

CHEMICAL CHARACTERIZATION OF BOTTOM SEDIMENT SAMPLES FROM ADMIRALTY BAY, KING GEORGE ISLAND, ANTARCTIC

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Since 1982, several Brazilian scientific projects have been developed in the Antarctic region. The Hydro Geochemistry of Admiralty Bay project started in 2000 being coordinated and developed by researchers from IO/USP. One of the purposes of this scientific project is to assess the content of heavy metals and other elements of interest in bottom sediments; providing information about the natural levels of the region and about possible anthropogenic influences, especially in bays with restricted circulation processes and scarce human occupation like Admiralty Bay. Sediments provide a temporary integrated indication of the aquatic environment condition and act as a major reservoir for metals, though some sediments can also act as a source of contaminants. In the context of the Brazilian Antarctic Program (PROANTAR) two sampling trips were undertaken in two Antarctic summer periods (2003/2004 and 2004/2005). In this paper the results obtained in these campaigns for the elemental characterization of the upper bottom sediments are presented. About 20 samples were collected in Admiralty Bay, on Bransfield strait, King George V (62°05'S and 58°25'W) Island. After collecting the samples, they were frozen (-20°C) and kept in this condition. In the laboratory all samples were previously dried at 60°C in a ventilated oven, passed through a 0.063 mm sieve and homogenized before analysis. Trace elements (As, Ba, Br, Co, Cr, Cs, Hf, Rb, Sb, Sc, Ta, Tb, Th, U and Zn), rare earth elements (Ce, Eu, La, Lu, Nd, Sm, Tb and Yb) and major elements (Fe, K and Na) were determined by using instrumental neutron activation analysis (INAA). Methodology validation was performed by analysis of Buffalo River Sediment (NIST SRM 2704), Soil 7 (IAEA) and BEN (Basalt -IWG-GIT) certified reference materials. Organic carbon, nitrogen, sulphur and phosphorous (organic and total) were determined in the sediment samples as well. For total mercury determination FIA-CV-AAS technique was employed. Methodology validation was performed by analysis of the Marine Sediment (IAEA 433) and Estuarine Sediment (NIST SRM 1646^a) reference materials. The mean concentration of total mercury in the sediment samples was: 32 ± 12 (16 to 66) $\mu\text{g kg}^{-1}$ (1st campaign) and 22 ± 9 (10 - 46) $\mu\text{g kg}^{-1}$ (2nd campaign), for all samples distributed along Admiralty Bay. The mean concentrations obtained for most of the elements analyzed by INAA, considering all sampling points in each campaign, are close to previous results (summer campaign 2002/2003) confirming that they represent the background of the region. In summer 2004-2005, the average values of organic carbon was 0.19% (<0.01 % to 0.41 %). In relation to the total nitrogen, all values were less than 0.17 %, while total sulphur in the sediments varied from 0.10 to 1.64 %. The average value for organic phosphorous was $3.69 \mu\text{mol.g}^{-1}$ (0.48 to $10.66 \mu\text{mol.g}^{-1}$), while the inorganic phosphorus presented values between 24.71 to $50.18 \mu\text{mol.g}^{-1}$, corresponding to a range from 73 to 99 % of total phosphorus. ANOVA will be applied to the elemental concentrations obtained in both campaigns for the sediment samples in order to verify if there is significative difference among these values. The results obtained for multielemental and Hg concentrations in the sediment samples will be compared with UCC values (Upper Continental Crust). Cluster analysis of the chemical data will be applied.

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