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Latitudinal and sediment depth gradients in foraminiferal assemblage of the southeast Atlantic

Stefan Müllegger & Werner E. Piller

*Institute for Earth Sciences, Karl-Franzens-University, Graz, Austria
stefan.muellegger@uni-graz.at*

During Meteor cruise 63/2 to the Southeast Atlantic in March 2005, sixty-one sediment cores were sampled to study foraminifera. Repeated multicorer hauls between S 30° and the equator yielded samples for the reconstruction of oceanic parameters by use of planktic and benthic foraminifera and crucial sediment parameters. As samples were taken in horizontal slices (0–5 cm: 0.5 cm steps; 5–15 cm: 1 cm steps; 15–35 cm: 5cm steps) changes in sedimentation and productivity can be reconstructed. Assuming expected sedimentation rates below 3cm/1.ka (Ruddiman, 2001. *Earth's climate*; W.H. Freeman & Co., *New York*; Pierre *et al.*, 2001. *Proc. ODP, Sci. Results 175*: 1-22), the time spanned may be at least 10 kyr. All sample sites are between 5,000 and 5,600 m water depth. Nevertheless, calcareous foraminiferal tests are a frequent component of grain fractions >125 µm. This indicates that the calcite compensation depth (CCD) lies deeper than 5,600 m in the studied areas of the Southeast Atlantic. This assumption is supported by the fact that even fractured, aragonitic pteropod shells were found in some surface sediment samples. Sample sites were chosen along a north-south transect to document interactions between faunal alteration and sedimentary and oceanic parameters. The investigated samples show clear differences in sedimentation and faunal composition for the three investigated deep-sea basins.

Sedimentation: Whereas samples from the Guinea Basin show constant sedimentation dominated by carbonate secreting organisms (mainly foraminifera and Coccolithophorida), Angola and Cape Basin samples show a different situation. In northern Angola as well as in northern Cape Basin, surface samples are composed of mainly biogenic opal in the sand fraction and various contents of terrigenous material in the sand, silt and clay fractions. At sediment depths of 7-8 cm in the Cape Basin and 10-11 cm in the Angola Basin, a complete change in sediment composition is obvious with a nearly equal silicate/carbonate ratio. At a sediment depth of 14 cm in the Angola Basin, sediments are similar to those of the Guinea Basin, with a high calcareous biogenic proportion. The change in sediment composition is also manifested in different sediment colours, varying from brownish-black in surface sediments to dark yellowish brown at

20 cm sediment depth. A similar situation is observed in the sediment record of the northern Cape Basin at S 30°. A change from siliceous to carbonate sedimentation with increasing sediment depth is visible. Various proportions of terrigenous material of all grain size fractions are obvious. In general, an increase in the content of clastic sedimentation with increasing latitude was observed.

Foraminifera: For a first, semiquantitative analysis, one core from each investigated abyssal basin was processed. Compared to the Guinea and Angola basins, a loss of warm-water species in the planktic foraminiferal assemblages in favour of transitional species was observed in the northern Cape Basin. At a sediment depth of 15 cm in the Cape Basin, mainly *Globorotalia scitula*, *Globorotalia inflata* and *Globorotalia truncatulinoides*, and ancillary *Orbulina universa* and *Globigerinella siphonifera*, dominate in the sediment fraction > 250 µm. In Angola Basin sediments, *Globorotalia scitula* as well as *Globorotalia truncatulinoides* and *Globigerinella siphonifera* are absent, whereas *Globorotalia tumida*, *Globorotalia cultrata*, *Sphaeroidinella dehiscens*, *Neogloboquadrina dutertrei* and *Globorotalia crassaformis* appear. A minor change in planktic foraminifera assemblages is obvious between the northern Angola and the Guinea basins. All species occurring in the Angola Basin are present in the Guinea Basin except *Globorotalia inflata*. *Pulleniatina obliquiloculata* and *Globigerinoides ruber*, and ancillary *Globigerinoides sacculifer*, appear in the Guinea Basin but neither in the Angola nor in the Cape Basin.