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A measurement routine to determine ^{137}Cs activities at steep mountain slopes

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Caesium-137 (^{137}Cs) is a common tracer for soil erosion. So far, in-situ measurements in steep alpine environments have not often been done. Most studies have been carried out in arable lands and with Ge detectors. However, the NaI detector system is a good priced, easy to handle field instrument. A comparison of laboratory measurements with GeLi detector and in-situ measurements with NaI detector of ^{137}Cs gamma soil radiation has been done in an alpine catchment (Urseren Valley, Swizerland). The aim of this study was to calibrate the in-situ NaI detector system for application at steep alpine slopes. Replicate samples from an altitudinal transect through the Urseren Valley were measured *ex situ* in the laboratory with a GeLi detector, and compared to *in situ* NaI detector measurements. *Ex situ* soil samples showed a big variability in ^{137}Cs activities at a meter-scale. This large, small scale heterogeneity determined with the GeLi detector is smoothed out by uncollimated in-situ measurements with the NaI detector, which provide integrated estimates of ^{137}Cs within the field of view of each measurement (3.1 m^2). There was no dependency of ^{137}Cs on pH, clay content and carbon content. However, a close relationship was determined between ^{137}Cs and soil moisture. Thus, in-situ data must be corrected for soil moisture. Close correlation (R^2 = 0.86) was found for ^{137}Cs activities (in Bq kg^{-1}) estimated with both, in-situ (NaI detector) and laboratory (GeLi detector) methods which proves the validity of the in-situ measurements with the NaI detector system. This paper describes the calibration of the NaI detector system for field application under elevated ^{137}Cs activities originating from Chernobyl fallout.