^{210}Pb, ^{226}Ra and ^{137}Cs LEVELS AND SEDIMENTATION RATE IN ADMIRALTY BAY, ANTARCTIC PENINSULA

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For many years Antartic was considered to be unpolluted but recently this region has beeen widely contamined by anthropic activities [1]. Radioactive pollution is of major concern due to its relation to the impact of radionuclides on the environment.

The main reason for studying these artificial radionuclides is to identify the distribution of these elements that have been spread through Antarctica by atmospheric fallout, from nuclear tests. Also, studying natural radionuclides (^{210}Pb and ^{226}Ra) contribute to obtain a historical on pollution from sedimentary columns, found on the ocean ground.

Thus, in this work are presented the levels of artificial (^{137}Cs) and natural (^{210}Pb and ^{226}Ra) radionuclides found in marine sediments from Admiralty Bay, located in the Antarctic Peninsula. The main goal of this research was to verify the presence of ^{137}Cs and to determine the sedimentation rate using ^{210}Pb unsupported. This rate can also be useful in future studies on the impact of both organic and inorganic pollutants, from the various activities in Admiralty Bay.

The studied area is in the south-western part of King George Island, in South Shetland Islands. There are three research stations in this bay: Comandante Ferraz (Brazil), Henryk Arctowski (Poland) and Macchu Pichu (Peru) (Fig. 1).

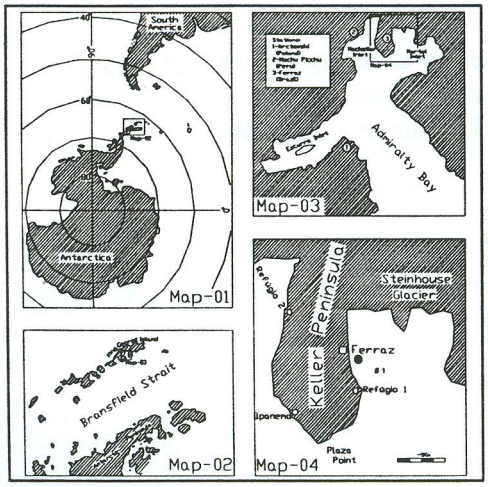

Figure 1. Studied area and sampling location.

The experiment went as follows; a sediment core was collected by scuba diver, in the austral summer of 2002, using PVC core. Subsequently, the core was sliced into 2 cm subsections for analysis. The samples were then wrapped in aluminum foil, even dried at 50°C for two days, homogenized using a mortar and pestle and finally stored in glass bottles.

Later the sediment samples (20 to 30 g) were transferred into appropriate plastic containers for gamma counting. The samples were counted in gamma-ray spectrometer of low background, HPGe detector GMX50P model, with a resolution of 1.9 keV for ^{60}Co 1332.40 keV photopeak. The radionuclides ^{210}Pb, ^{226}Ra and ^{137}Cs were assayed by their mean photopeaks: 47 keV, 609 keV (^{214}Bi) and 661 keV, respectively. The methods of analysis and data acquisition were described by Figueira *et al.* [2] and Saito *et al.* [3]. The levels of radionuclides in function of depth are presented in Figure 2.

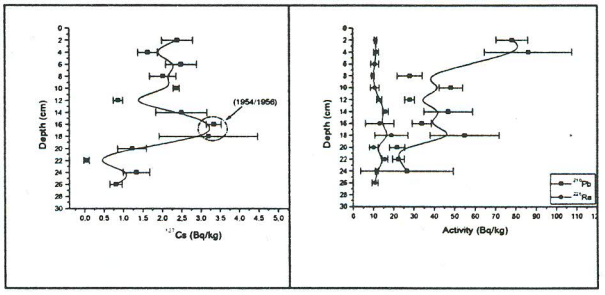

Figure 2. Levels of ^{137}Cs, ^{210}Pb and ^{226}Ra along the sedimentary column.

The maximum levels of radionuclides were 86.2 Bq.kg^{-1} (^{210}Pb), 15.8 Bq.kg^{-1} (^{226}Ra) and 3.34 Bq.kg^{-1} (^{137}Cs). Sedimentation rates were determined by ^{210}Pbunsupported and ^{137}Cs levels. The value of sedimentation rate by CIC model was (3.48 ± 0.72 mm.y^{-1}), which agreed with the ^{137}Cs method (3.48 ± 0.20 mm.y^{-1}). The highest value of ^{137}Cs in the sedimentary column can be related to the period of several atmospheric nuclear tests in the Southern Hemisphere and subsequent deposition by fallout. These tests were realized by United States in 1954 (Castle) and 1956 (Redwing).

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