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Southern Scientific Centre, Russian Academy of Sciences
Geological Institute, Russian Academy of Sciences**

QUATERNARY STRATIGRAPHY AND PALEONTOLOGY OF THE SOUTHERN RUSSIA: connections between Europe, Africa and Asia

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The conference is devoted to the memory of Andrey Dodonov – geologist, colleague, friend and teacher

Editorial Board: V.V. Titov, A.S. Tesakov

Quaternary stratigraphy and paleontology of the Southern Russia: connections between Europe, Africa and Asia: Abstracts of the International INQUA-SEQS Conference (Rostov-on-Don, June 21–26, 2010). Rostov-on-Don, 2010. 228 p.

The book presents the materials of the International Conference held in Rostov-on-Don (Rostov Region, Russia). Reports concern a wide spectrum of issues connected to the study of Quaternary marine and continental deposits of Eastern and Western Europe, Asia, and Africa. Paleobiological record of the Eastern Europe, faunal connections with Asia, Africa, and Western Europe are considered. The special attention is given to questions of paleogeography, climatic changes in the Quaternary, stratigraphy and sedimentology of Eastern Europe. Also presented are the newest data on the tectonics and climatic record. Questions of distribution and chronology of Paleolithic sites, adaptations of the ancient people to paleoenvironment are discussed.

Addressed to geologists, stratigraphers, paleontologists, paleogeographers, and archaeologists.

Materials are published with the maximal preservation of the authors' texts

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**Международный союз по изучению четвертичного периода
Секция европейской четвертичной стратиграфии
Южный научный центр РАН
Геологический институт РАН**

ЧЕТВЕРТИЧНАЯ СТРАТИГРАФИЯ И ПАЛЕОНТОЛОГИЯ ЮЖНОЙ РОССИИ: взаимосвязи между Европой, Африкой и Азией

**Материалы международной конференции
INQUA-SEQS 2010**

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При поддержке INQUA, грантов РФФИ № 10-05-06045-г, 09-05-00307а, Программы фундаментальных исследований Президиума РАН «Происхождение биосферы и эволюция геобиологических систем», Программы фундаментальных исследований ОНЗ РАН «Состояние окружающей среды и прогноз ее динамики под влиянием быстрых глобальных и региональных природных и социально-экономических изменений»

Конференция посвящена памяти Андрея Евгеньевича Додонова – геолога, коллеги, друга и учителя

Редакционная коллегия: В.В. Титов, А.С. Тесаков

Четвертичная стратиграфия и палеонтология южной России: взаимосвязи между Европой, Африкой и Азией: Материалы международной конференции INQUA-SEQS (Ростов-на-Дону, 21–26 июня 2010 г.). Ростов-на-Дону, 2010. 228 с.

Книга содержит материалы международной конференции INQUA-SEQS 2010, проведенной в г. Ростов-на-Дону (Ростовская область). Сообщения касаются широкого спектра проблем, связанных с изучением четвертичных морских и континентальных отложений Восточной Европы, Западной Европы, Азии и Африки. Рассматриваются палеобиологическая летопись Восточной Европы, фаунистические взаимодействия с Азией, Африкой и Западной Европой. Особое внимание уделяется вопросам палеогеографии, климатических изменений в четвертичном периоде, стратиграфии и седиментологии в Восточной Европе. Показаны новейшие данные изучения тектонической и климатической летописи. Обсуждаются вопросы распространения и хронологии палеолитических стоянок, адаптации древнего человека к палеосреде.

Издание предназначено для геологов-стратиграфов, палеонтологов, палеогеографов и археологов.

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PLEISTOCENE LARGE MAMMAL ASSOCIATIONS OF THE SEA OF AZOV AND ADJACENT REGIONS

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Different levels of Pleistocene deposits are widely distributed in the south of Eastern Europe. Ample materials from a number of reference sections from this area were used for definition of Pleistocene Faunistic complexes (Gromov, 1948; Alexeeva, 1990).

Middle Villafranchian Eastern European animal associations correlated to zone MN17, determined as the **Khapry Faunistic Complex**, were characterized by the prevalence of *Archidiskodon meridionalis gromovi*, late *Anancus*, an abundance of large and slender *Equus (Allohippus) livenzovensis*, early *Elasmotherium chaprovicum*, *Paracamelus alutensis*, *Arvernoceros* and *Eucladoceros*, *Libralces*, and *Gazellospira*. In type localities of the complex Khapry and Liventsovka the following ratio of large mammal's remains was recorded: "*Archidiskodon*" – 23 %, *Equus* – 24 %, *Paracamelus* – 9 %, *Eucladoceros* – 10 %, *Anancus* – 9 %, *Arvernoceros* – 9 %, and Carnivora, Bovidae, Rhinocerotidae and others account for approximately 2 %, each (Baigusheva, 1971; Titov, 2008). This assemblage includes abundant forms adapted to open steppe and forest-steppe landscapes. Many thermophilic forms characteristic for humid and wooded conditions, as lophodont mastodons, tapirs, and hippopotamuses, disappeared. The combination of European and Central Asian elements was typical for Eastern European associations due to the position of this area at a junction of paleozoogeographic regions (Bajgusheva et al., 2001). The megafauna is accompanied by a rich small mammal association, including *Mimomys praepliocaenicus*, *Borsodia praeungaricus cotlovinensis*, *Mimomys* ex gr. *reidi*, correlated with Late Villanyian and regional zone MNR2 (Tesakov, 2004).

