Re–Os evidence for age and origin of peridotites from the Dabie–Sulu UHP belt

H.L. YUAN[1,2] S. GAO[2,1], R. L..RUDNICK[3], Z.M. JIN[2] AND R. J. WALKER[3]

[1] State Key Laboratory of Continental Dynamics, Department of Geology, Northwest University, Xi'an, 710069, China. (hlyuan@263.net)

[2] State Key Laboratory of Geological Processes and Mineral Resources, Faculty of Earth Sciences, China University of Geosciences, Wuhan 430074, China(sgao@263.net; zmjin@cug.edu.cn)

[3]Geochemistry Laboratory, Department of Geology, University of Maryland, College Park, MD 20742, US.A.(rudnick@geol.umd.edu, rjwalker@geol.umd.edu)

We determined whole–rock major and trace element and mineral chemical compositions of serpentinized garnet peridotites of mantle origin from the Xugou peridotite body of the Sulu ultrahigh–pressure metamorphic terrane, central eastern China. The whole–rock data show negative correlations between MgO and TiO_2, Al_2O_3, total Fe, CaO and Na_2O (r= –0.66 to –0.95) and positive correlations between whole–rock Al_2O_3 and CaO and incompatible elements (Li, V, Cu, Ga, Sr, Y, Zr, heavy rare earth elements (HREEs), Hf, Pb and U) (r=0.69 to 0.98), which likely reflect melt depletion trends. Four highly refractory samples were selected for Re–Os isotopic analysis. The correlation between $^{187}Os/^{188}Os$ and $^{187}Re/^{188}Os$ ratios reflects an ancient event of melt extraction.

The TRD, TMA and errorchron ages of the Xugou peridotites are all similar, suggesting that these peridotites formed around 2.0Ga ago. The ages are similar to Os ages for mantle peridotites from the Dabie terrane and for peridotite xenoliths from the Yangtze craton, but contrast markedly with the Archean age of the continental lithospheric mantle (CLM) beneath the adjacent eastern block of the North China craton[1-3] prior to the Triassic collision and with its present-day age distribution. Our results suggest that, like eclogites and gneisses of crustal origin, the peridotites in the Dabie–Sulu UHP belt were also derived from the Yangtze craton, further supporting the hypothesis that the crust and underlying lithospheric mantle of the Yangtze craton were subducted to depths of >180-200 km to form the world's largest UHP belt.

References

[1] Gao S., Rudnick R.L., Carlson R.W., McDonough W.F. and Liu Y.S(2002).*EPSL* **198**, 307-322.

[2] Wu F.Y., Walker R.J., Yang Y.-H., Yuan H.-L. and Yang J.-H(2006). *GCA* (IN REVIEW).

[3] Wu F.Y., Walker R.J., Ren X.W., Sun D.Y. and Zhou X.H(2003). *Chem. Geol.* **196**, 107–129