Taphonomy of selected larger Foraminifera living on coral reef slopes

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Living larger Foraminifera of NW Pacific coral reef slopes demonstrate the highest biodiversity of this group. Their distribution depends strongly on water depth, thus they show gradients in assemblage composition, called coenoclines. The most important factor for larger Foraminifera is the management of light availability to house symbiotic algae, which is performed by wall structures.

These dependencies lead to the following distribution pattern: Soritids, which dominate in shallow waters of the reef flat and reef moat (*Marginopora*, *Amphisorus*), occur in much lesser abundance down to 60m depth (*Sorites*, *Amphisorus*, *Parasorites*) showing an optimum within the upper 40m. Similar trends can be experienced for the star shaped calcarinids (*Neorotalia*, *Calcarina*, *Baculogypsina*), except the large genus *Baculogypsinoides*. Alveolinids, in contrast to the soritids, are restricted to fore reef areas, but demonstrate similar distribution form and depth ranges like the soritids. Nummulitids are less abundant in the upper slope, except *Heterostegina* preferring hard substrates. All the other nummulitid species become abundant in the middle (50m; *Nummulites*, *Operculina*) and dominant in deeper parts of the slope (round about 100m), where they can get extremely large sizes (*Planoperculina*, *Planostegina*, *Cycloclypeus*). In contrast to these families, the *Amphisteginidae* scatter the whole depth range of larger Foraminifera, also demonstrating strong depth dependencies expressed in differing species ranges.

Whereas light intensity is the main factor responsible for the distribution of living forms leading to rather identical live assemblages at appointed depths, empty shells are affected by the water energy regime. Tests can be transported before final deposition dependent on current intensity and slope steepness,.

Two transects down to 100m with differing morphology and tilting of the slope were chosen to demonstrate the amount of transportation in selected larger forams. Both transects show a steep reef front (6 degrees) down to 30m depth. Therefore, all tests are transported current downwards in various degrees depending on test size and shape (e.g., *Alveolinella*, *Amphisorus*, *Heterostegina*). *Amphisorus* living in high abundance behind the reef crest is transported mainly to the beach, but smaller amounts of empty tests can be transported over the reef crest to the slope. It enriches empty tests in the uppermost slope part (0 to 5m), where these species prevent to live.

Below the base of the frontal reef slope a flat section (less than 2 degrees) continues down to 70m depth in one transect. The other profile is steeper showing an inclination of 4 degrees down to 80m depth. This affects transportation in the latter, while empty shells of lenticular or globular form remain autochthonous in the former transect (e.g., *Nummulites*, *Baculogypsinoides*). But the large sized *Cycloclypeus* is also transported downwards there despite weak flow intensity, whereby floating is induced by the thin plate-like test form. In both transects the deepest parts (80m to 100m depth) are influenced by local topography, since there are islands and reefs with extremely steep slopes located in close proximity. Therefore, forms living in the shallow parts of these island slopes (*Alveolinella*, *Amphisorus*) are transported downwards and accumulated in the deepest region. All species reaching their habitat optimum at these depths (e.g., *Planoperculina*, *Planostegina*) did not show transportation, but demonstrate slow accumulation according to a reduced sedimentation rate.

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