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Biochronology and palaeoenvironment of Cenozoic Circum-Caribbean Larger Foraminifera

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During the Cenozoic, the areas of the Gulf of Mexico, Yucatan and Florida-Bahamas were dominated by contiguous passive margins hosting long-lasting, large carbonate platforms. In contrast, Southern Central America and the Antilles were formed by a collage of mostly oceanic terranes and arcs that reflect the complex tectonic emplacement of the Caribbean Plate between N- and S-America. In this context, carbonate palaeoenvironments were short-lived and formed either on volcanic edifices (seamounts and island arcs) or on terranes uplifted into the photic zone by collisional tectonics. Our data comes mainly from localities on the Caribbean Plate (Costa Rica, Panama and the Antilles) but includes also data from Florida, Cuba and Yucatan.

The biochronologic range of most Circum-Caribbean taxa of Larger Foraminifera is currently controversial, because it is based on a large number of local and regional stratigraphic publications of the last 50 years. This work reflects a high variability of faunal composition form one area to the other, suggesting that local ranges are more likely to be controlled by changing palaeoenvironments than by biochronology. To overcome these problems, we compiled a database comprising 130 taxa from over 60 localities.

Larger Foraminifera from carbonate rocks were studied in several hundred oriented thin sections and oriented sections of isolated specimens that were studied by cathodoluminescence, transmitted light microscopy and SEM for isolated and washed material. X-ray microtomography was also used to produce 3D-imaging of some forms. $^{87}Sr/^{86}Sr$ ratios were measured for age calibration on Paleocene-Eocene, Oligocene, and Late Miocene-Pliocoene fossils. Biochronologically calibrated and well-documented records of Larger Foraminifera from the literature were also incorporated into the database. Unitary Associations (UA) were calculated using Biograph and the UA-Graph software, UA represent the maximum ranges of all considered species with respect to each other. Up to 40 UA result for the late Paleocene - middle Miocene time interval. However, many of these associations may have an ecologic significance, but nevertheless there is a high biochronologic potential in this dataset, that is now calibrated in more detail by co-occurring planktonic foraminifera, nannofossils and strontium isotope data.

The late Paleocene is characterized by the association of *Ranikothalia* spp. (*R. bermudezi, catenula*, *soldadensis*, *tobleri , antillea*) with *Discocyclina* , *Hexagonocyclina*, *Athecocyclina*, *Neodiscocyclina* , *Actinosiphon* and *Amphistegina* spp.

The Eocene Larger Foraminifera facies are characterized by many species of *Amphistegina*, *Asterocyclina*, *Cyclolo-culina*, *Dictyoconus*, *Discocyclina*, *Euconoloides*, *Eofabiania*, *Fabiania*, *Gypsina*, ,*Helicolepidina, Heterostegina, Homotrema, Lepidocyclina, Linderina, Neodiscocyclina, Nummulites, Operculina, Operculinoides, Orthophragmina, Polylepidina, Proporocyclina, Sphareogypsina* and *Yaberinella.*

The Oligocene is characterized by many species of *Archaias*, *Heterostegina*, *Miogypsina* , *Miolepidocyclina*, *Miosorites, Lepidocyclina*, and *Nummulites*.

Lower-middle Miocene carbonates contain associations of *Amphistegina*, *Archaias*, *Miosorites*, *Miogypsina*, *Miolepidocyclina* and *Operculina*.