PALEOPRODUCTIVITY CHANGES IN THE UPWELLING SYSTEM OF CABO FRIO (RIO DE JANEIRO STATE, SE – BRAZIL) DURING THE LAST 4,000 YEARS: EVIDENCE FROM GEOCHEMICAL SIGNATURES

SILVA FILHO, E.V. [1]*, ALBUQUERQUE, A.L.S. [1], FIGUEIREDO, A.M.G. [2], ANDRADE, M.M. [1], DOS SANTOS, I.R.[1], DA SILVA, A.C.C. [1], TURCQ, B.[1,3] & SIFEDDINE, A.[3]

[1]Departamento de Geoquímica, Universidade Federal Fluminense, 24020-007, Niterói-RJ, Brazil
[2]PEN-CNEN/SP, Supervisão de Radioquíimica, Caixa Postal 11049, Pinheiros 05422-970, São Paulo, SP, Brazil
[3]Institute de Recherche pour le Développment, Bondy, France.
*geoemma@vm.uff.br

Barium was first proposed as a proxy for paleoproductivity in sediments of the equatorial Pacific, where high Ba concentrations were correlated with organic carbon flux. Upwelling systems are characterized by high pelagic productivity which may be observed in bottom sediments. The coastal region of Cabo Frio in the Rio de Janeiro State (~22°S) is a prominent site of seasonal upwelling. Prevailing NE winds associated with bottom topography enhance upwelling of the colder and nutrient-rich South Atlantic Central Water (SACW). A sediment core was collected in a mud bank in the area

affected by the upwelling (water depth 115 m) and analyzed for U, Ba, Sc through Neutron Activation analysis, S by an automatic CHNS analyzer and the radiocarbon cronology was obtained by AMS. The consistent pattern of $Ba_{biogenic}$ records in Figure 1 suggest increase of the Cabo Frio productivity during 2000 fi 3450 yr cal. BP. The absence of sulphur enrichments and the decrease of uranium values supports that sedimentation occurred under oxygenated bottom water conditions. We infer that bottom water oxygen concentrations in the upwelling Cabo Frio region were high enough to prevent extensive sulfate reduction and the Ba remobilization. Consequentely our $Ba_{biogenic}$ can be used as a reliable paleoproductivity proxy.

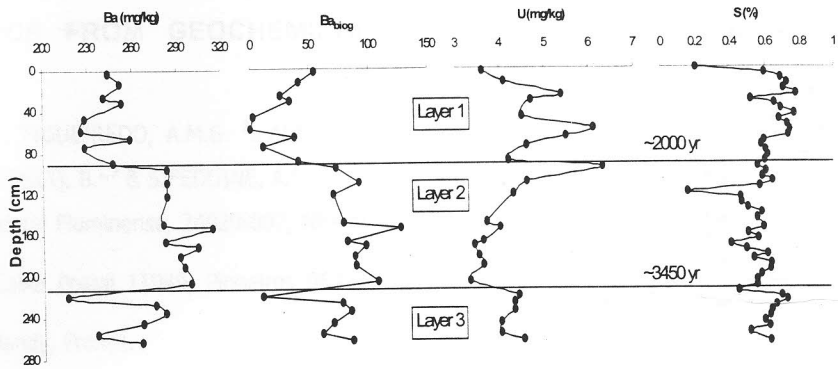

Figure 1: Barium, biogenic barium, Uranium and sulphur profiles in studied core.

Acknowledgement

We thank the CENPES/PETROBRAS and crew of Astro Garopa for the help and assistance during the sampling.