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Determination of the age of carbonate rocks by the cosmogenic chlorine-36 in the valleys of Miętusia and Mała Łąka

The Mietusia and Mała Łąka valleys were glaciated at the turn of the Holocene and Pleistocene, with the maximum extent during the Last Glacial Maximum (LGM). This was one of the assumptions of the project, which we wanted to prove by dating glacial forms. Both valleys are situated in the Western Tatras. This part of the Tatra Mountains is much less studied in terms of the age of glacial and postglacial forms compared to the forms from the High Tatras. We used the cosmogenic ³⁶Cl because of the geological structure of the study area, which consists mainly of Triassic dolomites and limestones with very limited meade of gneiss and other metamorphic rocks at the highest picks (Krzesanica 2122 m a.s.l., Małolączniak 2096 m a.s.l., Ciemniak 2096 m a.s.l.).

The Tatra Mountains (Western Carpathians) are the northernmost alpine orogen which was glaciated in the Pleistocene. Therefore, they are a kind of palaeoclimatic link between the area of southern Europe and Scandinavia and Central – Eastern Europe. For this reason, the reconstruction of the palaeoclimate for these glaciers seems to be a necessity.

The Tatra Mountains are situated at the junction of continental and oceanic climate, which causes high temperature amplitudes and the highest precipitation in the summer months. The high amount of



precipitation, especially in warm months, causes high erosion rates (including chemical erosion) and a rapid rate of change in glacial forms (especially in the lower parts of the valleys).

In the course of this study, we obtained 32 dates based on the measurement of cosmogenic ^{36}Cl produced *in situ*, derived from boulders building maximum and recession moraines, and from the floor of the valleys. Dates from morainic boulders range from 20.7 ± 0.8 ka to 8.8 ± 0.4 ka, with a high standard deviation for one moraine. Bedrock dates are: 16.7 ± 0.7 ka and 18.8 ± 1.1 ka. From the obtained results it is very difficult to determine a reliable moment of glacier stabilization and the age of the entire form especially for the LGM moraines. Unfortunately, this makes it difficult to use these glaciers as a palaeoclimatic source of information, as we cannot put climatic conditions into a specific time frame.

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