

Radiation events of the past identified by ^{210}Pb in lakes bottom sediment layers

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Principles and survey procedure of the identification of radiation event of the past on the base of antedated layers of pond bottom sediment is described. Results of experimental investigation (2005-2006) of sediment samples taken in the Timiryazev Garden pond in Moscow and in the pond of a village Podkhozheye in Moscow district are presented. Dating of bottom layers have been carried out using ^{210}Pb . This radionuclide is used as a tracer to estimate the sedimentation rate in ponds (0,3-0,4 cm/y.). It is shown, that the content of ^{137}Cs , the main anthropogenic radionuclide in

all fallout of the second part of XX century, is relatively higher at the depth 7-8 cm under the bottom surface. It can be explain by the Chernobyl fallout. A second maximum of 11-13 and 17-22 cm (for each of ponds) can be explain by a global origin. The origin of both of these maxima is confirmed by radionuclide ratios, typical for global and Chernobyl depositions at the Moscow region. It is very important to choose a suitable site for this purpose. It is necessary to choose a lake with a negligible run-off from a catchment.

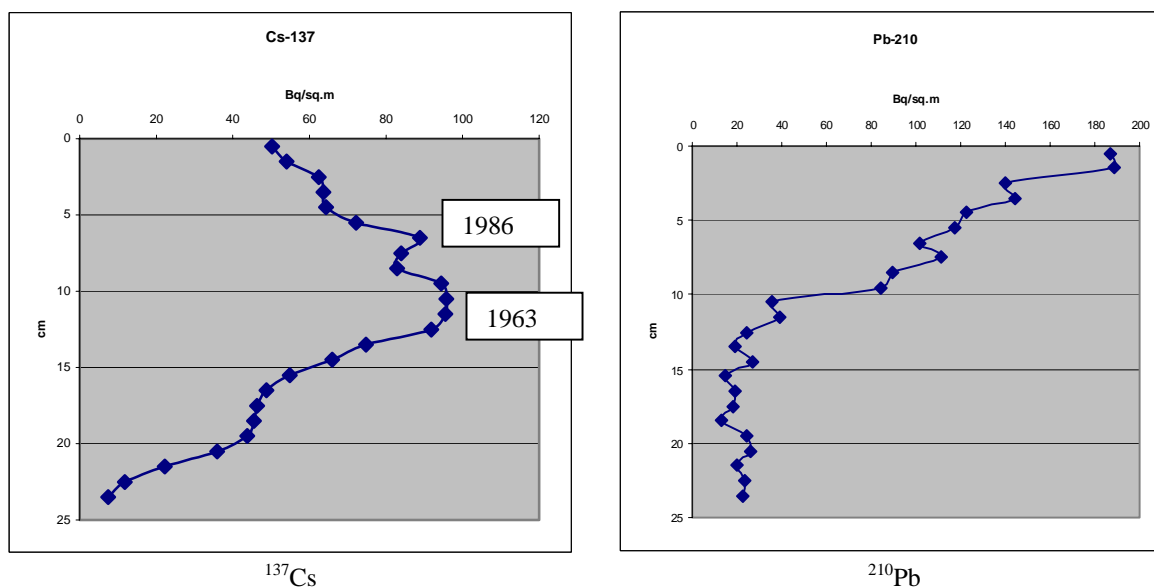


Fig1. Example of Timiryazev Garden pond in Moscow: vertical distribution of studied radionuclides in bottom sediments, 2005

Samples from layers antedated as Chernobyl and global depositions were analysed in radiochemistry laboratory on the content of ^{90}Sr and $^{239+240}\text{Pu}$. Radionuclide ratios in global deposition are: $^{90}\text{Sr}/^{137}\text{Cs}=0.63$; $^{239+240}\text{Pu}/^{137}\text{Cs} = 0.021$. The ratio: $^{90}\text{Sr}/^{137}\text{Cs}$ is stable in time due to similar $T_{1/2}$ for both of elements. In view of considerably different $T_{1/2}$ for $^{239+240}\text{Pu}$ and ^{137}Cs , their ratio can be estimated on 2006 as $^{239+240}\text{Pu}/^{137}\text{Cs} = 0.055$. Ratios received by us for samples at the depth 17-20 cm are: $^{90}\text{Sr}/^{137}\text{Cs}=0.27-0.31$, $^{239+240}\text{Pu}/^{137}\text{Cs} = 0.03$ can be considerate as similar for calculative values and confirming origin of depositions. Radionuclide ratios in Chernobyl deposition are: $^{90}\text{Sr}/^{137}\text{Cs}=0.01-0.02$, $^{239+240}\text{Pu}/^{137}\text{Cs} = 0.00025$ due to the fact that ^{90}Sr and $^{239+240}\text{Pu}$ released by Chernobyl accident was not

volatiles. Ratios received by us: $^{90}\text{Sr}/^{137}\text{Cs} = 0.0065$; $^{239+240}\text{Pu}/^{137}\text{Cs} = 0.00041$ - are also similar to anticipated values.