PR0173

Noble gas isotopes recording subduction-related component in metasomatized and deformed mantle xenoliths from the southwestern margin of the São Francisco Craton, Brazil

○ L.G. Braga[1], T. Jalowitzki[1], H. Sumino[2], R.A. Fuck[1], F. Gervasoni[3], M.M.D. Costa[4], R.V. Santos[1]

（[1] Universidade de Brasília, [2] University of Tokyo, [3] Universidade Federal de Pelotas, [4] Agência Nacional de Mineração）

Mantle xenoliths hosted by the diamond-bearing Canastra-1 kimberlite, located in the southwestern margin of the São Francisco Craton (SFC), Brazil, represent heterogeneous fragments from a stratified mantle column within the garnet stability field (>80 km). Here we report the first noble gas isotopes data for samples from the deep cratonic lithosphere-asthenosphere. These samples comprise sheared lherzolites, clinopyroxenites, websterites (anhydrous and hydrated samples), and eclogites. Noble gas isotopes (helium, neon, and argon) were determined by stepwise crushing extraction method (100, 500, 1000 and 2000 strokes for each sample) in a high-vacuum line to extract and purify the gases trapped in fluid inclusions from clinopyroxene and garnet separates. Our results show that the upper mantle underneath the SFC registered a complex geological evolution. Helium isotopic ratios are strongly radiogenic, with low $^{3}He/^{4}He$ ratios (<3.21 R_A; where R_A corresponds to the atmospheric ratio). Extreme radiogenic ratios (0.17 R_A) for clinopyroxenes from eclogitic samples attest volatile recycling via subduction. No significant variation is observed in the $^{3}He/^{4}He$ ratios with an increasing number of strokes. The total ^{4}He concentrations in separated clinopyroxene crystals tend to show higher values than those obtained from garnet crystals. Additionally, clinopyroxene samples also show lower $^{3}He/^{4}He$ ratios when compared to garnet. In the neon three-isotope diagram, most xenoliths present composition indistinguishable from the atmospheric ratio or they have strong mass interference of $^{40}Ar^{++}$ and CO_2^{++} to $^{20}Ne^{+}$ and $^{22}Ne^{+}$, respectively. However, some samples plot within the air-MORB line, whereas the hydrated websterites plot along the air-crustal mixing line. The $^{40}Ar/^{36}Ar$ isotopic ratios indicate mixing between the air and a mantle component (313-1211), with a strong atmospheric contribution. Therefore, we suggest that an ancient oceanic crust, probably related to the Gondwana amalgamation, was responsible for the effective recycling of a subducted-related noble gas component.