GSA Annual Meeting in Phoenix, Arizona, USA - 2019

Paper No. 274-6
Presentation Time: 9:00 AM-6:30 PM

THE BOU AZZER AND SIRWA OPHIOLITES (ANTI-ATLAS, MOROCCO): INSIGHT INTO POLYPHASED SUBDUCTION-ACCRETION DYNAMICS DURING NEOPROTEROZOIC TIMES

TRIANTAFYLLOU, Antoine[1], HODEL, Florent[2], BERGER, Julien[3], MACOUIN, Melina[2], BAELE, Jean-Marc[4], MATTIELLI, Nadine[5], MONNIER, Christophe[6], DUCEA, Mihai N.[7], POUJOL, Marc[8], LANGLADE, Jessica[9] and TRINDADE, Ric I.F.[10], (1)Department of Geosciences, University of Arizona, Tucson, AZ 85721, (2)Géosciences Environnement Toulouse (GET), Observatoire de Midi-Pyrénées, CNRS, IRD,, Université Toulouse III Paul Sabatier, 14, Avenue Edo Belin, Toulouse, AZ 31400, France, (3)Laboratoire Geoscience Environnement Toulouse, Universite Paul Sabatier Toulouse, 14, Avenue Edouard Belin, Toulouse, 31400, France, (4)Department of Geology, Faculty of Engineeri University of Mons, Mons, 7000, Belgium, (5)Laboratoire G-Time, Département des Sciences de la Terre et de l'Environnement, Université Libre de Bruxelles, CP 160/02, Avenue F.D. Roosevelt 50, Brussels, 1050, Belgium, (6)LPGN, Université de Nantes, 2, rue de la Houssinière, Nantes, BP 44322, France, (7)Faculty of Geology and Geophysics, University of Bucharest, Bucharest, 011004, Romania, (8)Géosciences Rennes - UMR 6118, Université Rennes 1, Campus Beaulieu, Rennes, 35042, France, (9)Ifremer, Centre de Bretagne, Technopole Brest Iroise, Plouzané, 29280, France, (10)Departamento de Geofisica, IAG/USP, Rua do Matao,1226, Cidade Universitaria, Sao Paulo, SP 05508-090, Brazil

We present a petrological, geochronological and geochemical study of Neoproterozoic ophiolitic units exposed in the Pan-African orogenic belt (Moroccan Anti-Atlas). These units comprise two main complexes: *(i)* the Khzam ophiolite (in the Sirwa window) to the west and *(ii)* the Aït Ahmane ophiolite to the east (in the Bou Azzer inlier). Both complexes mainly consist in serpentinized ultramafics associated with rare chromite pods and pyroxenite which are in tectonic contact with mafic units made of isotropic and layered metagabbros and metabasalts dykes. Khzama ophiolite has been dated at 762 Ma (U-Pb zircon dating on plagiogranite dykes) and we dated Aït Ahmane ophiolite at 745.9 ± 7.4 Ma (U-Pb zircon dating on a layered metagabbro). The precursors of Aït Ahmane and Khzama serpentinites are spinel harzburgites associated with minor dunitic lenses, both entirely serpentinized. Bulk rock composition shows low contents in incompatible major and trace elements (Al_2O_3: 0.2-1.3 wt.% and Ti: 3-38 ppm) and in HREE ([Yb]N<0.4), attesting of a highly refractory protolith. This is in agreeme with high Cr# (0.44-0.81) and rather low Mg# (0.25-0.73) ratios of Cr-spinels cores in serpentinites from the two complexes. Whole-rock trace elements data show that the Aït Ahmane and Khzama harzburgites are residues a high degree of partial melting, similar to peridotites from the IBM forearc region. Their REE compositions can be modeled by 17 to 31% partial melting in an open-system hydrous dynamic model using an already depleted mantle source. Metabasaltic rocks are tholeiitic with variable subduction zone signature marked by low LILE/HFSE ratios. Based on their Ti, Nb, Th contents and REE patterns, two types of metabasalts can be distinguished; b occurring in the Sirwa and the Aït Ahmane ophiolitic massifs. The first type shows typical N-MORB signature as the second, is marked by a strong influence of subduction component. Trace elements modeling attests that th are petrogenetically related to the multiple-steps formation ultramafic harzburgitic residue. Geochronological U-Pb data attest that both ophiolites are synchronous. The petrological and geochemical results furthermore confirm that they represent a single portion of supra-subduction oceanic lithosphere.

Session No. 274--Booth# 249
T19. Subduction Zone Systems: Geochemical, Petrochronological, and Geophysical Constraints on Lithospheric Structure, Composition, and Geodynamics (Posters)
Wednesday, 25 September 2019: 9:00 AM-6:30 PM

Hall AB, North Building (Phoenix Convention Center)

Geological Society of America *Abstracts with Programs.* Vol. 51, No. 5
doi: 10.1130/abs/2019AM-336212

Back to: T19. Subduction Zone Systems: Geochemical, Petrochronological, and Geophysical Constraints on Lithospheric Structure, Composition, and Geodynamics (Posters)

<< Previous Abstract | Next Abstract >>