Jericho eclogites of the Slave Craton record multiple subduction-related crust formation events

K.A. SMART*, L.M. HEAMAN AND T. CHACKO

Dept. of Earth & Atmospheric Sciences, Univ. of Alberta, Edmonton, AB T6G 2E3, Canada
(*correspondence: kasmart@ualberta.ca)

Most eclogite xenolith ages reported for the Slave craton are Paloeoproterozoic and are interpreted as remnants of subducted oceanic crust associated with the 1.9 Ga Wopmay orogeny. Although older craton-building subduction events have been inferred for the Slave craton, Archean eclogite ages have not been documented. At least three distinct geochemical types of eclogite xenoliths have been recognized at Jericho. Basaltic-type eclogites are consistent with having oceanic crustal protoliths and have 1.9 Ga zircon ages, corresponding to Paleoproterozoic subduction [1,2]. We report geochemical and Sr, Pb and O isotopic data from the basaltic Jericho eclogites that support Paleoproterozoic subduction of oceanic crust. In addition, another sub-suite of Jericho eclogites shows evidence of melt depletion, manifested by refractory major-elements and low LREE contents. Clinopyroxenes have variable Pb isotope compositions ($^{206}Pb/^{204}Pb$ = 15.51-17.26, $^{207}Pb/^{204}Pb$ = 15.08-15.49) and interestingly, clinopyroxene from one xenolith alone shows much of this compositional range. The majority of Pb isotope analyses fall along a linear array (interpreted as a mixing line) that intersects a terrestrial Pb growth curve at 170 Ma (age of Jericho kimberlite) and 2.67±0.32 Ga, broadly corresponding to widespread 2.71-2.66 Ga calc-alkaline volcanism that occurred in the Slave craton.

Experiments show that high pressure partial melting of hydrated basalt yields tonalitic melts and eclogite residues [3], and cratonic eclogite xenoliths have been proposed as the residue of tonalites present in the overlying crust [4]. Interestingly, 2.61 Ga Concession tonalites of the northern Slave craton have initial Pb isotopic compositions that define the unradiogenic end of the above Pb isotope mixing line and perhaps represent the initial Pb isotopic compsosition of the Jericho eclogites before contamination. If this interpretation is correct then there are multiple subduction-related eclogite suites in the Slave cratonic lithosphere and at least one of these suites is related to Neoarchean magmatism in the Slave crust.

[1] Heaman et *al*. (2006) *J.Pet* **47,** 821-58. [2] Schmidberger *et al*. (2005) *EPSL* **240**, 621-633. [3] Rapp & Watson (1995) *J.Pet* **96**, 891-931. [4] Ireland *et al*. (1994) *EPSL* **128**, 199-213.

Volcanism in the Saronic Gulf (W Aegean): Geochemical indications for across-arc variations?

I. SMET[1]*, M.A. ELBURG[1] AND F. VANHAECKE[2]

[1]Department of Geology and Soil Science, Ghent University, Krijgslaan 281 S8, 9000 Ghent, Belgium
(*ingrid.smet@ugent.be)

[2]Department of Analytical Chemistry, Ghent University, Belgium

Initial results of the ongoing reserach into the geochemical variations along the South Aegean subduction zone comprise data of mainly basaltic-andesitic and dacitic rocks from the islands of Aegina, Methana and Poros. These volcanic centres are situated in the westernmost part of the arc and constitute a cross-arc section, with Aegina located towards the rear of the arc and Poros closest to the trench.

Despite distinctions in silica content, the mineralogy of the samples does not vary significantly, being dominated by plagioclase, clinopyroxene and amphibole, ± olivine, orthopyroxene, biotite and xenocrystic quartz and zircon. This illustrates the importance of magma mixing for their petrogenesis and is consistent with the presence of numerous mafic enclaves in most deposits.

Higher Sr and lower Nb-Ta concentrations characterise Aegina compared to Methana and Poros. The higher Sr contents point towards a different subduction component in the source of Aegina. Poros shows higher concentrations of Li, Cs, Pb and Be, combined with higher La/Lu ratios. This might reflect higher degrees of crustal assimilation, consistent with the presence of quartz and zircon xenocrysts. Some Methana samples also contain small zircons, but none have been found in the Aegina rocks.

The observed across-arc variations appear to be influenced both by decreasing amounts of crustal contamination towards the rear of the arc, as well as variations in the composition of the subduction component. If high Sr/Nd ratios can be equated with a higher proportion of slab-derived fluids, then, surprisingly, the source of the rear-arc volcano would contain larger amounts of fluids than the more frontal centres.

Both Pb & Sr isotope data and trace element data will be presented to constrain the relative importance of source variations versus crustal contamination.