



EVALUATION OF THE ACTIVITY CONCENTRATIONS OF Ra-226, Ra-228 AND Pb-210 IN SEDIMENTS FROM ANTARCTICA, IN THE ADMIRALTY BAY REGION

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The natural radionuclides of U-238, U-235 and Th-232 series have been used as tracers in research of oceanic processes and management of the coastal region. Some of the natural radionuclides are especially used as tracers of the flux of particulated material into the ocean, which occur both in the water column and/or in the sediment. The Ra-226, Ra-228 and Pb-210 have helped scientists understand some environmental phenomena occurring on the planet. In this study we performed a radiochemical characterization of a sedimentary column called (1B) of 248 cm collected in the Admiralty Bay, South Shetland archipelago – Antarctica region to determine the activity concentrations (mBq g^{-1}) of Ra-226, Ra-228 and Pb-210 and the its application in a geochronological model to calculate the sedimentation rate. The sediment samples were submitted an acid leaching and then the radiochemical separation of Ra-226, Ra-228 was performed by co-precipitation of the Ba(Ra)SO_4 and sequential separation of the Pb-210 by co-precipitation of PbCrO_4 . These precipitates were measured in gas-flow low background proportional detector. The Ba(Ra)SO_4 was measured after 21 days of the precipitation and the PbCrO_4 precipitate were measured after 10 days from the final date precipitation. The Pb-210 was detected via gross beta counting of its Bi-210 decay products. The time interval of 21 days for Ra-226 measurement was required for its achieve secular equilibrium with their daughters and the contribution of alpha emitting radioisotopes Ra-223 an Ra-224 were nil. This time interval was also enough to allow the equilibrium Ra-228/Ac-228. The activity concentration of Ra-226 ranged from 11 ± 1 (mBq g^{-1}) to 54 ± 5 (mBq g^{-1}), and the Ra-228 ranged from 48 ± 5 (mBq g^{-1}) to 155 ± 13 (mBq g^{-1}). With the values obtained from activity concentrations of Ra-226 and Pb-210, it was determined the activity concentration of unsupported Pb-210, which is Pb that comes from the atmosphere. The activity concentration of Pb-210 ranged from 7 ± 1 (mBq g^{-1}) to 458 ± 23 (mBq g^{-1}), while unsupported Pb-210 ranged from 7 ± 3 (mBq g^{-1}) to 434 ± 25 (mBq g^{-1}). Based on CIC (Constant Initial Concentration) geochronological model, the sedimentation rate of 0.59 ± 0.05 cm year^{-1} was estimated in the sedimentary column (1B) coming from the Admiralty Bay region.

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