

## **Mass balance during retrogression of eclogite-facies minerals in the Rongcheng eclogite, eastern Sulu ultrahigh-pressure terrane, China**

**TIAN N. YANG,<sup>1,\*</sup> ZHI Q. XU,<sup>1</sup> AND MARY LEECH<sup>2</sup>**

<sup>1</sup>Institute of Geology, Chinese Academy of Geological Sciences, Beijing, 100037, China

<sup>2</sup>Geological and Environmental Sciences, Stanford University, Stanford, California 94305, U.S.A.

### **ABSTRACT**

Eclogite from Rongcheng in the easternmost part of the Sulu ultrahigh-pressure metamorphic terrane has broken down (at least partially) with the formation of coronae of spinel + anorthite around kyanite, symplectites of pargasite + plagioclase around garnet, and symplectites of diopside + plagioclase after omphacite. Textural evidence and microprobe analysis indicate that this breakdown was generated by discontinuous reactions. Quantification of material transfer and textural information suggest that the reaction mechanism involved local exchange of components among the three major minerals (omphacite, garnet, and kyanite) during dissolution and discontinuous precipitation, coupled with exchange between eclogites and their host rocks. The symplectite formed after omphacite gained Al and minor Si and Na from its surroundings, and lost Mg, Ca, and minor Fe to its surroundings. Formation of the symplectite around garnet was accompanied by gain of Ca, Al, Si, Na, and H<sub>2</sub>O, and by loss of Mg and Fe<sup>2+</sup> to its surroundings. Coronae around kyanite gained Ca, Fe, Mg, and minor Si, and provided Al to their surroundings. Material exchange between eclogite and host rocks occurred as well: eclogite gained minor Al, Na, and H<sub>2</sub>O from the host rocks, and provided Mg, Fe, and Ca to the host rocks. Pressure and temperature estimation using THERMOCALC yielded a lower temperature ( $655 \pm 70$  °C) and higher pressure ( $1.3 \pm 0.2$  GPa), which values contrast with estimates made by other authors. Strong deformation may have created a path for ingress of hydrous fluids, then resulted in a localized lower T and/or higher P.