Geophysical Research Abstracts
Vol. 12, EGU2010-5378, 2010
EGU General Assembly 2010

A high-altitude calibration site for 10Be surface exposure dating at Tres Lagunas, NW-Argentina

Jana Zech (1), Roland Zech (2), Peter W. Kubik (3), and Heinz Veit (1)

(1) Institute of Geography, University of Bern, Hallerstr. 12, 3012 Bern, Switzerland, (2) Department of Geological Sciences, Brown University, Box 1846, Providence RI 02912, USA, (3) Laboratory of Ion Beam Physics, ETH Zurich, Schafmattstrasse 20, 8093 Zurich, Switzerland

10Be surface exposure dating (SED) has become an important tool for geo-scientists, because it allows directly determining the deposition age of geomorphological features, which has been particularly difficult in semi-arid high mountain regions due to the lack of suitable material for radiocarbon dating. More precise glacial chronologies, for example, may now provide valuable information about past changes in precipitation and temperature. However, remaining systematic methodological uncertainties can still limit the ability to obtain exposure ages with accuracies better than 10%, in places 20-30%. These uncertainties mainly result from different approaches to parameterize the cosmic ray flux with space and time and thus production rate scaling - as reflected in the range of the available scaling schemes. In order to overcome the systematic methodological uncertainties, more local calibration sites are required.

We present results from Tres Lagunas, NW Argentina ($\sim$22°S, 4500 m asl), where we applied 10Be SED on moraines and additionally recovered an 8 m sediment core to obtain independent radiocarbon age control. The sediment core contains a layer of till, intercalated between laminated lake sediments and could be radiocarbon-dated to $\sim$18 cal. ka BP. The till most likely correlates with a lateral moraine SED dated to $\sim$17.0$\pm$1.9 ka applying the scaling scheme of Lifton et al. (2005). Adopting the radiocarbon age and the 10Be concentration of the respective boulder yields a reference production rate of 4.58$\pm$0.26 atoms/g/a, which is in good agreement with the global mean production rate of 4.65$\pm$0.12 atoms/g/a. This indicates that the scaling scheme of Lifton et al. is accurate at high altitudes.