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Geochronology and evolution of tufa deposits at Roski Slap in Krka National Park, Croatia

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Roski Slap is one of the key scene sites within the Park due to its impressive active tufa barrage system within a canyon. Ancient tufa sediments are preserved in the canyon walls, having a total height of 22.5 m over the current river level (m c.r.l.). The cascade facies of these sediments suggest the existence of a barrier-lake tufa system (B-LS). A large block of this deposit (1.5-13.5 m c.r.l.) collapsed at some point as a result of the erosion of the B-LS. Between the block and the canyon wall there is a mamelar tufa. This is a typical facies of tufa bearing lakes and represents the formation of a 2^{nd} B-LS slightly downstream, with a lake at least 7 m in depth and sediments reaching a minimum height of 8.5 m c.r.l. We used U-Th to establish the chronology of these ancient tufas and try unravelling how much time took to erode the 1^{st} B-LS. Four dates from the 1^{st} B-LS provided dates from 123 to 130 ka BP with uncertainties ranging from 0.9 to 1.3 ka. Eight dates from the 2^{nd} B-LS provided dates from 122 to 130 ka BP with uncertainties ranging from 2.3 to 3.8 ka. The $^{230}Th/^{232}Th$ activity ratios of 11 to 88 suggest that true ages might be slightly younger than the dates here reported. However, the initial ^{230}Th correction of dates using the isochron method does not provide better chronologies since at least two sources of ^{232}Th might be present. Despite a limited uncertainty in the accuracy, we can conclude that both phases of B-LS were deposited during the Last Interglacial Period. Our dating uncertainty is large enough to prevent us differentiating the ages of these two ancient tufa systems, suggesting a relatively fast erosion episode between both of them.