



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

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The wide occurrence of pteropods and planktonic foraminifera in the marine environment of the modern ocean and ultimately their contribution to the marine sediments, make them especially important for the study of past and present marine ecosystems and their reaction to climatic changes.

In the present study, pteropods and planktonic foraminifera were collected from the upper 2000 m of the water column along two transects at 20 and 22°W between 38°N and 31°N in April 2007 and December 2008, respectively. Both transects cross the Azores Frontal System that forms the northern boundary of the North Atlantic's subtropical gyre. The abundance of both organisms and of specific planktonic foraminifera species were quantified in each tow sample. Additionally, stable oxygen and carbon isotope measurements were done in the following planktonic foraminifera species: *Globorotalia scitula*, *Globigerinoides ruber*, *Globorotalia hirsuta*, *Globigerinella siphonifera*, *Globorotalia inflata*, *Hastigerina pelagica*, *Globorotalia truncatulinoides*, and *Orbulina universa*.

In April 2007, the distribution of pteropods and planktonic foraminifera abundances and planktonic foraminifera species on both sides of the Azores Front seems to be related to the spring bloom. Comparing the two transects in abundance and fauna composition, there are higher abundance and diversity at the 22°W transect than at 20°W indicating high variability in the plankton although the hydrographic conditions were not much different. In the water column, pteropods are present mostly in the upper 100 m, while foraminifera become dominant below this depth. Seasonally, the abundance and diversity of pteropods and planktonic foraminifera is often higher in April 2007 than in December 2008. Being surface dwellers, *G. ruber*, *O. universa* and *G. siphonifera* were present in the upper 200 m. *H. pelagica*, *G. inflata* and *G. truncatulinoides* (dextral) were found in the upper 400 m. The deep dwelling species like *G. truncatulinoides* (sinistral), *G. scitula* and *G. hirsuta* occurred in deeper waters, between surface and 1200 m. Both north and south of the Azores Front, the species occurring with highest abundances were *G. scitula* and *G. hirsuta*. North of the Front, abundance of *G. scitula* varied from 55 to 77% and of *G. hirsuta* from 9 to 18%. South of the Front, *G. scitula* occurred between 18 and 77% and *G. hirsuta* range was 16 to 35%.

Stable isotopes values of living specimens of planktonic foraminifera generally reflect the environmental parameters of the waters in which the carbonate shell was calcified. Deep-dwelling species, like *G. scitula*, *G. hirsuta* and *G. truncatulinoides* seem to be good indicators for the water masses of Azores Front and therefore for the reconstruction of past conditions.