Securely dated Late Villafranchian large mammal localities that yielded abundant material are few in Eastern Europe. Terminal middle to late Villafranchian faunas of the region are assigned to the **Psekups (Odessa) Faunistic Complex**, which can be considered as a later stage of the Khapry Complex. The main criteria of this unit include the presence of *Archidiskodon meridionalis meridionalis*, *Stephanorhinus* cf. *etruscus*, *Equus (A.)* cf. *major*, *Eucladoceros orientalis orientalis*, and *Pseudodama nestii*. Bunolophodont mastodons *Anancus* and camels *Paracamelus alutensis* became less numerous during this time. The locality Palan-Tukan (Transcaucasia), dated to the early Late Villafranchian, yielded the latest find of *Nyctereutes megamastoides* (Sotnikova, Sablin, 1993). This time was likely witnessed increasing aridification and extension of steppe-like areas. In comparison with the previous stage, no drastic reorganizations occurred in composition of mammal associations. Large mammal fauna of the Psekups assemblage is correlated to the regiozone MNR1 with predominance of *Borsodia* gr. *newtoni-arankoides*, *Mimomys* spp., and *Clethrionomys kretzoi* (Tesakov, 2004).

Early Pleistocene. Terminal Late Villafranchian, Early Galerian, and Early Biharian animal associations of Eastern Europe are assigned to the **Taman Faunistic Complex**. They commonly include index forms of large mammal, as *Archidiskodon*

meridionalis tamanensis, *Elasmotherium caucasicum*, *Eucladoceros orientalis*, *Bison tamanensis*, and *Pontoceros ambiguus*. Tamanian association also includes *Canis tamanensis*, *Canis (Xenocyon) lycaonoides*, *Ursus* sp. *Lutra simplicidens tamanensis*, *Pachycrocuta brevirostris*, *Panthera* sp., *Homotherium latidens*, *Equus (Allohippus)* cf. *major*, *Stephanorhinus* cf. *etruscus*, *Tragelaphus* sp., *Gazella* sp., and other forms (Verestchagin, 1957; Forsten, 1999; Sotnikova, Titov, 2009). This animal spectrum indicates a variety of biotopes typical for steppe and forest-steppe landscapes, and does not contain mesophilic elements. Taphocoenoses of the Taman assemblage were dominated by remains of animals typical for half-open and open habitats, as elephants, deer, horses, and bisons. The fauna of the Tsymbal locality associated with alluvial deposits (Taman peninsula) shows the following ratio of forms: *Archidiskodon* – 42 %, Cervidae gen. – 34 %, *Equus* – 12 %, *Bison* – 5 %, *Stephanorhinus* – 3 %, Castoridae gen. – 2 %, Tragelafini gen. – 1 %, and *Elasmotherium*, *Canis*, *Panthera*, and *Sus* – less, than 0,01 % each (by Vereschagin, 1957). Most localities of Taman large mammals occur in alluvial, deltaic, and lagoon deposits. It indicates an important presence of flowing waters in these areas. These localities were likely formed during the first half of this period which was characterized by a warmer, relatively humid climate approaching the subtropical type. The Taman megafauna is accompanied by *Prolagurus pannonicus*, *Lagurodon arankae*, and *Allophaiomys pliocaenicus* which characterize MQR 8 regiozone. A climatic cooling that occurred in the second half of Early Biharian (the period of a cold phase of development of the Taman Faunistic Complex), and also the general tendency to aridification have brought to a significant reduction or extinction of some mostly thermophilic forms of animals. In general, for pre-Galerian period of the East Europe there was typical a prevalence of steppe regions above forest-steppe ones. From this time onwards the savanna-like landscapes characteristic for the Khapry and Psekups complexes are replaced in this area by steppe landscapes.

Eastern Europe faunas of early Middle Pleistocene belong to the **Tiraspol Faunistic Complex**. The most part of the known localities of large animals are pertained for alluvial and deltoid deposits and are ascribing to the periods of warm phases of Middle Pleistocene. A basis for its choosing is the presence of steppe elephant *Mammuthus trogontherii*, large horse *Equus süssenbornensis*, small and slender *Equus* cf. *altidens*, *Stephanorhinus* cf. *etruscus*, *Stephanorhinus kirchbergensis*, *Praemegaceros verticornis*, *Alces latifrons*, *Bison schoetensacki* (*B. aff. priscus* by Sher, 1997) and earlier cave predators *Ursus (Spelaeoarctos) deningeri*, *Panthera spelaea* (Pleistocene of Tiraspol, 1971; Forsten, 1999). This association is considered as relatively cold resistance. It consists mainly of descendants of those animals who could survive through epoch of cold snaps. The inhabitants of open landscapes (steppe and forest-steppe) prevailed in it. The most part of the information about the animal association of the first half of this time period gives the stratotype locality Kolkotova Balka (Tiraspol gravel) whence occurs the most various fauna. Finds of two practically complete skeletons of *Mammuthus trogontherii* from Kagalnik sand pit are synchronous to it (Tesakov et al., 2007). During the interglacial period (which is correlated to the Muchkap interglacial), which was accompanied by the expansion of a forest zone, elephants *Elephas (Palaeoloxodon) antiquus* reached up to the Urals, into a lower course of Volga River, and to Transcaucasia (Alexeeva, 1990). This large mammal association is correspondence with MQR5 regiozone with predominance of *Stenocranius gregaloides* (Tesakov, 2004).

