



## Detrital mica Ar-Ar ages from rivers draining the Qilian Shan on the NW margin of the Qaidam basin

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Our study of Ar-Ar ages of detrital white mica from Eocene to Pliocene successions of the Qaidam basin shows almost exclusively ages with  $250 \pm 3$  and  $279 \pm 3$  Ma in the northeastern part of the basin (Rieser et al., 2007), in contrast to a dominance of mainly early Palaeozoic ages in its western part. As no nearby source of these Indosinian ages is known so far, we dated mica from rivers draining the Qilian Shan between Delingha in the SE to Dacaidan in the NW in order to assess the Qilian Shan as a possible source. All sample locations are northeast of the early Palaeozoic UHP-belt running along the basin margin. Direct access to the Qilian Shan for collecting samples is very restricted and no Ar-Ar ages from this mountain range are published until now. Confirmation or rejection of an Indosinian belt in the Qilian Shan would have implications for both the geodynamic evolution of the area and filling models of the Qaidam basin.

We dated white mica from six rivers, which drain the mountain ranges south of the drainage divide to the Danghe and the Qinghai Hu. Pooling all ages (ca. 150 single grains) gave minimum and maximum ages of ca. 175 Ma and ca. 1300 Ma, respectively. There are 3 significant groups in the age distribution with median ages of 190 Ma, 255 Ma and 425 Ma, with a minor peak at about 380 Ma. Their proportions are ca. 15%, 30% and 45%, respectively. The rivers show marked differences in their age distributions. 2 samples from the Ar Gol at Delingha, which drains the eastern part of the range, show 2 groups with ages of 250 and 430 Ma. The river, which drains the middle part of the range, displays the same age groups, but their medians are shifted to somewhat younger ages. There are also a number of ages between 300 and 400 Ma, though they display no distinct peak. The rivers at and north of Dacaidan show extremely different age distributions: The Iqe river, which drains a large portion of the northern range, display only one age group with 425 Ma, two small catchments to the south and to the north of the Iqe river gave each on age group too, but with median ages of 190 Ma and 255 Ma, respectively.

These ages indicate two main thermo-tectonic events in the Qilian Shan, a Silurian and a Permo-Triassic event. The significance of the early Jurassic ages needs further investigations, as these ages are from a very small area only and the type of source rocks is unknown so far (metamorphic or magmatic). The Silurian ("Caledonian") age group is well known from the area (Qinling, Qilian, Altyn) and related to an orogenic cycle from subduction to continental collision. Indosinian ages are obviously substantial, as they make up a considerable part of the age population and occur in rivers draining a major part of the range. Therefore we propose an Indosinian orogenic belt running within the southern Qilian Shan.

Regarding filling models of the Qaidam basin, the occurrence of Indosinian ages in the Qilian Shan allows a local derivation of the sediments in the eastern part of the basin. A big difficulty for a provenance solely from the Qilian Shan are the missing Caledonian ages in the whole Tertiary sedimentary sequence in the eastern part of the basin.

Rieser, A.B., Liu, Y., Genser, J., Neubauer, F., Handler, R., Ge, X.H., 2006. *Terra Nova*, 18, 79–87.