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In-situ cosmogenic ^{14}C extraction method for AMS measurements

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Cosmogenic nuclides have become a widely used tool in Earth surface sciences in the recent years. The use of in-situ cosmogenic ^{14}C is a relatively new method of analysis which has a great potential for earth surface studies. With a half-life of 5,730 years it reaches saturation quickly, which makes it especially suitable to study short-term erosion rates and young burial histories (Holocene). In combination with longer-lived cosmogenic isotopes (^{10}Be, ^{26}Al) in-situ cosmogenic ^{14}C can be used to identify inheritance effects and determine complex exposure and erosion histories.

However, due to its low concentrations in terrestrial rocks, the procedures for extraction, purification and measurement of in-situ cosmogenic ^{14}C have required extensive efforts. At present, only a very small number of research institutes worldwide are working on the development of extraction protocols and even fewer maintain operating systems. We present the progress of the operational in-situ cosmogenic ^{14}C extraction scheme at the University of Cologne, including preparation of gas targets suitable for analysis at the CologneAMS facility.