7. A total of more than 100 species have been identified. They were classified according to their microhabitat preferences. All studied samples are characterized by a high abundance of calcareous epifaunal – shallow infaunal species together with low percentages of agglutinated taxa. Species diversity was described using several diversity indices that demonstrate similar variability during MIS 5 and 7 and an opposite changes during MIS 1. Cluster and Q-mode factor analysis were applied to establish dominant assemblages and major trends of foraminiferal variability. The assemblages (Factors I, II and III) are characterized by maximal scores of Epistominella exigua, Alabaminella weddellensis and Globocassidulina subglobosa, respectively. These opportunistic species are associated with seasonal supply of fresh, labile organic matter to the sea floor, and also prefer high oxygen concentrations in the bottom waters. In contrast to diversity indices, factor I, II and III do not demonstrate similar distribution throughout the studied intervals. This might be related to different combinations of amount and quality of organic matter supplied to the sea floor and corresponding oxygen content near the seafloor on the Rio Grande Rise during Holocene, MIS 5e and MIS 7. Accessory foraminiferal taxa thriving in well-oxygenated conditions and being capable to adapt to pulsed food supply (Oridorsalis umbonatus, Pullenia bulloides, Ioanella tumidula, Cibicidoides wuellerstorfi, Quinquelocilina spp., Pyrgo spp.) also occur throughout the studied intervals.

This work is supported by RFBR (grant No.16-35-50080-mol_nr).