WATER-COLUMN PALEO-TEMPERATURES DURING THE HOLOCENE IN CAMPOS BASIN, BRAZIL

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ABSTRACT

This paper presents a initial phase of a project for determination of superface and bottom-water temperature on the continental slope of Campos Basin at Cabo Frio region for the last 10,000 years. The O\textsuperscript{18}/O\textsuperscript{16} isotopic ratios of 24 samples of benthic foraminifera based on *Uvigerina peregrina* species and 24 samples of planktonic foraminifera based on *Globigerinoides ruber* from a 48 cm core is being analyzed. The isotopic ratios will be inserted in a mathematical equation (Shackleton, 1974) for temperature determination.

INTRODUCTION

Bottom and surface water temperature variations during the Holocene (10,000 yr. B.P.) supplies keys informations in order to understanding marine events, such as sea-level variation and circulation patterns.

Besides this, it is also possible to correlate paleo-salinity with the paleo-temperatures, as well as to observe the interdependence between foraminiferal assemblages with the available nutrients brought by the local upwelling

Paleo-temperatures will be determined by the isotopic ratio presented in the calcium carbonate tests of foraminifera. The Accelerator Mass Spectrometry (AMS) technique will be used to date the samples.

The isotopic ratio associated with radiometric dating will help on environmental interpretations, and also to establish sedimentation rate of the upper continental slope.

Samples for this research are from the station 6764 (23.16° S and 40.94° W) (fig. 1) collected at upper slope (440m) during “Living Resources of Economic Exclusive Zone Project” (REVIZEE) on March/98. Viana (1998a) considered this region as an area of expansion of the Brazil Current (BC) where sedimentation rate is 4cm/1,000 years during the Holocene and represents an important site for the deposition of shelf-overspilled sands, being influenced by the South Atlantic Central Water (SACW) which is carried northward by the Brazil Intermediate Counter-Current (BICC) (Viana, 1998b).

Samples were collected from a box-corer filled with 48 cm of sediment. Samples was standardized into 10 cm\textsuperscript{3} and separated as 24 samples of biogenic material according to Boltovskoy and Wright (1976).

After this, 30 individuals of *Globigerinoides ruber* and 80 of *Uvigerina peregrina*, both of the fraction >62 micrometers, were picked under a stereomicroscope.

The O\textsuperscript{18}/O\textsuperscript{16} isotopic ratio is being obtained as courtesy in the Geoscience Institute of University of Bremen in a mass spectrometer FINNIGAN MAT 252 that just needs 5 - 10 individuals of 125 - 250 micrometers. For age dating it was chosen 5 samples: 0-2 cm, 10-12 cm, 20-24 cm, 34-36 cm and 46-48 cm. The technique will be AMS.

Epstein et al. (1953) determined the relation between δ\textsuperscript{18}O calcite temperature and water. The expression of this relation was changed by Craig (1965) and later by Shackleton (1974).

\[ T (^\circ C) = 16.9 - 4.38 (\delta_C - \delta_w) + 0.10 (\delta_C - \delta_w)^2 \]

EXPECTED RESULTS

1. Kahn et al. (1981) estimated that in Tanner Basin an increase in the mean surface-water temperature of 5 ± 0.8°C occurred from near the end of Wisconsin glaciation to the Holocene thermal maximum at about 7,500 yr. B.P. Depending on the geochronological extend of the results, we hope to evaluate this information and also collaborate for better knowledge on paleo-temperatures in the Brazilian oceanic basins.
2. Intend to correlate with sea-level fluctuations and the main episodes of submergence and emergence.

3. To evaluate the sedimentation rate found by Viana (1998a) and verify the Holocene/Pleistocene limit. Vicalvi (1995, in Viana, 1998b) found this limit at 12.5 cm in middle Slope (761m), south of São Tomé Canyon.

REFERENCES


Fig.1: Location of core 6764 at 440 m in Campos Basin.