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A volume inventory of glaciers in the Austrian Alps

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Knowledge of glacier ice thickness is essential for the interpretation of glacier-climate interaction and ice-dynamic modelling studies. Furthermore, the total ice volume is an interesting parameter for water resource management. The compilation of the new Austrian glacier inventory, which is in progress now, for the first time includes volume and ice thickness data. To understand the changes in ice covered areas between the Austrian glacier inventory of 1969 and 1997, the spatial distribution of ice thickness and ice dynamics have to be taken into account.

Ice thickness of temperate glaciers can be measured by e.g. drilling, seismics, geoelectric methods, or using ground penetrating radar (GPR). For this study, ice thickness data were collected with a lightweight GPR that operates at frequencies of 4 and 6.5 MHz. Between 1995 and 2003, 50 Austrian glaciers of different types with areas between 17 and 0.4 km^2 have been surveyed. Obviously, it is not possible to measure the ice thickness of all 918 Austrian glaciers. To include volume data in the new Austrian glacier inventory, the ice thickness data collected will be used to develop a relation between glacier area and ice volume. Using this relation, ice volumes of all glaciers can be estimated. Ice thickness measurements are being continued in order to arrive at a representative spectrum of thickness of Austrian glaciers.