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## **【13】 $^{233}\text{U}$ / $^{236}\text{U}$ signature allows to distinguish thermal reactor emissions from weapons fallout in the environment.**

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Isotopic ratios of radioactive releases into the environment are useful signatures for contamination source identification. The atomic  $^{233}\text{U}$  /  $^{236}\text{U}$  ratio analysed in representative environmental samples by Accelerator Mass Spectrometry showed ratios of  $(0.1-3.7) \cdot 10^{-2}$ . The ratios detected in compartments of the environment affected by releases of nuclear power production or by weapons fallout differ by one order of magnitude. Significant amounts of  $^{233}\text{U}$  were only released in nuclear weapons fallout, either produced by fast neutron capture on  $^{235}\text{U}$  or directly by  $^{233}\text{U}$  fuelled devices. This makes the  $^{233}\text{U}$  /  $^{236}\text{U}$  ratio a promising new fingerprint for radioactive emissions, which may serve as a superior oceanographic tracer as Uranium behaves conservatively in sea water. Our findings indicate a higher release of  $^{233}\text{U}$  before the maximum of global fallout in 1963, setting constraints on the design of the nuclear weapons employed.

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