

Presented by ANTONIO C. ROCHA-CAMPOS

Heavy metals distribution in the aquatic ecosystems endowed with human activities is nowadays a serious environmental problem. The number of studies related to heavy metals and bottom sediments have been growing lately, because the bottom sediment is the main reservoir for heavy metals contents.

Ten samples from the Embu-Mirim river were collected and studied in this basin to measure downstream towards the Guarapiranga Reservoir. The purpose is to study the Cr, Cu, Ni and Zn contents in the bottom sediments sampled by means of two subsamples, one at the top and the other in the base of the core sediments. The influence of the physicochemical properties (pH and Eh), the organic matter data and granulometric data were correlated to the heavy metals found in this environment. The research shows the probable contamination by those metals in the sediment of the Guarapiranga Reservoir.

The results obtained so far suggest a possible tendency of the values of Cr, Ni and Zn to depend on the properties of the organic matter, and that the Cu amounts are being governed by the pH values, as a function of the sources emission of those metals. The granularity is directly related to the concentration of the metals, because the sampling stations with larger amounts of metals are clayey, while the smallest amounts were found in the stations of sandy size.

With the collected data, an environmental approach becomes relevant in the area, seeking to improve the quality of the bottom sediment, mainly for Cr and Ni that present considerable decline in the quality of the water of the Guarapiranga Reservoir. — ( *December 14, 2001* ) .

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#### **FACIES, 3<sup>rd</sup> ORDER SEQUENCE STRATIGRAPHY AND HYDROLOGIC POTENTIAL OF SANDSTONES, MAFRA FORMATION (LATE PALEOZOIC), PARANÁ BASIN, BRAZIL\***

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The middle part of the Mafra Formation shows, in Mafra and Rio Negro, a great thickness of diamictites, sandstones, shales, siltites and varvites.

According to Canuto's (1999) nomenclature, the following facies were recognized, in a general way: com-

pacted massive diamictite, lenticular diamictite, cross-bedded and showing fining-upward sandstone, lenticular sandstone, massive siltite, massive siltite with dispersed clasts, laminated or massive shale with dispersed clasts, interlaminated (very fine sandstone intercalated with silty shale), and regular rhythmite, some of them corresponding to diagnostic (#) facies of facies associations.

Four facies associations were also recognized: A<sub>1</sub>, compacted massive diamictite#; A<sub>2</sub>, laminated or massive shale with dispersed clasts#; lenticular diamictite; cross-bedded and showing fining-upward sandstone, lenticular sandstone, massive siltite with dispersed clasts# and regular rhythmite#; A<sub>3</sub>, massive siltite, lenticular diamictite and cross-bedded and showing fining-upward sandstone; and A<sub>4</sub>, interlaminated#, lenticular sandstone and cross-bedded and showing fining-upward sandstone; they represent, respectively, lowstand, transgressive, highstand and regressive glacio-isostatic system tracts, forming a complete 3<sup>rd</sup> order sequence.

The alternation of psammitic and pelitic sediments identified sandstone porosities between 20 to 25% and the observed permeability of 10<sup>-3</sup> cm/s indicate a good potential as aquifers.

According to their great lateral extension, it can be expected that they can supply the local community even without a systematic exploration. Besides existing wells in the vicinity, water seeps in outcrops, directly used by the population have also been verified. — ( *December 14, 2001* ) .

\* Supported by FAPESP 97/13973-2.

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#### **PROBABLE FIRST OCCURRENCE OF LYCOPODIALES IN THE GONDWANA NEOPALEOZOIC\***

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The Transitional “A-B” Taphoflora is a Lower Permian plant megafossil association of the Paraná Basin (Southern Brazil), whose type locality is located on the Sítio Itapema Cerquilho (SP). In this taphoflora there

is a representative of the Lycopodiales associated with a diversified taphoflora composed of sphenophytes (e.g. *Stephanophyllites*, *Phyllothea* and *Paracalamites*); protoglossopterids (e.g. *Rubidgea* and *Palaeovittaria*); glossopterids (e.g. *Gangamopteris*); seeds (e.g. *Samaropsis* and *Cornucarpus*); proto- and glossopterid fructifications (*Arberia*, *Arberiopsis*, *Itapemia* and *Hirsutum*-like fructifications). The entire phytofossiliferous assemblage is representative of the earliest development stage of the Glossopteris Paleoflora in the Paraná Basin (Asselian-Sakmarian).

