**Pu and U isotopic signatures in sediment samples from Lake Bo Langvlei, South Africa**

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We present the radiochemical method for the determination of major and minor uranium and plutonium radionuclides in sediment samples using ICP-MS techniques (sector field and multi-collector). The sediment core was obtained from Lake Bo Langvlei in South Africa. The main objective of this study is to provide comprehensive U and Pu datasets ratios (e.g., 236U/239Pu, 236U/233U, 240Pu/239Pu, 241Pu/239Pu), in order to identify sources of radioactive fallout contamination.

The Pu isotope ratios show large variations with three major phases: (i) an initial phase dominated by the nuclear weapon testing in the Pacific Proving Grounds (240Pu/239Pu > 0.20, sediment depth 7.5 - 10.5 cm), followed by (ii) a period of maximum Pu activity marked by fallout from the nuclear tests in French Polynesia (240Pu/239Pu ~0.15, sediment depth 4.5 - 7.5 cm), and finally (iii) a phase with a Pu isotope signature consistent with global fallout (240Pu/239Pu > 0.18, sediment depth 2.0 - 4.5 cm). We observed 233U/236U isotope ratios varying between 0.010 and 0.023, with large uncertainties.