Post Tiraspolian faunal communities are known from cave sediments of Northern Caucasus. They evidence the presence of forest-steppe landscapes, and dry and warm climate similar to the modern one. The specific structure from the lower horizons of Early Paleolithic site of the Treugolnaya Cave includes *Canis mosbachensis*, *Ursus (Spelaeartcos) deningeri*, *Crocota spelaea*, *Panthera spelaea*, *Equus altidens*, *Stephanorhinus hundsheimensis*, *Capreolus cf. süssenbornensis*, *Cervus elaphus*, *Bison schoetensacki*. This association is allocated as independent Urup Faunistic Complex and interpreted as early regional Caucasian stage of the next Middle Pleistocene **Singil Faunistic Complex** (Baryshnikov, 2007).

Separate finds of large mammals of late Middle Pleistocene **Khazar Faunistic Complex** originate from the Don River alluvium, and have no exact stratigraphic situation. *Mammuthus chosaricus*, *Stephanorhinus kirchbergensis*, *Elasmotherium sibiricum*, *Camelus knoblochi*, *Bison priscus longicornis*, *Saiga tatarica*, *Megaloceros giganteus*, and *Cervus elaphus* were typical for that association. The mammal association of the Likhvin interglacial in the south of the Russian Plain indicates the presence of forest-steppe conditions with the prevalence of steppe forms. The megafauna correlates with MQR2 regional zone with the prevalence of *Lagurus lagurus* and *Arvicola mosbachensis*.

From Mikulino interglacial (Eemian) deposits of Don River Region early Late Pleistocene **Shkurlat Faunistic Complex** is known. Fluvial deposits of the Veshenskaya locality in middle course of Don River, not associated with a archaeological site, produced remains of *Canis sp.*, *Ursus (Spelearctos) savini rossicus*, *Leo spelaea*, archaic form of *Mammuthus primigenius*, *Coelodonta antiquitatis*, *Equus hydruntinus* и *Equus cf. latipes*, *Cervus elaphus*, *Megaceros giganteus*, *Alces alces*, and *Rangifer tarandus*. This association indicates forest-steppe conditions.

Elements of the **Mammoth (Upper Paleolithic) Faunistic Complex** are mostly known from Upper Paleolithic sites. This association typically includes *Canis lupus*, *Ursus arctos*, *Mammuthus primigenius*, *Equus caballus latipes*, *Equus hydruntinus*, *Cervus elaphus*, *Megaloceros giganteus*, *Alces alces*, *Rangifer tarandus*, *Bos cf. primigenius*, *Bison priscus*, and *Saiga tatarica*. This large mammal association was mainly characteristic of interglacial stages of the region. This fauna is correlated with MQR1 regional zone by small mammals (Tesakov, 2004).

Megafaunas record of the Sea of Azov Region is relatively complete. It allows to trace the development of faunal communities in the south of Eastern Europe related to climatic and zoogeographic changes. Being on the border of the European and Asian faunas, the communities of this territory had specific characteristics that distinguish them from other regions.

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Large mammals of Khaprovian faunal complex from Liventsovka locality.

1 – *Arvernoceros* cf. *verestchagini*: the part of the skull with the fragments of antlers, rostral view; 2 – *Eucladoceros dicranios tanaitensis*: the fragment of left antler, medial view; 3 – *Gazellospira gromovae*: the fragment of left horn, aboral view; 4 – *Anancus arvernensis alexeevae*: right upper jaw with M^2 - M^3 occlusal view; 5 – *Archidiskodon meridionalis gromovi*: right ramus of lower jaw with M_3 occlusal view; 6 – *Palaeotragus* (*Yuorlovia*) *priasovicus* Godina et Baigusheva: the fragment of right lower jaw with M_1 - M_3 , labial view; 7-8 – *Paracamelus alutensis*: 7 – right metacarpal bone Mc III+IV, dorsal view, 8 – right metatarsal bone Mt III+IV, dorsal view; 9 – *Stephanorhinus* sp.: left lower jaw with P_2 - M_3 , labial view; 10 – *Elasmotherium chaprovicum*: right M^1 , occlusal view; 11 – *Equus* sp.: the fragment of right upper jaw with P^4 - M^1 , occlusal view; 12 – *Equus* (*Allohippus*) *livenzovensis*: occlusal view of right P^3 - M^3