**Records of plutonium isotopes in different sedimentary environments in China**

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Plutonium isotopes are promising tools for studying the modern sedimentary processes because of their long half-lives, high particle affanity and increasingly sensitive measurement technologies. In this study, records of plutonium isotopes in sediment cores collected from different sedimentary environments in China, such as shallow lakes, peat, and shrub dunes, were systematically investigated and comapred. Results showed that plutonium isotopes recorded in most sedimentary environments in China are mainly sourced from the global fallout of the Nuclear Weapon Tests (NWT) conducted during the 1940~1980s. It was found that the original deposition record of plutonium isotopes in shallow lake sediments and peat sediments were not fully preserved due to the post-deposition process such as sediment resistribution within water cloumns or sediment migration in deep layers. In comparison, nebkha (a unique type of aeolian dune formed by the interception of wind-blown sediments by vegetation, are widely distributed in arid and semi-arid regions) sediments are less affected by post-deposition processes, and the rapid accumulation of both distant and proximal plutonium-bearing sediments transported by wind resulted in the high preservation efficiency of Pu isotopes in arid environments. The findings not only underscore the widespread nature of plutonium contamination on a global scale—even in remote deserts—but also demonstrates the potential of plutonium isotopes as chronostratigraphic markers for interpreting aeolian sedimentary processes in desert environments.