

Rb/Sr and Sm/Nd isotope analyses of CCSD eclogites (Sulu, China): a test for the closure temperature concept

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The age of UHP metamorphism in the Sulu belt is now well established between 228 and 221 Ma ([1] and references therein). However, precise interpretation of the whole set of geochronological data in terms of P-T path that allows to deduce exhumation rates remains uncertain. Here we may pose two key questions: (1) Do the zircon U/Pb ages date the prograde, peak or retrograde stage of the P-T path? (2) Should the zircon ages be interpreted as the crystallization or cooling ages? We choose to address the second question here.

Eclogite samples from the Chinese Continental Scientific Drilling (CCSD) borehole in Donghai (Sulu Belt, eastern China), provide a unique opportunity to test the closure temperature concept [2]. Our sample set is composed of ten eclogites selected along a 2000m core transect. All the eclogites recorded the same P-T path (peak at 850-910°C, >35kbar followed by nearly adiabatic decompression, [3]), however, they are characterized by a wide variety of modal and chemical compositions (i.e pyrope content in garnet from 10 to 50%), as well as granulometry (grain size between 2mm and 200µm). The closure temperature theory expects that grain size, modal composition and chemical composition of the mineral phases control the temperature at which a radiochronometer is set to function during cooling. Therefore, the comparison of geochronological data obtained for a given isotopic system applied to the same mineral species in the 10 samples should provide an excellent test for this concept since all the parameters given before are variable.

The results of Sm/Nd dating on garnets and Rb/Sr dating on phengites of different size fractions of the same sample will be discussed at the conference.

References

- [1] Liu F., Xu Z. and Xue H. (2004) *Lithos* **18**, 411-429.
- [2] Dodson M.H. (1973) *Contrib. Min. Petrol.* **40**, 259-274.
- [3] Tong L., Jahn B.-M., Iizuka Y. and Xu Z. (accepted) *International. Geol. Reviews*.