Geochemistry of first cycle volcanogenic sedimentary rocks from the Neoarchaean Sandur superterrane, India

C. MANIKYAMBA[1], R. KERRICH[2] AND S.M. NAQVI[1]

[1]National Geophysical Research Institute Hyderabad, India, 500 007 (cmaningri@yahoo.com, naqvimahmood@yahoo.com)
[2]Department of Geological Sciences, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 5E2, Canada (Robert.kerrich@usask.ca)

Black shales and cherts of SST are divided into two populations on the basis of their Ce abundance which varies from 1.7 to 42 ppm. Population I samples have geochemical characteristics similar to those of island arc basalts (IAB) with the exception of depletion in MgO and enrichment in Al_2O_3. Al_2O_3 has a positive correlation with almost all REE and HFSE except transitional metals whereas MgO is negatively correlated with other constituents except Ni and Cr. Most of the black shale samples of Population I have positive Eu anomalies, enriched LREE and almost flat HREE patterns. The high CIA values (80-90) reflect intense weathering and leaching within the basin. Th/Sc and Nb/La ratios suggest the predominance of mafic source over the felsic. The relationship between Al_2O_3 and other constituents indicate that fine grained aluminous clay/Aeolian dust from a distal part inhomogeneously mixed with the magnesium leached debris. Population II exhibits depleted REE with positive Eu anomalies.Geochemical features of black shales and cherts of SST indicate that they are provided from proximal plume-hotspot and island arc basalts and deposited as first cycle intra-oceanic arc-trench sediments. Kerogen isolated from population I black shales shows $\delta^{15}N$ of 2.5 to 14.62‰ and $\delta^{13}C$ are –26 to –32‰ reflecting on the biogenic source of carbon and nitrogen appears to be primary.

Reference

Condie K.C., (1993), Chemical Geology. 104, 1-37

Petrology of ultramafic xenoliths from Kharchinsky Volcano, Russia

C.L. DEKTOR[1], G.M. YOGODZINSKI[1] AND T.G. CHURIKOVA[2]

[1]Department of Geological Sciences, University of South Carolina, Columbia, SC 29208 (cdektor@geol.sc.edu)
[2]Institute of Volcanic Geology and Geochemistry, Petropavlovsk-Kamchatsky, 683006, Russia

Abundant ultramafic xenoliths from Kharchinsky Volcano provide a rare opportunity to study the physical conditions and processes in the upper mantle and lower crust of the Kamchatka arc. Forty-five representative xenoliths of the 250 that were collected from an alkaline dike at the summit of the late Pleistocene volcano, fall into olivine-rich and pyroxene-rich groups based on geochemical and petrographic observations. Xenoliths of the olivine-rich group (n=12) are harzburgites and lherzolites with protogranular to porphyroclastic textures and relatively uniform, Mg-rich olivine and pyroxene compositions (Fo_{91-92}, CPX Mg#=0.94-0.96). Xenoliths of this group contain Cr-rich spinel, and several samples contain mm-scale veins of pargasitic amphibole. Kink-banding in olivine is common, consistent with deformation under mantle conditions. Overall, these xenoliths appear similar to the 'type-one' or Cr-Diopside group interpreted as restite left after the extraction of basaltic melt from upper mantle lherzolite. The pyroxene-rich group (n=33) is made up of hornblende pyroxenites (90%) and wehrlites (10%). Silicate mineral compositions are Fe-rich and variable (Fo_{76-82}, CPX Mg#=0.75-0.88). Xenoliths of this group contain relatively Fe-rich oxides (magnetite, hercynitic spinel), and up to 50% hornblende, which occurs as coarse poikilitic crystals and mm-scale veins. Pyroxene-rich xenoliths may also contain small quantities of feldspar (<5%). Fluid inclusions are markedly more abundant in samples of the pyroxene-rich group, and fluid inclusion density is commonly much greater in pyroxene than in olivine of the same sample. Texturally, samples of the pyroxene-rich group are generally finer grained and less intensely deformed. Overall, these xenoliths have textural and compositional characteristics similar to the 'type-two' or Al-Augite group interpreted as cumulates from basaltic melt in the lower crust and upper mantle. The petrology and geochemistry of the Kharchinsky xenoliths will provide important new constraints on the physical conditions and processes that have operated in the deep crust and upper mantle beneath the Kamchatka arc.