Depleted peridotites and basalts chemistry of Neoproterozoic oceanic lithosphere remnants (Araguaia Belt, Brazil)

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Few remnants of the Neoproterozoic oceanic lithosphere associated with the break-up of Rodinia decorate the ancient sutures between major cratonic pieces. Through petrography, mineral and bulk-rock chemistry, we investigate two major ultramafic units and associated mafics in the eastern border of the Amazonian Craton (central Brazil).

The Serra do Quatipuru and Serra do Tapa ultramafic units comprise mainly fully serpentinized spinel harzburgites, minor dunite lenses, chromite pods and websterite dykes. In serpentinites, lizardite-chrysotile pseudomorphic texture and high magnetite content (up to 4.8 wt. %) attest to a static oceanic-like serpentinization at 200<T<350 ºC. Mafic rocks comprise dykes of olivine gabbro cutting across the ultramafics and N-MORB pillow lavas capping the succession. In harzburgite, moderate Cr# and Mg# of Cr-spinel (respectively 0.36-0.50 wt. % and 0.60-0.73 wt. %) and high Al_2O_3 and Cr_2O_3 content of CPX (respectively 4.09-4.45 wt. % and 1.15-1.41 wt. %) are characteristic of depleted abyssal peridotites. These results are consistent with bulk rock chemistry (Al_2O_3 of 0.36-2.45 wt.% for MgO of 42.02-47.09 wt. % and Ti of 3.42-208.58 ppm), which also reflect a moderatly to highly depleted protolith for the serpentinites. REE element composition of residual harzburgite can be modeled by a 12% to 23% eutectic dynamic partial melting of a DMM source and percolation of 0.008% to 0.25% of a 0.1% DMM melt. A net difference in the REE concentrations between Northern (Serra do Tapa) and Southern (Serra do Quatipuru) units are consistent with lower partial melting in the north. It may result from a greater seafloor extent and spreading center maturity to the south, compatible with some paleogeographic reconstructions that pin the rotation pole for the Rodinia break-up just north of the Amazonian craton.