HPS-01 General contributions to stratigraphy

Plio-Pleistocene mammalian biochronology of Russia: theory and practice

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The modern mammalian biochronology of Russia was derived from the chronological system elaborated by Valerian Gromov in late 30-s of the last century. It was based on successive evolutionary stages of the mammoth evolutionary lineage studied in a number of European localities. Original Gromov's sequence of 1948 included Khapry, Psekups, Taman, Tiraspol, Singil, and Late Palaeolithic mammal units, or complexes. Currently, the stable core of original Gromov's mammal units is widely used in European Russia, Ukraine, Moldova, and Belarus. In the 60-s of the last century large-scale investigations of fossil small mammals lead to the elaboration of rodent (mainly arvicolids) based chronological units.

Although consistently called biostratigraphic, most mammal based zonations in Russia are essentially biochronologic because they are based on stages of evolution of mammals from isolated sites rather than on stratigraphic sequences with layer-to-layer paleontological content. Nevertheless, the tight integration of many reference localities with regional formations, and particularly relationships with marine sediments of the Eastern Paratethys, provide a sound stratigraphic control for the mammalian unit systems. Advances in magnetostratigraphy in last decades of the 20th century permitted to resolve most remaining problems on the order of units and establish unambiguous correlations of continental and marine formations.

At the same time, there are several factors that hamper the broad application of the standard biochronological system and its detalizing. First, it is the so-called regional "stratigraphic separatism" when some territories with independent stratigraphic administration having different names of mammal-based chronological units, regardless of the same mammalian species and assemblages used for their characteristics. In addition, at present time there is a series of insufficiently standardized biochronological systems proposed by individual students and research groups as a development of the Gromov's system, which share some unit names and differ in others. The criteria of units (whether based on small or large mammals) should still be refined.

The practical importance of mammalian biochronology is very high. In situation of widespread continental deposits, lack of volcanic sediments suitable for radiometric dating, and a continuing instability of international Plio-Pleistocene chronostratigraphy, the transcontinental mammal zonation is one of the few sound bases for continental stratigraphy of Plio-Pleistocene in Russia.

The prospects of the mammalian biochronology in Russia is in maintaining integrity of East European mammal units, creating the fully standardized system of units spanning the Euro-Siberian zoogeographic province and its integration with all-European biochronology (ELMA) and with biochronologic systems of Transbaikalia and Western Beringia.