



## **Thermal history of Yukahe and Xitieshan UHP belts, North Qaidam, western China.**

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The North Qaidam Mountains high pressure/ultrahigh pressure metamorphic belt is a recently discovered HP/UHP metamorphic terrane in western China (Yang et al. 2001). Four HP/UHP metamorphic units can be distinguished along the North Qaidam Mountains. From East to West: the Dulan eclogite gneiss unit, the Xitieshan eclogite-gneiss unit, the Luliangshan garnet Peridotite gneiss unit, and the Yukahe eclogite-gneiss unit. Our research focuses on the petrology and geochronology of the Xitieshan and the Yukahe units. We have selected quartz, hornblende and garnet for analysis for  $^{40}\text{Ar}/^{39}\text{Ar}$  dating by incremental heating and stepwise crushing in order to shed light on the peak and retrograde metamorphic history of this area. Stepwise crushing experiments were carried out in an in-house designed crushing apparatus (Qiu and Wijbrans 2006) which was connected to a three stage extraction line and a quadrupole mass spectrometer (Schneider et al. 2009).

Ten quartz single mineral samples (8 from Yukahe and 2 from Xitieshan) came from quartz veins which cross cut eclogite and garnet amphibolite lenses. Eight hornblende samples (3 from Yukahe and 5 from Xitieshan) were separated from garnet amphibolite or amphibole mica gneiss. Garnet was separated from two eclogites, one from Yukahe and one from Xitieshan. Garnet from Yukahe yielded an age by incremental heating of 506 Ma, whereas hornblende stepwise crushing ages range from 480 – 450 Ma. Garnet from Xitieshan yielded an age by stepwise crushing of 234 Ma, whereas hornblende yielded ages in the range 450 – 386 Ma. Quartz experiments showed a range of apparent ages that point to a dominant excess argon reservoir. The youngest ages found in quartz experiments, in the range from 217 Ma to 286 Ma, point to overprinting in the late Paleozoic and possibly as young as the Triassic.

The two sites show distinct differences in their isotopic results with samples from Yukahe preserving evidence of the 450 – 500 Ma event, whereas the Xitieshan site appears to be overprinted.

Qiu H.N., and Wijbrans J.R. 2006, Paleozoic ages and excess  $^{40}\text{Ar}$  in garnets from the Bixiling eclogite in Dabieshan, China: New insights from  $^{40}\text{Ar}/^{39}\text{Ar}$  dating by stepwise crushing. *Geochimica et Cosmochimica Acta* 70. pp. 2354 - 2370..

Schneider B., et al. 2009,  $^{40}\text{Ar}/^{39}\text{Ar}$  geochronology using a quadrupole mass spectrometer. *Quaternary Geochronology* 4 (6) 508-516.

Yang, J. et al., 2001. Discovery of coesite in the North Qaidam Early Palaeozoic ultrahigh pressure (UHP) metamorphic belt, NW China. *Comptes Rendus Acad. Sci., Serie II Sci. Terre Planetes.* 333(11): 719-724.