

Petrology and Geochronology of Eclogites from Western Segment of Altyn Tagh Tectonic belt, Northwestern China

ZHANG Jianxin ZHANG Zeming

(Institute of Geology, CAGS, Beijing, 100037, P. R. China)

The eclogites from western segment of Altyn Tagh tectonic belt occur as lens or boundins within quratzofeldspathic gniesses or pelitic gneisses characterized by amphibolite-facies parageneses. The petrographic and reaction textures testify to three main metamorphic stages: (1) peak eclogite-facies stage ($P>15\text{kb}, T=731-811^{\circ}\text{C}$), (2) granulitic facies stage ($P=11-14\text{kb}, T=700-800^{\circ}\text{C}$) and (3) amphibolite-facies stage ($P=6.3-9.5\text{kb}, T=619-738^{\circ}\text{C}$) during decompression. The trace element, rare earth element and Sm-Nd isotopic data suggest that most of the eclogites have protolith feature resembling T-type (transitional type) MORB (mid-ocean ridge basalt). The well-preserved eclogite is selected for Sm-Nd and U-Pb isotopic dating. The Sm-Nd isotopic data yield a whole rock-garnet-omphacite isochron of $500\pm 10\text{Ma}$ age. The U-Pb isotopic measurements of zircons from same eclogite show that the four grain populations are near concordant and are well plotted on concordia curve, giving a weighted mean age $503.9\pm 5.3\text{Ma}$. Two kinds of methods obtain a similar age, which reveals the peak metamorphic age of eclogites, and reflects the existence of Mountain root related to Caledonian subduction and continent-continent collision.