ing results on different chemical fractions from a number of different (medieval) buildings have shown promising internal consistency. Some of these have been reported in Heinemeier *et al.* (1995).

The separation techniques and examples of mineralogical analysis will be presented along with series of dating results on medieval churches from Åland, Finland and, as a curiosity, the Newport Tower, Rhode Island, USA.

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THE AMS FACILITY AT THE UNIVERSITY OF AARHUS, DENMARK

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The accelerator mass spectrometry (AMS) system based on the 6 MV EN tandem accelerator at the Institute of Physics, Aarhus is described. The current sample preparation methods, measurement procedures and system capacity for ^{14}C measurements are discussed. Information will be given on precision, accuracy and background level for different sample sizes and preparation techniques.

IN-SITU PRODUCTION OF COSMOGENIC NUCLIDES: ACCELERATOR SIMULATION EXPERIMENTS WITH MUONS AND MEASUREMENT OF DEPTH PROFILES

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The *in-situ* production of cosmogenic nuclides is important for the determination of background events in all low-level detection experiments (*e.g.*, the experiment ^{205}Tl (ν_e, e^-) ^{250}Pb (Neumaier, Nolte and Morinaga 1991), for many geophysical applications (*e.g.*, the determination of erosion rates or dating of old groundwaters) and for industrial applications. In the present paper, the *in-situ* production of cosmogenic radionuclides was investigated by performing accelerator simulation experiments with slow negative muons at PSI Villigen and with 200 GeV muons at CERN and by measuring concentrations of ^{10}Be and ^{26}Al in natural quartz samples up to depths of 260 m.

The *in-situ* production rate was calculated as a function of depth z taking into account spalation reactions, reactions with stopped negative muons, reactions with fast muons and background reactions. The production rate due to μ^- capture can be expressed by $P_{\mu-}(z) = I_{\mu-}(z) \cdot f_C \cdot f_D \cdot f^*$ with the