Remnant ancient lithospheric fragments in Proterozoic Dunzhugur Ophiolites in southern Siberia

KUO-LUNG WANG[1,2], MARINA A. GORNOVA[3], VICTOR KOVACH[4], ZHUYIN CHU[5], VASILII A. BELYAEV[1,3], KUAN-YU LIN[1,2], SUZANNE Y. O'REILLY[6]

[1]Inst. Earth Sciences, Academia Sinica, Taipei, Taiwan (kwang@earth.sinica.edu.tw)

[2]Dept. of Geosciences, Natl. Taiwan Univ., Taipei, Taiwan

[3]Inst. Geochemistry, SB RAS, Irkutsk, Russia

[4]Inst. Precam. Geol. and Geochr. RAS, St. Petersburg, Russia

[5]Inst. Geology and Geophysics, CAS, Beijing, China

[6]CCFS/GEMOC, Dept. of Earth and Planetary Sciences, Macquarie University, Sydney, Australia

The most ancient ophiolite of the Central Asian Orogenic Belt, Dunzhugur ophiolites in Eastern Sayan, Russia dated at 1020 Ma[1], is considered to have formed in the fore-arc setting of the Dunzhugur island arc, facing the Gargan Block continent. The oceanic plate separating these was subducting beneath the arc[2]. Recent Nd isotope results (εNd (t) = –1.0-+1.5 and $t_{Nd(DM)}$ = 1.8-1.6 Ga) of Dunzhugur ophiolites are interpreted as recording the infiltration of melts mixed with subducted continental sediments from Gargan Block, lending support to the above scenario[3]. New whole-rock platinum-group elements (PGE), and Re–Os isotope data plus one sulfide Re-Os result from peridotites of Hara-Nur and Ulan-Sardag massifs associated with Dunzhugur ophiolites in this study reveal the existence of an ancient domain in the underlying lithospheric mantle. Dunite, harzburgite and chromitite showing residual PGE patterns (Pd/Ir = 0.07-0.62) with low $^{187}Re/^{188}Os$ ratios (0.0037-0.0632) yield t_{MA} model ages of 2.38, 1.84, 1.44 and 1.22 Ga ($^{187}Os/^{188}Os$ = 0.11353-0.11978). A low $^{187}Re/^{188}Os$ harzburgite with IPGE-depleted PGE pattern and one sulfide in dunite yield t_{MA} model ages of 1.38 and 1.53 Ga. The pristine residual signatures, along with the ancient Os model ages *older than* the Dunzhugur ophiolites cannot be ascribed to recycled (subducted) ancient crustal materials in the lithospheric mantle. Similar crustal event age peaks occur in the South China Block/Laurentia, suggesting a connection with the southern Siberian Craton before the opening of the Paleo-Asian Ocean. Thus remnant lithospheric fragments stranded by rifting of the ancient continental regions are inferred to occur in the Neoproterozoic Dunzhugur ophiolites as observed in modern ocean basins[4].

[1]Khain et al., EPSL, 2002; [2]Kuzmichev, *CAOB: Geology, Evolution, Tectonics & Models*. A. Kröner (ed.), 2015; [3]Sklyarov et al., RGG, 2016; [4]O'Reilly et al., *Lithos*, 2009.