Depth Distribution of Benthic Foraminifera in the Middle and Deeper Sublittoral to Uppermost Bathyal Northwest of Okinawa, Japan

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Distribution of optimally preserved benthic foraminifera is related to depth in the sublittoral and uppermost bathyal around Okinawa, Japan. Depth is a composite factor that influences physical factors, i.e., temperature, salinity, substrate caused by hydrodynamics and illumination. Sediment samples between 64m and 275m depth were taken from the seafloor by grab sampler. Optimally preserved tests were analyzed using a Motic SMZ- 168 microscope. Grain sizes < 63μm were analyzed using Micromeritics Sedigraph ET5100. Grain sizes > 63μm were analyzed by sieving. Statistical analysis performed on seven larger and 45 smaller benthic foraminiferal species includes canonical correspondence and correspondence analyses. Depth distributions are fitted by power transformed normal distributions. Distributions in grain size classes and percentages of silt and clay are depicted in circle graphs. Taxonomic description grouped the benthic foraminiferal tests into seven orders, 55 families, 100 genera and 175 species. The first components of the bimodal distribution pattern of *Amphistegina lessonii, Calcarina hispida, A. bicirculata, A. radiata, A. papillosa* and *Operculina complanata* demonstrate optimal depth distributions in the middle sublittoral. *Planostegina longisepta* demonstrates optimal depth distribution in the deeper sublittoral. Dependence on coarse sand is demonstrated by *A. bicirculata, A. radiata* and *C. hispida*. Dependence on fine sand is demonstrated by *A. lessonii*. Dependence on very fine sand is demonstrated by *O. complanata* and *P. longisepta*. *A. papillosa* does not show dependence on any particular substrate type. Optimal depth distributions of the larger foraminifera are in agreements with the living individuals. Larger foraminiferal specimens picked between the 125 - 250μm sieve fraction demonstrate depth transport. Low depth transport is demonstrated by *A. lessonii* and *C. hispida*. High depth transports at 210m are demonstrated by *A. bicirculata, A. papillosa, O. complanata* and *P. longisepta* indicating similar test buoyancies. Highest depth transport at 270m is demonstrated by *A. radiata*. Depth distributions of optimally preserved smaller benthic foraminiferal tests demonstrate optima in the middle sublittoral, deeper sublittoral and uppermost bathyal. Optimal depth distributions of the tests in the middle and deeper sublittoral is related to dependence on either coarse sand, medium sand or no dependence on specific substrate type. Optimal depth distributions of the tests in the uppermost bathyal is related to dependence on fine and very fine sand. Agglutinated foraminiferal tests have demonstrated agreement between optimal depth distribution and dependence on substrate type. Benthic foraminifera with secreted $CaCO_3$ tests have shown partial agreement between optimal depth distribution and dependence on substrate type. Life position of the smaller benthic foraminifera is influenced by test dominance in percentages of silt and clay. Test dominance in the high or highest percentages of silt and clay is reflected on infaunal life position. Test dominance in the low or lowest percentages of silt and clay is reflected on epifaunal life position. Test dominance in medium percentages or no dominance reflects on either epifaunal or infaunal life position. Test dominance in percentages of silt and clay is related to its dependence on substrate type.