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Last deglaciation in the central Balkan Peninsula: geochronological evidence from the Jablanica and Jakupica Mts (North Macedonia)

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Several studies applied numerical age determination methods to examine glacial phases of the central Balkan Peninsula. However, the resulting conflicting datasets require further discussion. This study provides ¹⁰Be Cosmic Ray Exposure (CRE) ages of a succession of glacial landforms in the Jablanica and Jakupica Mts (North Macedonia), aiming at a better understanding of Late Pleistocene glacier development in the area.

In the Jablanica Mt. (~41.25° N; Crn Kamen, 2257 m a.s.l.) six glacial stages were identified (Temovski et al., 2018). The CRE ages of five glacial stages (from the second oldest to the youngest) range from 16.8^{+0.8}/_{-0.5} ka to 13.0^{+0.4}/_{-0.9} ka. Accordingly, the most extensive glaciation in the Jablanica Mt. occurred before ~17 ka (Ruszkiczay et al., 2020).

Based on the accumulation area balance ratios (AABR) of the reconstructed glaciers, their mean equilibrium line altitudes (ELAs) were estimated. The average ELA of the glaciers was 1792±18 m a.s.l. during the largest ice extent, and 2096±18 m a.s.l. during the last phase of the deglaciation.

Independent reconstructions of key climatic drivers of glaciological mass balance suggest that glacial re-advances during the deglaciation in the Jablanica Mt. were associated to cool summer temperatures before ~15 ka. The last glacial stillstand may result from a modest drop in summer temperature coupled with increased winter snow accumulation. In the study area no geomorphological evidence for glacier advance after ~13.0^{+0.4}/_{-0.9} ka could be found. Relying on independent climate proxies we propose that (i) the last glacier advance occurred no later than ~13 ka, and (ii) the glaciers were withdrawing during the Younger Dryas when low temperatures were combined with dry winters.

In the Jakupica Mt. (~41.7° N, Solunska Glava, 2540 m a.s.l.) a large plateau glacier was

reconstructed. The study area comprised six eastward facing, formerly glaciated valleys. Cirque floor elevations range from ~2180 m a.s.l. at Salakova Valley, to between ~2115 and ~2210 m a.s.l. on the carbonate plateau. The lowest mapped moraines are descending down to 1550-1700 m a.s.l. Due to the large plateau ice and the complicated system of confluences, glacier reconstructions using semi-automated GIS tools are problematic. Four to six deglaciation phases were reconstructed, and a preliminary estimation of the ELAs based on the maximum elevation of the lowermost lateral moraines leads to ELA values of 1800 ± 50 m a.s.l. for the most extended phase. Multiple CRE ages for the subsequent glacial stages are also being acquired for Jakupica Mts.

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Temovski M, Madarász B, Kern Z, Milevski I, Ruszkiczay-Rüdiger Zs. (2018) Glacial geomorphology and preliminary glacier reconstruction in the Jablanica Mountain, Macedonia, Central Balkan Peninsula. *Geosciences* 8(7): 270