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$^{87}Sr/^{86}Sr$ dating and preliminary interpretation of magnetic susceptibility logs of giant piston cores from the Rio Grande Rise in the South Atlantic

Authors: Christian Michel Lacasse [a,*], Roberto Ventura Santos [b], Elton Luiz Dantas [b], Quentin Vigneron [c], Isabela Moreno Cordeiro de Sousa [b], Vadim Harlamov [d], Maria Aline Lisniowski [d], Ivo Bruno Machado Pessanha [d], Eugênio Pires Frazão [e], José Adilson Dias Cavalcanti [f]

[a] *Geological Survey of Brazil (CPRM), Quadra 02, Bloco H, Edifício Central Brasília, Setor Bancário Norte, Asa Norte, CEP: 70040-904, Brasília, DF, Brazil*

* Corresponding author: Fax: +55-6121088452 - Email: christian.lacasse@cprm.gov.br

[b] *University of Brasília, Institute of Geosciences, CEP: 70910-900, Brasília, DF, Brazil*

[c] *Ecole Normale Supérieure de Lyon, 46 Allée d´Italie, 69007 Lyon, France*

[d] *Geological Survey of Brazil (CPRM), Avenida Pasteur 404, Urca, CEP: 22290-255, Rio de Janeiro, RJ, Brazil*

[e] *Geological Survey of Brazil (CPRM), Rua Antônio Henrique de Melo 2010, Capim Macio, CEP: 59078-580, Natal, RN, Brazil*

[f] *Geological Survey of Brazil (CPRM), Avenida Brasil 1731, Bairro Funcionários, CEP: 30140-002, Belo Horizonte, MG, Brazil*

Abstract

Giant piston cores recovered from shallow depths (<1200 mbsl) on the northern flank of the Rio Grande Rise, bathed today in intermediate waters (AAIW, UCDW), have uncovered new stratigraphic and paleoceanographic aspects of the Plio-Pleistocene in the South Atlantic. Based on strontium isotope analysis of well-preserved foraminifera-rich sediment a stratigraphy was developed from lowess curve fitting of the data and an optimized matching with an internationally recognized timescale of $^{87}Sr/^{86}Sr$ seawater variation through geological times. Depth-to-age conversion of the magnetic susceptibility logs was implemented based on the identification of correlative peaks between cores and the developed $^{87}Sr/^{86}Sr$ age model. The influence of Northern Hemisphere glaciation is reflected in these new stratigraphic logs by a gradual increase from ~2.7 Ma in the lower signal of magnetic susceptibility (below background level), to values approaching the arithmetic means, likely reflecting an overall increase in terrigenous input. The Rio Grande Rise cores have very low Plio-Pleistocene sedimentation rates (~0.4-0.8 cm/ka), similar to gravity cores from the oligotrophic subtropical South Atlantic (below ~2000 mbsl), and for which an inverse correlation between carbonate content and magnetic susceptibility was established. The coring depths on the Rio Grande Rise encompass strong gradients in oxygen concentration and other seawater parameters that define today´s AAIW/UCDW transition. Depth-dependent variation in sedimentation rates since the onset of Northern Hemisphere glaciation coincides with the