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Isochron burial dating of the Haslau terrace of the Danube (Vienna Basin) and interlaboratory comparison of sample preparation in Vienna and Budapest

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In the Vienna Basin, terraces to the South of the Danube form a staircase with altitudes ranging between 25 and 130 m above current water level. The terrace system has been strongly dissected by faults related to the sinistral movement of the Vienna Basin Transform Fault System [1, 2]. Although each fault block displays a slightly different succession of terraces, fault-related vertical displacements south of the Danube have not yet been quantified.

To better understand the Quaternary terrace sequence and its displacement along a fault segment south of the Danube, the isochron burial dating method [3] based on the ^{26}Al and ^{10}Be cosmogenic nuclide pair has been used on a terrace at Haslau an der Donau (∼40 m above river level). This terrace is locally the lowest of a staircase of a total of 6 different levels. Based on geomorphological mapping, its age was considered to be Middle Pleistocene [4].

The sample set consisted of several quartzite cobbles taken from two sedimentary units (5.5 m and 11.8 m depth) separated by an erosional hiatus of unknown duration. Six cobbles were selected for inter-laboratory comparison and processed at both the Cosmogenic Nuclide Sample Preparation Laboratory at Vienna and at Budapest [5]. AMS measurements were performed at the French national facility ASTER (CEREGE, Aix-en-Provence) and at the Vienna Environmental Research Accelerator (VERA).

Initially, the obtained results show that the ^{10}Be and ^{26}Al concentrations calculated from the subsamples processed independently using different extraction schemes at both laboratories overlap within error for all subsamples but one, whose ^{26}Al concentrations were significantly different. The low ^{26}Al concentration measured in one Budapest sample probably resulted from Al having been trapped within the insoluble residues observed after evaporation to dryness. A modification of the sample processing allows overcoming this difficulty while treating for the following sample set.

The results demonstrate that the laboratory background is safe for in-situ produced cosmogenic ^{10}Be and ^{26}Al extraction at both Vienna and Budapest laboratories and that the different geochemical digestion and purification schemes applied by the two laboratories for the extraction of ^{10}Be and ^{26}Al lead to similar results.

A preliminary (not corrected) isochron burial age of ∼2.4 Ma was calculated for the higher sedimentary unit of the Haslau terrace on the basis of the slope of the isochron. This age is significantly older than the Middle Pleistocene age previously estimated. Further age determinations are nevertheless necessary to decide whether this preliminary age is accurate or not.

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