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A new extraction line for terrestrial produced cosmogenic ^{14}C at the Isotope Geochemistry lab of ETH Zurich, Switzerland

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Long-lived terrestrial cosmogenic radionuclides (^{10}Be, ^{26}Al and ^{36}Cl) and stable nuclides (^{3}He and ^{21}Ne) are widely applied in quantitative geomorphology and Quaternary dating studies. Current efforts in extracting and measuring small quantities of cosmogenic ^{14}C suggest this nuclide to be promising especially for studies of young exposures, high erosion rate settings and settings that have approached steady state isotope and landscape conditions relatively fast. Hereby advantage is taken of the short half-life of ^{14}C (5730 yrs). The combination of short-lived and long-lived nuclides will also help to decipher complex exposure histories hidden in the integrated signal of long-lived nuclides.

Cosmogenic ^{14}C is produced by spallogenic and muogenic reactions in the target mineral quartz predominately on oxygen. Based on the principles of extracting terrestrially produced cosmogenic ^{14}C implemented by the group of N. Lifton and J. Pigati (University of Arizona, Tucson) we have designed and built a new all-metal extraction line at the Isotope Geochemistry labs of ETH Zurich. Pure, chemically etched quartz aliquots are degassed by an electron bombardment furnace in the presence of ultra-pure O_2. The evolved CO_2 gas is passing the system in a single flow mode. Gas purification is accomplished by a combination of cryogenic trapping and sublimation via several variable temperature traps and a passing over a hot Ag/Cu system. The evolved CO_2 will be analyzed in the new gas ion source-AMS system at ETH Zürich. First blank results are expected to be presented at the meeting.