# Plagiogranites from Oceanic Core Complex of MAR at 5º10'S: dating and possible mechanism of formation

S.SILANTYEV[1]* , J.KOEPKE[2] A.ARISKIN[1] , M.ANOSOVA[1] , E.KRASNOVA[1] , E.DUBININA[3] AND G.SUHR [4]

[1]Vernadsky Institute, Moscow, 119991, Russia (* correspondence: silantyev@geokhi.ru )
[2]Institut fuer Mineralogie, Leibniz Universitaet, Hannover, 30167, Germany (koepke@mineralogie.uni-hannover.de)
[3]Institute of the Geology of Ore Deposits, Petrography, Mineralogy, and Geochemistry, Moscow, 119017, Russia
[4]Institut fuer Geologie und Mineralogie, Koeln Universitaet, Koeln D-50674, Germany

The structure and composition of the seafloor basement of the South Mid-Atlantic Ridge (SMAR) are still studied much less thoroughly than those in segments of the ridge north of the Equator. This explains interest attracted to the collection of rock samples gathered during Cruise MARSUED IV of the R/V *Atalante* (2008) at the SMAR intersection with the 5ºS Fracture Zone. Our newly obtained data on the geochemistry and age of Plagiogranite–Gabbronorite association sampled during this expedition in the Oceanic Core Complex of the SMAR at 5°10' S suggest close genetic relations between these rocks. The U/Pb zircon age of Plagiogranite sample is 1.059 ±0.055 Ma and is in good agreement with the zircon age of plutonic rocks in the Oceanic Core Complexes of northern MAR. A distinctive geochemical feature of the rocks examined is their unusually depleted $^{87}Sr/^{86}Sr$ and $^{143}Nd/^{144}Nd$ ratios, which suggest that the plutonic rocks of the Plagiogranite–Gabbronorite association in SMAR at 5°10' S could be derived from the most strongly depleted mantle reservoir of all known to occur beneath the axial MAR zone. The peculiar pole of depletion discovered in SMAR at 5°10′ S is in good agreement with character of the geochemical segmentation of SMAR between 0º - 12° S and can, perhaps, be explained by the melting of an ancient mantle source that was significantly depleted by planetary-scale magmatism during the initial opening of the Atlantic Ocean. The COMAGMAT-5.2 [1] numerical thermodynamic simulation of the possible crystallization links between the Plagiogranite and Gabbronorite from the SMAR at 5°10' S led us to conclude that the leading role in the origin of the least magnesian Oceanic Plagiogranite was played by a two-stage process: the partial melting of the Gabbronorite and the subsequent fractionation of the newly generated melt.

[1] Ariskin A., Danyushevsky L., Bychkov K. *et al* Modeling solubility of Fe-Ni sulfides in basaltic magmas:The effect of Ni in the melt, *Econ. Geol*., 2013, V.**108**, N8. PP.1893-2003