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Geochemistry of the serpentinized ultrabasic rocks from Bragança (Upper Allochthon), Portugal

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The Upper Allochthon Complex (UAC), an arc-derived continental unit on top of a nappe stack structure in NW Iberia, is well preserved in the core of the Bragança Complex. The UAIC encompasses a serpentinized mafic-ultramafic igneous suite (i.e. peridotites: dunites, harzburgites, lherzolites and wehrlites, olivine-clinopyroxenites and websterites; pyroxenites) [1]. Lizardite to antigorite and to Mg,Fe-chlorite transformation was identified in the serpentinized rocks, confirming an increase of temperature and pressure in system. The Al_2O_3/SiO_2 ratio increases in wehrlite rocks and decreases in dunite-harzburgite rocks, whereas MgO/SiO_2 ratio decreases in wehrlite rocks and increases in dunite harzburgite rocks. High amounts of Cr (2000 to 4400 ppm) and Ni (1500 to 2900 ppm) were measured in serpentinized rocks. Low amounts of Nb, Ta, Zr and Hf (<0.03 ppm) were recorded. REE contents in serpentinized rocks is very low (0.7 to 12 ppm). Higher REE contents were measured in pyroxenite rocks (128 ppm). The LREE contents (<6.31 ppm) is higher than HREE (< 5.77ppm). Most pyroxenite samples are REE-enriched, while more depleted samples are amongst the more hydrated peridotite rocks. The ∑REE tends to decrease as hydration increases. Eu/Eu* anomaly ranges from 0.62 to 3.57. Higher values seems to be related with feldspar alteration from gabbro rocks. The REE chondrite-normalized patterns [2] show a flattened shape where a slight LREE-enrichment is observed (Fig. 1). REE patterns show relatively enriched compositions, especially pyroxenite rocks but also peridotites, similarly to what has been shown by Deschamps et al. [3] for subduction-related serpentinites.

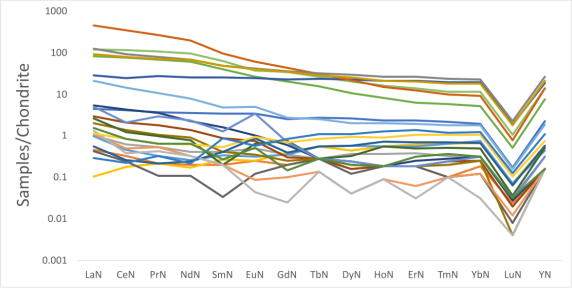

Fig. 1 - REE chondrite normalization patterns of the serpentinized ultramafic rocks from UAC, Bragança.

[1] Le Bas & Streckeisen (1991), *Journal of the Geological Society* 148, 825-833.

[2] McDonough & Sun (1995), *Chemical Geology* 120, 223-253.

[3], Godard, Guillot & Hattori (2013), *Lithos* 178, 96-127.