The Transitional Taphoflora “A-B” of the Paraná Basin or association *Rubidgea-Gangamopteris-Arberia* of S. Paulo State may correspond to an interglacial or post-glacial stage of warmer climate during which coal seams were formed. This taphoflora is included in a siltstone bed of Tubarão Group, probably at the top of the Itararé Subgroup.

The studied specimen, *Lycopodites* sp., is a fertile form with sporangia arranged in axils of microphylls spread over through the vegetative body. Despite of not being possible to confirm homospority, due to the preservation state of the specimen, the apparent absence of ligule, the presence of uninervate microphylls and mainly the presence of sporophylls with axillary sporangia similar to vegetative microphylls dispersed among them support its assignment to *Lycopodites* Lindley et Hutton 1833.

To the present knowledge, this is one of the first occurrences of the Order Lycopodiales, not only in the South American continent, but also in the whole Gondwana. — ( December 14, 2001 ) .

\* Supported by FAPESP 97/03639-8.

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#### CONTAMINATION POTENTIAL OF THE ILHABELA (SP) LANDFILL

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Ilhabela is a city in the São Paulo northern seashore located about 220 km from the capital of the state. Its geographical position is determined by the parallels 23°42' and 23°56'S and the meridians 45°41' and 45°28'W and altitude varying from the sea level up to 1300m. The economic basis of the city are the tourism and fishing and it is known as “Sailing Capital” (Capital da Vela) due to

the optimum conditions to practice of that nautical sport. About 83% of Ilhabela's area are in the State Park (preservation area created on January 20, 1977 by Decree 9414). Its population is about 13,500 inhabitants, raising up to 150,000 during the summer season. The research area is located about 5 km from downtown Ilhabela and can be reached by the road SP 131. Previous studies pointed out that due to local land use restrictions there is no other appropriate site for the sanitary landfill. The landfill is in operation since 1987 and receives the domestic and construction solid wastes and tree trimmings generated in the county. The material is disposed on the soil and mixed with soil of the same region taken from a neighbor area. It is located in a neighborhood close to a fundamental school and several houses, and with no foundation treatment and no control of the leachate destination. Due to the high contamination potential of the leachate generated in such type of waste disposition, it may contaminate the soil, changing its physical, chemical and biological characteristics and compromising the water of rivers and groundwater by modification of its natural characteristics. This paper intends to investigate the potential of contamination of the landfill. Soil, groundwater and surface water samples were taken and chemical and physicochemical analyses were carried out. The results suggest that the heavy metals that are carried by the leachate remain mainly associated to the soil, but may be diluted and reach the groundwater under special conditions, e.g. acid rain. In addition, the leachate is compromising the groundwater quality since chemical analyses show that other ions have already reached it. — ( December 14, 2001 ) .

#### SUBDUCTED CONTINENTAL CRUST: METAMORPHIC CONTROL OF DECOMPRESSION IN THE HIND PORTION OF THE AIURUOCA-ANDRELÂNDIA NAPPE, SOUTH-SOUTHWEST BORDER OF SÃO FRANCISCO CRATON, MINAS GERAIS\*

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The *Nappe* system in south-southwest São Francisco Craton represents the southern extension of the Brazilian belt and describes an inverted metamorphic pile (stack) of green schist facies (bottom) toward amphibolite facies (Carmo da Cachoeira e Aiuruoca-Andrelândia nappes) and high pressure granulites in the top, under a high tem-