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Late Pleistocene ice field on Jakupica Mt. (North Macedonia): extent and timing glaciation

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Since the 19th century, geomorphological studies in the currently mainly unglaciated central Balkan Peninsula described extended glacial landforms and repeated glaciations. With the growing number of numerical ages an ambiguous picture has formed concerning the timing of the most extended glaciation and also on the glacier response to the cooling phases (e.g. Younger Dryas) during the last deglaciation of these mountain ranges.

This study provides ^{10}Be cosmic ray exposure ages of a succession of glacial landforms in the Jakupica Mt. (North Macedonia), aiming to improve the understanding of Late Pleistocene glacier development in the area [1].

In the Jakupica Mt. (~41.7° N, ~21.4 E; Solunska Glava, 2540 m asl) a large plateau glacier was reconstructed (max. area ~45 km^2, max thickness: ~300 m), where three main ice accumulation areas could be delineated [2]. The study area comprises six northeastward facing, formerly glaciated valleys. Two of these valleys emerge from the plateau, one stands separate, and the remaining three are topographically separated by a relatively flat NNW-SSE oriented ridge. During the most extensive glacial stages, these three valleys were fed by ice overflowing above this ridge from the plateau. The lowest mapped moraines are descending down to 1550-1700 m asl suggesting the former existence of glacier tongues of ~3 km length. The large plateau ice and the complicated system of confluences makes glacier reconstructions and equilibrium line altitude (ELA) calculations challenging. Thus, the ELAs were preliminary estimated based on the maximum elevation of the lowermost lateral moraines, leading to ELA values of 1800±50 m a.s.l. for the most extended phase.

The maximum ice extent outlined by the lowest mapped moraines descending down to 1550-1500 m asl. occurred around ~24-19 ka (n=5), in agreement with the timing of the Last Glacial Maximum. During the Lateglacial, the exposure ages are getting younger by the glacier recession

up to the moraines at ~1820 m asl (~19-14 ka, n=15). However, the highest sampled landforms (~2200 m asl) provided ages with a large scatter between ~25 and ~5 ka (n=6). This large scatter and the observed bias towards old ages are most probably the result of inherited cosmogenic nuclide concentrations within the rock. Consequently, ^{10}Be exposure ages alone are apparently not suitable to determine the age of final deglaciation of this mountain. Similar conditions have been observed in the Retezat Mts (Southern Carpathians, Romania) [3].

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[1] Ruszkiczay-Rüdiger et al., 2020. Last deglaciation in the central Balkan Peninsula: Geochronological evidence from Jablanica Mt. (North Macedonia). Geomorphology 351: 106985

[2] Temovski et al., 2019. Glacial geomorphology of the northeastern part of the Jakupica Mountain, Macedonia, Central Balkan Peninsula. GRA 21, EGU2019-7822

[3] Ruszkiczay-Rüdiger et al., 2018. Glacier reconstruction, deglaciation chronology and paleo-environment reconstruction, Retezat Mountains, Southern Carpathians, Romania. Geologica Balcanica; Abstracts of the XXI. CBGA Congress, Salzburg, 10-13 September; p. 240-241.