Zeitschrift: Schweizerische mineralogische und petrographische Mitteilungen = Bulletin suisse de minéralogie et pétrographie

Band: 48 (1968)

Heft: 1: Symposium "Zone Ivrea-Verbano"

Artikel: Isotopie U-Ph ages of zircons from the Ceneri zone, Southern Alps

Autor: Pidgeon, R.T. / Köppel, V. / Grünenfelder, M.

DOI: https://doi.org/10.5169/seals-37764

Isotopic U-Pb Ages of Zircons from the Ceneri Zone, Southern Alps

(Summary)

By *R. T. Pidgeon**), *V. Köppel* and *M. Grünenfelder* (Zürich)**)

Six zircon samples from different rock types were analyzed isotopically for uranium and lead. One sample from an "orthogneiss", consisting of K-feldspar, biotite, plagioclase, quartz (REINHARD, 1964), and one sample from a paragneiss, consisting of plagioclase, biotite, quartz, ± muscovite, ± aluminosilicates, ± K-feldspar, ± hornblende (REINHARD, 1964), were large enough to be divided into different fractions by sieving and magnetic separations for the analyses.

The apparent U-Pb ages of zircons from the "orthogneiss" are almost concordant (433—546 my) and indicate a major event 420 to 440 my ago. It is believed that this event led to the formation of new zircons in these rocks and that it corresponds therefore in time to the major metamorphism of the higher amphibolite grade of the rocks in the Ceneri zone.

By sizing a large "orthogneiss" zircon sample into four different grain size fractions a small spread of their U content and U/Pb ratios was achieved. The three finer fractions with the highest U content and highest U/Pb ratios yielded almost concordant ages (433—462 my). The coarsest fraction with the lowest U content and lowest U/Pb ratio yielded somewhat higher apparent ages (445—546 my) which may be due to an inherited, pre-metamorphic Pb component of their U-Pb system. This interpretation is compatible with the observation that a few zircons contain cores of an older, rounded zircon generation.

The zircons of the paragneisses have suffered also a major lead loss during this metamorphism. No morphological evidence for the formation of new zircons was found. Their apparent ages (582—1364 my) are higher than those

---

*) Present Address: Scottish Research Reactor Centre, East Kilbride, Scotland.

**) Institut für Kristallographie und Petrographie, Eidg. Technische Hochschule, Sonneggstrasse 5, 8006 Zürich.

of the zircons from the "orthogneiss" samples. One zircon sample was divided by sieving and magnetic separations into eight different fractions seven of which were isotopically analyzed. The non-magnetic fractions show a regular increase of their U content and a decrease of the apparent ages with decreasing grain size. The magnetic fractions have a higher U content and still lower apparent ages, but do not exhibit the correlation between grain size, U content, and apparent ages found in the non-magnetic fractions.

The apparent ages indicate a minimum age of the primary source of the paragneiss zircons of 1600 to 1800 my.

The isotopic analyses of the zircons provided new information as to the time of the major metamorphism of the Ceneri zone as well as an insight into the premetamorphic history of the rocks.

A detailed paper on this subject will appear simultaneously with a paper by B. GRAUERT on zircon ages from the Silvretta and the Gotthard massif in "Contributions to Mineralogy and Petrology".

References

REINHARD, M. (1964): Über das Grundgebirge des Sottoceneri im Süd-Tessin und die darin auftretenden Ganggesteine. Beitr. geol. Karte Schweiz, NF, 117. Lfg.