Everywhere present, hard to detect: oceanography to geology with the new AMS isotope ^{236}U

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The recent finding that about 1000 kg of ^{236}U from nuclear weapons tests were spread by global fallout [1, 2] has opened up a range of possible applications. ^{236}U is present at levels well above the maximum natural concentrations in practically all compartments of the surface environment. Several laboratories worldwide have developed capabilities for detection of ^{236}U with sufficient sensitivity during the past years.

In global oceans, where ^{236}U is present at levels up to ^{236}U/U $\sim 10^{-8}$ first successful applications underline the good suitability as a tracer for oceanography, and show that relatively small water samples are sufficient [2, 3]. At VERA, we have measured ocean depth profiles and coral archives, revealing complementary or superior properties to established tracers like ^{14}C, CFCs, ^{137}Cs and ^{129}I. Studies of land-bound fallout ^{236}U in soil and water samples demonstrate the applicability in hydrology and sediment transport studies.

Technical development at VERA focuses on decreasing the minimum sample size for anthropogenic ^{236}U. However, the relatively high isotopic ratios encountered do not fully exploit the extraordinary abundance sensitivity of VERA. We therefore strive to extend our measurement capabilities towards the natural ^{236}U in typical crustal rocks (expected isotopic ratio between 10^{-13} and 10^{-15}), by installing an additional bending magnet and switching to helium as a stripper gas. Also laboratory background must be minimized. We expect many applications on the field of geology and hydrology.

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