

**P16-14****PHENOMENON OF THE CRETACEOUS PALEOISLAND  
ARC AT THE BLACK SEA FLOOR****K. E. SHNYUKOVA<sup>1</sup>, I. B. SHCHERBAKOV<sup>1</sup> and E. F. SHNYUKOV<sup>2</sup>**

<sup>1</sup> Institute of Geochemistry, Mineralogy and Ore Formation, National Academy of Sciences of Ukraine, 34 Palladyn Ave, Kiev 142, 252680, Ukraine

<sup>2</sup> Department of Marine Geology and Sedimentary Ore Formation, National Scientific Museums of Natural History, National Academy of Sciences of Ukraine, 15 Bogdan Chmelnytsky St., Kiev, 252030, Ukraine

Lomonosov submarine massif (LSM) is situated at the Black Sea floor 26 miles distant southwestwards from Sevastopol between 44 35 N, 32 30 E and 44 20 N, 33 10 E. It represents a fragment of the paleoisland arc and has been explored by now within the area 44 km. long and about 10 km. wide. The crystalline rocks of LSM are exposed along the edge of the continental slope at a depth of 200 to 1800 m. (Shnyukov, Shcherbakov and Shnyukova, 1977).

According to the density model across the continental slope based upon the gravimetry data (Shnyukov et. Al. , 1998) LSM is a typical transition zone continent-ocean. Its northwestern part is located on the continental crust corresponding to the southern margin of the Scythian platform which in its turn is considered to be a dipped margin of the East European platform. Southeastern part of LSM is disposed in the oceanic crust. The Earth's crust in the LSM vicinity is broken up by the system of closely spaced sublatitudinal dislocations into several subparallel plate-like blocks. Blocks with predominantly basaltic density (2,9 g/c ) alternate those with granitic density (2,72 g/c ). LSM itself is composed by mainly basaltic block. The thickness of granitic layer in it is reduced to 2,3 km (Shnyukov et. Al., 1998). Such dissected structure of the Earth's crust has been observed for 5 km towards the Western Black Sea depression. Two more blocks of basaltic and granitic density, respectively, have been determined here. It enables to infer that by the beginning of the formation of the depression LSM had been integral and later on its southeastern part was dipped. Blocked structure of the Earth's crust does not affect Moho that occurs here at a depth of 32-34 km.

Sedimentary rocks in LSM are represented by the components of Tavrik flysch and Upper Cretaceous marls and clays as well as by the Lower Carboniferous black argillites that testify to the presence of Scythian basement here. Upper Jurassic limestones which are known to be widely spread in the Mountainous Crimea are probably absent in LSM.

A remarkable peculiarity: despite its relatively small size LSM has a full number of ipetrographical attributes being characteristic for the island arcs. Volcanites of three typical island arc series have been established in LSM, namely boninite, calc-alkali and shoshonite ones. Boninite and calc-alkali series have plutonic and hypabyssal comagmates. Among the acidic plutonites there are rocks whose petrochemical peculiarities correspond to the "oceanic plagiogranites" which are known to be a component of the ophiolitic suites, although ophiolites self were not found in LSM. In spatial distribution of LSM igneous rocks a clear petrochemical zonality emphasizing the aforesaid heterogeneous structure of the crust has been detected. In the eastern part of LSM the rocks of boninite and calc-alkali series are situated and in the northwestern part the rocks of calc-alkali and shoshonite series have been revealed. It may be supposed that the submarine exposure of LSM opens the Island arc approximately across its strike. In such a case the dip of a hypothetical subduction plane should be towards the East European platform.

Another one interesting circumstance: the finds of the huge boulders of tonalites and plagiogranites analogous to the LSM rocks onshore the Southwestern Crimea together with paleontological data provide an assumption that this massif had been separated from the Crimea only 10-20 thousands years ago. Geological history of the Crimea and LSM was not the same, at least while depositing of thick limestone beds during Late Jurassic in the Crimea LSM had been a land.

The age of the LSM magmatism determined by the K-Ar method is 145-26 Ma. Among the datings two maximums are distinguished, namely 125 (Barremian) and 65 (Danian-Paleocene) Ma. Thus, in the LSM history two splashes of magmatic activity may be assumed. The first one is Early Cretaceous and was connected with the existence of the systems of rift basins both along the Srednegorie-Crimea-Caucasus belt and Pontides-Trancaucasus belt in Barremian to Aptian (Banks and Robinson, 1997; Nikishin et. al., 1998). The second splash is Late Cretaceous-Paleogene and was initiated by subduction-related rift subsidence (Nikishin et. al., 1998). These two splashes were preceded by the active Middle Jurassic magmatism in the Crimean Mountains (190-160 Ma) being comparable with the subduction-related magmatism in the Pontides-Transcaucasus belt.

Thus, in the Southern Crimea region forming the middle part of the Srednegorie-Crimea-Caucasus volcano-plutonic belt three climaxes of Anatolian subduction zone. During this period LSM had been an intra-arc rift basin. According to our data the formation of the Western Black Sea depression had begun not in the Middle Cretaceous as it is usually thought but much later, earlier than in Paleocene.

### References

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