TOTAL CONCENTRATION OF HEAVY METALS IN SEDIMENT CORES OF A RIVERINE FLOODPLAIN LAKE

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Lakes are ecossistems where there is a great potencial of metal accumulation in sediments due to their depositional characteristics. It is also well documented that the lacustrine suspended particulate is responsible for the deployement of metal ions from the water. The ultimate fate of these particules is the lake bottom. These mechanisms are specialy important in floodplain lake where metal distribution is strongly influenced by large loads of particulates from yearly inundation waters. Total concentration of heavy metals determined on sediment core from an oxbow lake at the Jataí Ecological Station, Moji-Guaçu river basin (São Paulo, Brazil).

Three sediment cores of about 50 cm long were collected at deepest part of the Infernão lake, sliced into sub-samples of 1 cm and the three sub-sample of each depth were mixed together to compose a sample. Samples were wet sieved using a 63 μm nylon sieve, dried in an oven at 60°C, ground and re-sieved, and finally ressuspended in a closed chamber and deposited on nucleopore membranes. Total metal concentrations were determined through the technique of particle induced X-ray emission (PIXE) for the following elements: Al, Si, Fe, Ti, K, Mn, Cu, Zn, Pb, V, Cr, Ca, Ni, S, P, Rb, Sr, Zr, and Ba.

The obtained concentration profiles were statistically treated using the software SPSS (statistical package social science). The treatment showed the existence of five principal components which explained 96% of profile concentrations.

The elements Fe, Co, Al, V, Ti, Mn, Ni, K, Zr, Sr, Cu and Zn are strongly associated to the first factor which is represented by the mineralogy of the geological matrix in function of the elements which present the largest covariance coefficient values and because their values are close in the covariance matrix. The statistical treatment show a dominance of Al (44 %), Fe (26 %), Si (24 %), Ti (3 %), K (2 %), being the others below 1 %. However this is not the only factor associated to the mineralogical matrix. A 3rd. factor is mainly associated to Si and, not so strongly association, to the other elements related to the 1st. factor. In the quantitative treatment the dominance is of Si (44 %) followed by total organic carbon (TOC) (24 %), Al (21 %), Fe (8 %), Ti (1 %) and K (1 %), being the others below 1 %. An X-Ray diffraction study of these sediments has shown the minerals kaolinite and quartz as the dominant forms.

The 2nd. factor is strongly associated to the organic matter as it mainly relates to the TOC depth profile of TOC and of Ca, and less strongly to S, Zn, Cu and P. In the quantitative treatment TOC represents 52 %, Si 21 %, Al 17 %, Fe 8 %, Ti 1% and S 1 % (other elements are below 1 %).

A 4th. factor is mainly related to the profile observed for Pb with little contribution of Sr and Zr while the 5th. factor is principally related to Cr and less pronounced to Ni and Mn. Pb and Cr concentration are higher at recently deposited layers compared to therest of the depth profile.

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