



FORAMS 2006

Foraminifera on coral reefs of Brazil: The FOCO project

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Coral reefs have been considered worldwide as good climatic bioindicators because they bear markings in their skeletons of interannual, decadal and higher time scales. These growth bands provide a continuous stratigraphic register of Quaternary climatic oscillations, but sampling procedures to obtain such a record involve some damage to living coral organisms. In this aspect the foraminifera are considered useful alternative bioindicators as they have the same metabolic requirements as corals, but sampling procedures produce no negative environmental impact. Foraminifera also present a more rapidly growing standing crop and also register shorter term changes on these environments. The Ministry of Environment of Brazil in 2004 began a program to identify possible bioindicators of climatic changes along the Brazilian coast line, and to promote their subsequent use as powerful tools for monitoring programs and coastal management. The sponsoring of the FOCO Project, which consisted of undertaking samples from reefs of Brazil since 2000, now allows for improved sampling of other areas. The objective of the FOCO Project is to carry out a survey of the quantitative and qualitative distribution of benthic foraminifera in reef sediment and test the applicability of this climatic observation in Brazilian coral reef areas. This supplements their use for base mapping environmental impact fronts using GIS in a 1:25.000 scale for coral reefs along the Brazilian margin through the observation of bleaching and/or deformation of tests, mainly in the genus *Amphistegina* spp. In this paper we present these results for the four different Brazilian coral reef systems analyzed, which

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encompass APA Costa dos Corais (PE) and Porto Seguro (BA) as well as Fernando de Noronha (PE) and Abrolhos Bank (BA), in order to verify if *Amphistegina* spp. can be used for this diagnosis in South Atlantic waters. A total of 72 reef sediment and 18 geochemical samples per area were collected in January 2005 and in July 2005. Samples were collected using scuba equipment, and parameters measured on site include visibility, water temperature, salinity and dissolved oxygen, both at the surface and at depth, while sampled sediments are analyzed for carbonate, phosphorus, and organic matter, as well as mineralogy and grain size. At the laboratory, foraminifera were identified under a stereomicroscope to the species level. The results suggest that *Amphistegina* spp. can be used as a low cost bioindicator to evaluate the health of Brazilian reefs, and also that photic stress can be the cause of the high number of bleached, small size and broken tests in *Amphistegina* spp. specimens.