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U-238 in sediments of the Kastela Bay, Adriatic Sea (Croatia)

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Distribution of U-238 in sediments of the Kastela Bay near the city of Split (Croatia) to a depth of 50 cm was studied due to an assumed discharge of the TENORM (Technologically Enhanced Naturally Occurring Radioactive Material) in the Bay. Sediment cores, comprising 604 samples, were taken on 95 stations and sliced into eight segments. U-238 massic activities were measured by gamma-spectrometry method using the Th-234 63.3 and 92.6 keV lines. Massic activities range was 6.7 –603 Bq/kg, mean value 34 Bq/kg, median 28 Bq/kg and the standard deviation 46 Bq/kg in eight sediment layers of 0 –50 cm depth. The maximum activity was determined in a layer 5 (20 –25 cm depth) on the station next to a former chemical factory "Adriavinil". U-238 massic activities of the Kastela Bay sediments generally show values typical for marine sediments. However, some elevated U-238 activities were observed on five stations. Four stations are located around the Split peninsula and one next to the "Adriavinil" factory. Moderately elevated massic activities (62 –191 Bq/kg) were observed on stations around the Split peninsula and in the deepest layer (layer 7 at 30 –40 cm depth) on the station next to the "Adriavinil" factory. These activities were 3 –10 times elevated compared to the activity of a typical Adriatic coast sediment (18.2 Bq/kg) and 1.5 –5 times compared to the activity of an uncontaminated average Kastela Bay sediment (38.8 Bq/kg). Very elevated massic activities (392 –603 Bq/kg) were registered only on the station next to the "Adriavinil" factory in the layers 1 –6 (0 –30 cm depth). Compared to the activity of the typical Adriatic coast sediment, activities in six layers on this station are 22 –33 times elevated and 10 –16 times compared to the activity of the uncontaminated average Kastela Bay sediment.

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