

Planktonic foraminifera as indicators of water masses north and south of the Azores Front/Current: evidence from abundance and stable isotope data

Foraminíferos planctónicos como indicadores das massas de água a Norte e a Sul da Frente/Corrente dos Açores: evidência de dados de abundância e isótopos estáveis

A. Rebotim (1,2,3), A. H. L. Voelker (1,2), J. Waniek (4)

- (1) Unidade de Geologia Marinha – LNEG, Estrada da Portela, Bairro do Zambujal, Apartado 7586 – Alfragide, 2610-999 Amadora, Portugal. andrea.rebotim@lneg.pt
- (2) CLIMAR, Rua dos Bragas, nº289, 4050-123 Porto, Portugal.
- (3) MARUM – Center for Marine Environmental Sciences, University of Bremen, Leobener Strasse, D-28359 Bremen, Germany.
- (4) Leibniz Institute for Baltic Sea Research, Warnemünde, Seestrasse 15, D-18119 Rostock, Germany.

The study of the dynamic interaction between pteropods and planktonic foraminifera and the abiotic and biotic components of the marine environment is of extreme importance in understanding their ecology and consequently the ecosystems where they live(d). Plankton tows were collected from the upper 2000 m along two transects (22°W; 20°W) across the Azores Front between 38°N and 31°N in different seasons (April 2007; December 2008; April/May 2009). The abundance of pteropods and planktonic foraminifera was determined, as well as, percentages of planktonic foraminifera species. Furthermore, stable isotope measurements were done in several foraminifera species.

In April 2007, the differences in pteropod and planktonic foraminifera abundances and in the prevailing foraminifera species north and south of the Azores Front, seem to be related to the spring bloom. Although the hydrographic conditions were similar in both transects, the abundances were higher in the 22°W transect. Comparing the data from April 2007 and December 2008, seasonal differences are evident with pteropods and planktonic foraminifera being more abundant and diverse in spring. Data from April/May 2009 are still being analyzed and will be compared with the previous data.

Stable ¹⁸O and ¹³C isotope values of living specimens of planktonic foraminifera generally reflect the environmental parameters of the waters in which the carbonate shell was calcified. Surface to thermocline dwelling species like *G. ruber*, *G. siphonifera* and *O. universa* seem to reflect conditions of the upper ocean. Deep-dwelling species *G. truncatulinoides*, *G. scitula* and *G. hirsuta* seem to be good indicators for the water masses, especially the Azores Front.

Palavras chave: foraminíferos planctónicos, pterópodes, Frente dos Açores, isótopos estáveis, foraminíferos vivos.

Keywords: planktonic foraminifera, pteropods, Azores Front, stable isotopes, living foraminifera.

Stable isotope values of North Atlantic water masses

Isótopos estáveis em águas do Atlântico Norte

A. H. L. Voelker (1)

- (1) IPMA, Division for Climate and Climate Change, 1749-077 Lisbon, Portugal. antje.voelker@lneg.pt

A comprehensive study of seawater stable isotope properties in the mid-latitude North Atlantic is still missing, especially for the intermediate and deep-water masses. To fill this gap seawater samples were collected since 2006 along various transects in the Northeast Atlantic. During the Atlantic Meridional Transect (AMT) 18 expedition the upper 300 m were sampled between 46.6 and 24.7°N. RV Poseidon cruises P334, P349, P377, and P383 to the Azores Front region (38.3–30°N; 22–20°W) generally yielded samples down to 2000 m. High-resolution sampling over the whole water column was performed during the OVIDE 2010 (Portugal to Reykjanes ridge) and KNI99-4 cruises. Cruise KNI99-4 implemented the section from Lisbon to the Cape Verde Islands of the US GEOTRACES North Atlantic transect. The isotope results clearly indicate the different water masses and hydrographic fronts, although variability in some regions is higher than expected, potentially an affect of the different years and seasons sampled and/ or meandering of the Azores Current. Higher isotope values are observed in the surface waters of the central subtropical gyre and on the southern side of the Azores Front, i.e. within the Azores Current. Lower isotope values are observed in the North Atlantic Deep Water and the Antarctic Intermediate Water upwelled off NW Africa. Mediterranean Outflow Water is best depicted in the Deuterium values because the salinity signal is less rapidly diluted than temperature. Combining the isotope with the respective station's CTD data will allow establishing regional relationships between isotope and temperature/ salinity.

Keywords: seawater, stable isotopes, Mediterranean Outflow Water, Azores Front, GEOTRACES.