Radioactive Contamination of Surface Marine Waters Adjacent to the Zmiinyi Island (2005-2010)

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Intensive studies of the Black Sea radioactive pollution had been carried out since 1986 [1-3] and shown that the Black Sea was the most heavily polluted of all the European seas in the last decades, that is why control of artificial long-lived radionuclides content, like Cs-137 and Sr-90, is urgent and important.

The aim of this work is to generalize and analyse results of radionuclide Cs-137 content in the Black Sea surface waters, which were sampled regularly in 2005-2010 by the staff of the «Island Zmiinyi» Marine Research Station of Odessa National I.I. Mechnikov University and then analysed in the laboratory of the Centre of Ecological Safety of the Sea (Odessa).

The report describes in details the methods of sampling, sample preparation and gamma spectrometry used during the studies. Altogether 27 samples of sea water and suspended matters have been sampled in 2005-2010 and content of Cs-137 determined.

It is shown that during the period of studies Cs-137 concentrations in the surface marine waters adjacent to the Zmiinyi Island varied within 3.5 – 18.4 Bq/m^3. At that, reliable trend towards decrease has been observed in the temporal distribution of concentrations, in accordance with which the Cs-137 concentration in the surface waters near the Zmiinyi Island for the past 5 years decreased approximately 2 times, and if compared to 1986 and 1992 [1,2] then 10-12 and 3-3,5 times, respectively. Measured Cs-137 concentrations have been compared to those in other areas of the sea. The comparison showed that Cs-137 concentrations in the western Black Sea are practically the same as in the eastern. Reasons of this phenomenon are being discussed.

Analyses of Cs-137 concentrations' seasonal trend in the Zmiinyi Island area have shown that every year Cs-137 concentration decrease is observed in the spring-summer period and increase of the concentration - in winter period. Comparison of Cs-137 concentrations' dynamics, annual flow of the Danube, sea level and salinity in the Zmiinyi area has been done. Substantiated is the conclusion that decrease in Cs-137 concentration is connected with the fact that cleaner Danubian waters are influencing the studied area.

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