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Assessing the contamination sources of actinides (236U, 237Np, 239Pu, 240Pu, 241Am, 243Am) in sedimentary reservoirs from the northwestern Black Sea

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Scarce data exist on the presence of anthropogenic radionuclides in the Black Sea. This region might have been affected by different regional contamination sources, such as the Chernobyl accident in 1986 (former Soviet Union, now Ukraine), the fallout due to the atmospheric tests carried out by former Soviet Union, or leakages from the different nuclear facilities on its borders. These sources coexist with the global fallout (GF) signal from the atmospheric testing of thermonuclear weapons mainly in the 1950s and the 1960s.

This work reports results on ¹³⁷Cs and anthropogenic actinides in three sediment cores from the northwestern Black Sea, with the aim of assessing the contamination sources to this understudied marine region. Those results are complemented by a ²¹⁰Pb dating. The samples were provided by the Horia Hulubei National Institute of Physics and Nuclear Engineering (HH-IFIN) and the National Institute of Marine Geology and Geo-Ecology (GeoEcoMar), both in Bucharest, Romania.

Firstly, natural occurring radionuclides (²¹⁰Pb, ²¹⁴Pb and ²¹⁴Bi) and ¹³⁷Cs were characterized by gamma spectrometry at the University of Seville, Spain. Subsequently, the samples were chemically processed to separate: i) Pu, Np and U in the three target cores; and ii) additionally, Am in one of the cores, following the radiochemical method described in (M. López-Lora, this conference). The presence of ²³⁶U, ²³⁷Np, ²³⁹Pu, ²⁴⁰Pu, ²⁴¹Am and ²⁴³Am was then investigated on the 1 MV Acceleration Mass Spectrometry (AMS) system at CNA, Seville, Spain.

Results on the atomic ratios ²⁴⁰Pu/²³⁹Pu, ²³⁶U/²³⁸U and ²⁴³Am/²⁴¹Am will be presented for an evaluation of the contamination sources and assess the studied elements in the context of an anoxic environment like the Black Sea.

Student Submission

Yes

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