

**Historic evolution of the human activities based on indicators of burning of fossil fuels in sediment of the Admiralty Bay, King George Island, Antarctic Peninsula.**

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The Antarctic environment has been considered as one of the pristine areas of the world, where the human influence is restricted to the scientific activities around the research stations and the tourism around this region. Therefore, the main sources of pollution in this region are the introduction of sewage and domestic effluents, and the burning of fossil fuels. The utilization of fossil fuels in the generation of energy for the human activities has contributed for long time to the introduction of a complex mixture of gases and of anthropogenic particulate containing polycyclic aromatic hydrocarbons, heavy metals and others pollutants.

The main aim of this project is to study the historic evolution of the human activities in the region of the Admiralty Bay using indicators of the burning of fossil fuel in sediments cores, dated from radiometrics measures such as the determination of the radionuclides  $^{137}\text{Cs}$  and  $^{210}\text{Pb}$ . Those indicators are named “fly-ash” particles and they are present in the particulate material and in the smog generated from the burning of fossil fuel. There are two kinds of “fly-ash” particles: spheroidal carbonaceous particle (SCPs) and the inorganic particulate (IASs) and they have been studied a lot in the North Hemisphere but never were analysed in the South Hemisphere.

The distribution of these particles in sediments cores and the spatial distribution in superficial sediments can reflect the extension and intensity of anthropogenic activities, mainly when there is the utilization of coal, fuel oils and burning of biomass. The methodology to process the samples will involve the counting of “fly-ash” particles by light microscopy, the analysis of organic biomarkers by gas chromatography (GC-MS) and the radiometric measures (gamma rays emission) for the radionuclides. The results of this proposal will allow a relatively quick evaluation of the emission of particulate material originating from the burning of fossil fuels. In addition, it will be possible to describe the historic evolution of the pollution in the region and to establish a baseline for those indicators in the sediment cores. The integration of radionuclides and “fly-ash” particles will permit the development of an approach and quickly method for the determination of the rate of sedimentation in the region of the Admiralty Bay.