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1 Structure and composition of rhodoliths from the Amazon River mouth, Brazil

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15 ABSTRACT

16 Rhodolith beds are one of the main habitats of the Brazilian Equatorial Margin
17 continental shelf due to their wide extent and provision of ecosystem services. Northern,
18 Central and Southern zones of the Amazon River mouth were sampled between water-
19 depths of 23 and 120 m, covering a continental shelf area of 9,500 km², to characterize
20 the structure and composition of rhodoliths along depth gradients and related river
21 plume influence. The deepest rhodoliths consist of a thin algal/bryozoan/encrusting
22 foraminifer cover around relatively large nuclei that determine the nodule size and
23 shape. At 120-m depth in the Northern zone the nuclei are made of fragments of
24 invertebrate boundstone or oolite rudstone, whereas at 100-m depth in the Central zone
25 the nuclei consist of sandstone clasts. In both cases, the nuclei are fragments of
26 sedimentary rocks that accumulated on the outer shelf during significantly lower sea
27 level. Low-light levels prevent substantial growth of the algal cover around the nuclei.
28 Reduced illumination and high nutrient levels led to the composition of rhodoliths at
29 95-m depth in the Northern zone, predominantly built by bryozoans with subordinate
30 coralline algae around small bioclastic nuclei. In the Central zone at 50-55 m depths,
31 coralline algae are the main components of mostly sub-spheroidal rhodoliths. They have
32 relatively recent ages of hundreds of years or show two phases of growth with the older
33 phase beginning 1,300 years ago and then being interrupted from about 1,000 years BP
34 to 600 years BP. All this suggests relatively high burial rates due to sediment flux,
35 changing in time to favor exhumation after burial in some instances. The rhodoliths
36 from 23 m in the Southern zone are growing under a low influence of the river plume

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