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Isochron burial dating of Danube terraces in the course of an interlaboratory comparison on sample preparation in Vienna and Budapest

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The Neogene development of the Vienna Basin's tectonic history is well-documented in seismic sections and hydrocarbon wells. The late Neogene to Quaternary history is less well preserved due to a gap in the sediment record starting from the Late Pannonian due to a large-scale uplift during a phase of basin inversion [1].
Quaternary sediments in the Vienna Basin form prominent Pleistocene terraces north and south of the Danube's recent floodplain. The Danube's course currently shifts to the south where it erodes into its own gravel terraces that were presumably accumulated during the Pliocene and Early to Middle Pleistocene. North of the Danube, a wide alluvial plain has developed with one prominent Middle Quaternary terrace level 17-25 m above the river (Gänserndorf and Schlosshof Terraces). The most recent tectonic events related to the sinistral movement of the Vienna Basin transform fault system are recorded north of the Danube by faulted terrace segments that were identified by paleoseismological trenching in combination with OSL [2].
In contrast, terraces south of the Danube form a staircase with altitudes ranging between 25 and 130 m above todays water level. The terraces in the south have also been strongly dissected by faults [3], each fault block preserved a slightly different succession of terraces. The fault-related vertical displacements south of the Danube have not yet been quantified. To better understand the Quaternary terrace sequence and its displacement in the southern zone, we use the cosmogenic nuclide pair of 26Al and 10Be for isochron burial dating of a Danube 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 published geomorphological works, the expected age is Middle Pleistocene. The isochron burial dating method is therefore well-suited to date this sedimentary setting due to the presence of large individual clasts that share the same post-depositional history, but have different pre-exposure and transport histories [4].
The sandy gravel of the Haslau terrace was sampled in an active gravel pit. At this location, two major sedimentary units are separated by an erosional hiatus of unknown duration. The upper sequence was sampled at 5.5 m depth and the lower one was sampled at 11.8 m depth. From both depths six quartzite or quartz-bearing cobbles were taken together with a bulk sample from the matrix for isochron burial duration determination. Five samples were split after crushing and sieving and were processed at both the Cosmogenic Nuclide Sample Preparation Laboratory at Vienna and at Budapest (http://www.geochem.hu/kozmogen/Lab_en.html), in order to assess and compare the sample processing preocedures of these recently operating sample preparation laboratories. AMS measurements were performed at the French national facility ASTER (CEREGE (Aix-en-Provence, France).

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