DEPTH PROFILES OF LONG-LIVED COSMOGENIC RADIONUCLIDES IN MBALE S. Merchel[1], U. Herpers[1], S. Neumann[2], R. Michel[2], P. W. Kubik[3], M. Suter[4], D. Faestermann[5], K. Knie[5], G. Korschinek[5], T. Schätz[5], N. Bhandari[6], [1]Abteilung Nuklearchemie, Universität zu Köln, 50674 Köln, Germany, [2]Zentrum für Strahlenschutz und Radioökologie, Universität Hannover, 30167 Hannover, Germany, [3]Paul Scherrer Institut c/o Institut für Teilchenphysik, ETH Hönggerberg, 8093 Zürich, Switzerland, [4]Institut für Teilchenphysik, ETH Hönggerberg, 8093 Zürich, Switzerland, [5]Fakultät für Physik, Technische Universität München, 85748 Garching, Germany, [6]Physical Research Laboratory, Navrangpura, Ahmedabad 380009, India.

Measurements of cosmogenic nuclides in meteorites are necessary to test and improve the physical models with which we try to understand the course of events in space. Furthermore radionuclides archive informations about the meteorites themselves e.g. their exposure history. Studies of how cosmogenic nuclides vary with depth below the surface of a meteoroid play an important part and are unfortunately still very scarce. Additionally, as far as we know the investigations on Mbale are the first of radionuclide data in connection with sample locations in the strewn field of a meteorite shower of such a great number of fragments.

The meteorite shower Mbale (L5/6) consists of 863 fragments with a total mass of 150 kg [1]. We received nine aliquot samples from G. Heusser in which concentrations of some radionuclides are known from γ-spectrometry [2]. We present the results for the long-lived cosmogenic nuclides ^{10}Be, ^{26}Al, and ^{53}Mn, which were determined in nine bulk samples using accelerator mass spectrometry (AMS) after radiochemical separation. Furthermore, cosmic ray tracks could be measured in six fragments. Exemplarily, Fig. 1 gives a selection of our data. Investigations of other radionuclides (^{36}Cl, ^{41}Ca, ^{59}Ni) are in preparation.

Based on a ^{21}Ne-exposure age of 26.9 m.y. [3] we are sure that all investigated radionuclides are in saturation. Therefore it is possible to compare our results with theoretical production rates, which are calculated on the elemental abundances of Al, Ca, Fe, Mg, Mn, and Ni (measured via ICP-AES) in Mbale, and a mean L-chondrite composition of other main target elements like C, O and Si.

We conclude that our samples originate from locations close to the surface up to the center of a meteoroid with a preatmospheric radius greater than 30 cm. Furthermore there is no indication of a complex exposure history of Mbale. At the conference the complete data obtained will be discussed in detail in the context of theoretical model calculations [4].

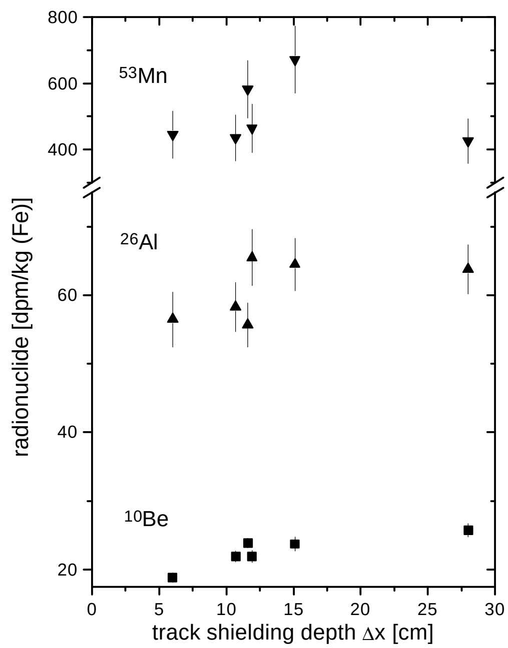

Fig. 1. Measured radionuclide activities vs cosmic ray track shielding depths

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