



EINLADUNG

zum

VERA-SEMINAR

von

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**Surface exposure dating in the Holocene – precise
¹⁰Be dating of very young surfaces**

The invention and implementation of accelerator mass spectrometry during the 1970's and 1980's enabled the measurement of long-lived radionuclides at levels that had previously been impossible. This increased sensitivity opened a range of geophysical and geochemical applications that are still being explored. In contrast to decay counting, which becomes very imprecise for count rates below about 1 dph ($\sim 2 \times 10^{10}$ atoms of ¹⁰Be), the first AMS measurements could quite readily quantify as few as 10^8 atoms of ¹⁰Be (Raisbeck et al., 1978). As a result, sample sizes needed for ice core studies dropped from tons to kg and measurement of ¹⁰Be in rocks exposed at the earth's surface, which had previously been impossible, could now be performed in a few tens of grams of quartz (Nishiizumi et al., 1986). Continued improvement in technique has, since these initial results, increased sensitivity by several more orders of magnitude. The detection limit of ¹⁰Be is currently about 5×10^3 atoms at the CAMS FN accelerator at Lawrence Livermore National Laboratory. The factors that have led to this improvement in sensitivity will be described and some important parameters that must be considered when working at the limits of detection will be discussed.

Far from being simply a technical tour de force, the improvement in the sensitivity, precision and accuracy of ¹⁰Be measurements has pushed geochronology into the range where analytical and geologic uncertainties are similar. This has permitted maximizing the effectiveness with which paleoclimate archives can be interpreted and has permitted the development of new sampling strategies to address questions in paleoclimatology and geomorphology. Several examples will be given including dating Holocene moraines in the Southern Alps of New Zealand, description of a new production rate calibration site, comparison of the accuracy of ¹⁴C and surface exposure dating and proposed work on dating recently exposed bedrock in Alpine sites around the world.

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1. Stock, Victor-Franz-Hess-Hörsaal**