



Planktic Foraminiferal Fluxes Associated with Agulhas Rings

I. Wilke (1,2), F.J.C. Peeters (2), G.-J. Brummer (3)

(1) Fachbereich Geowissenschaften, Universität Bremen, Klagenfurter Straße, 28359 Bremen, Germany, (2) Department of Palaeo-climatology and Paleoecology, Faculty of Earth Sciences, Vrije Universiteit, De Boelelaan 1085, 1081 HV, Amsterdam, The Netherlands, (3) Department of Marine Chemistry and Geology (MCG), Netherlands Institute for Sea Research (NIOZ), P.O. Box 59, 1790 AB Den Burg, Texel, The Netherlands. (frank.peeters@falw.vu.nl / Phone: +31-20-5987419)

Deposition fluxes of planktic foraminifera were monitored in the southeastern Cape Basin to improve interpretations from sedimentary records of the variability of Indian Ocean advection into the South Atlantic via Agulhas leakage. We deployed a time-series sediment trap from August 2000 to February 2001 in the area of influence of Agulhas rings, i.e. large anti-cyclonic eddies detached from the Agulhas Current, to assess the advection of Indian Ocean plankton by Agulhas leakage. Here, we report on the changing species, oxygen and carbon isotopic composition of planktic foraminifera as a result of Agulhas rings that moved over the trap site.

We found a coherent pattern between the shell flux records and satellite derived sea surface height and temperature indicating that deposition fluxes originated from two distinct hydrographic regimes. In the first 6-8 weeks as well as in the last 2 weeks of the time series, foraminiferal fluxes originated from cold southeast Atlantic waters. The faunal assemblage was dominated by *Globorotalia inflata*, *Globigerina bulloides*, *Globigerinata glutinata*, and *Neogloboquadrina pachyderma* (dex). In-between, Agulhas water influenced the planktic foraminiferal fluxes as indicated by warm, tropical-subtropical Indian Ocean species, including *Globigerinoides ruber*, *Globigerinoides sacculifer*, *Globigerinella aequilateralis*, *Orbulina universa* *Globorotalia menardii*, *Neogloboquadrina dutertrei*, *Globigerinella calida* and *Globorotalia theyeri*/*G. scitula* cpx.. However, *G. inflata* also occurred in significant fluxes in the intermediate period dominated by Agulhas water, corroborating physical oceanographic evidence

for rapid mixing between Agulhas rings and Atlantic water masses. Comparing the time scales of the satellite images and shell deposition fluxes, our data indicate that highest foraminiferal shell production occurs at its frontal zones rather than in the centre of a ring.

Most species showed lowest oxygen and carbon stable isotope values when the Agulhas waters are found above the trap site. Consistent with the enhanced foraminiferal fluxes, highest oxygen (lowest temperatures) and carbon isotope values appear associated with frontal zones, i.e. when Atlantic and Agulhas waters mix and upwelling of deeper waters may occur. These modern observations enable to distinguish between species properties associated with Agulhas leakage on the one hand and Atlantic water masses on the other hand.