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The Upper Miocene of the Rostov Dome (Eastern Paratethys): Implication of the chronostratigraphy and bivalvia-based biostratigraphy

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Abstract. The Rostov Dome is located in the south of the Russian Platform. In the Late Miocene this area was embraced by the Eastern Paratethys. The implications of a recently developed Neogene chronostratigraphy to the studied area are discussed. The Sarmatian regional stage corresponds to the upper part of the Langhian, the entire Serravalian and the lower part of the Tortonian global stages; the Maeotian regional stage corresponds to the upper part of the Tortonian and the lowermost horizons of the Messinian global stages; the Pontian regional stage corresponds to most of the Messinian and the lowermost Zanclean global stages. A first Bivalvia-based biostratigraphic framework is proposed for the territory of the Rostov Dome. Five biozones were established within the Serravalian–Messinian: *Tapes vitalianus*, *Cerastoderma fittoni–Cerastoderma subfittoni*, *Congeria panticapaea*, *Congeria amygdaloides navicula* and *Monodacna pseudocatillus–Prosodacna schirvanica*.

Key words: regional stages, chronostratigraphy, biozones, bivalves, Upper Miocene, Eastern Paratethys.

Апстракт Ростовска дома налази се на југу руске платформе. За време касног миоцена ова област припадала је Источном Паратетису. Разматран је значај савремене неогене хроностратиграфије за проучавану област. Сарматском регионалном кату одговара део лангиана, цео серавалиан и доњи део тортона; меотском регионалном кату одговара горњии део тортона и најнижи хоризонти месиниана; понтском регионалном кату одговара већи део месиниана и најнижи занклеан. По први пут се даје биостратиграфија горњег миоцена на основу шкољака за област ростовске доме. У оквиру саравалиан–месиниан установљено је пет биозона: *Tapes vitalianus*, *Cerastoderma fittoni–Cerastoderma subfittoni*, *Congeria panticapaea*, *Congeria amygdaloides navicula* и *Monodacna pseudocatillus–Prosodacna schirvanica*.

Кључне речи: регионални катови, хроностратиграфија, биозоне, шкољке, горњи миоцен, источни Паратетис.

Introduction

The study of the Upper Miocene deposits of the Eastern Paratethys began about 150 years ago (Abich, 1865; Andrusov, 1884; Andrussow, 1911), but some important questions on their stratigraphy are still unresolved. Correlation between global and regional stages (1) and the development of macrofauna-based biozonation (2) are among them.

The Rostov Dome is a promising area to study the Upper Miocene stratigraphy of the Eastern Paratethys. It is situated in the southern part of the Russian Platform (Fig. 1). The Upper Miocene sedimentary complexes are wide-spread and cover all its territory. The high abundance of fossil bivalves in the Upper Miocene deposits of the Rostov Dome suggests the use of this group for the development of the first regional biostratigraphic framework. To do this, it was first necessary to implement the recently developed chronostratigraphy of the Upper Miocene in order replace the regional scale of the Eastern Paratethys.

Geological setting

The Rostov Dome is situated in the South of the European part of Russia (Fig. 1). In a tectonical sense, it represents a specific structure in the eastern part of the Precambrian Ukrainian Craton, which itself is a great block of the Russian platfrom (Lebedko, 1980;

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POGREBNOV *et al.,* 1970). After its uplift in the Cretaceous–Paleogene, the dome has several times been covered by the sea from the south.

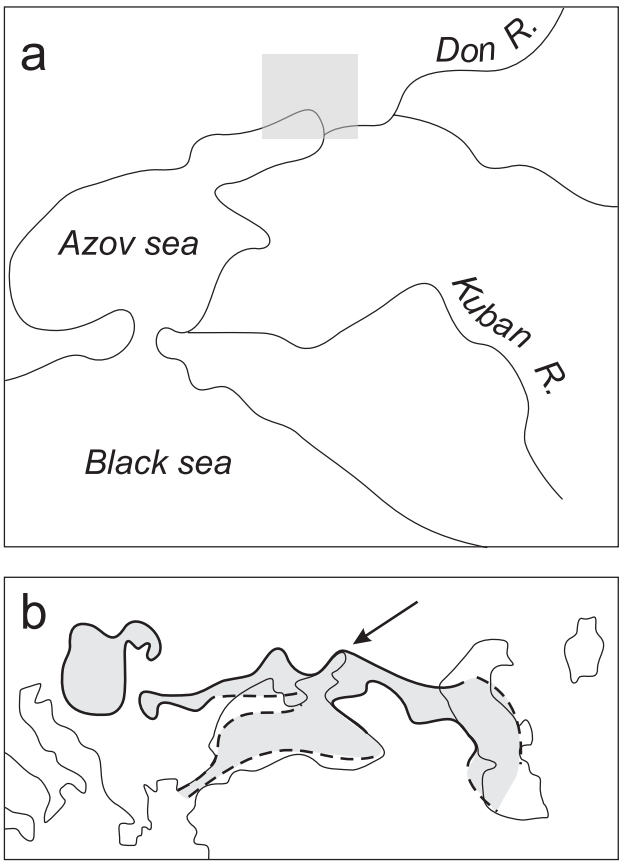

Fig. 1. Geographical (a) and palaeogeographical (b) locations of the studied area (shaded in a and indicated by an arrow in b). Palaeogeographical reconstruction after NEVESSKAJA *et al*. (1984).

In the Neogene, all the south of the European part of Russia was occupied by a large basin. It was a remnant of the previously existing Neotethys, which, after the orogeny in the alpine regions, became divided into 2 parts – the Mediterranean and the so-called Paratethys, consisting of Western (Pannonian), Central and Eastern Basins. The Paratethys originated at the end of the Paleogene, and its isolation strengthened cyclically from the Oligocene until the Pliocene (ILINA *et al*., 1976; NEVESSKAJA *et al*., 1984; NOSOVSKIJ, 2001; RÖGL, 1998, 1999; ULANOVSKAYA, 1998). The territory of the Rostov Dome is located at the northernmost periphery of the Eastern Paratethys (Fig. 1). It was embraced by sea during the maximums of cyclically repeating transgressions, when a relatively large and wide Tanaiss palaeobay originated (RUBAN, 2002a). Various sediments accumulated during these times – clays, silts, sands, marls, limes. But the most typical Upper Miocene deposits are skeletal limestones, consisting completely of shells of bivalves, less gastropods and their remains of different size.

Although the Upper Miocene deposits are well-exposed in outcrops within the studied area, they have been investigated only occasionally during the XX century by BOGATCHOV (see RODZJANKO, 1970) and later by RODZJANKO (1970, 1986). Also they have been characterized in few monographs, e.g., PAFFENGOLTS (1959), IVANITSKAJA & POGREBNOV (1962), but these descriptions mostly summarized the results of the above mentioned researchers.

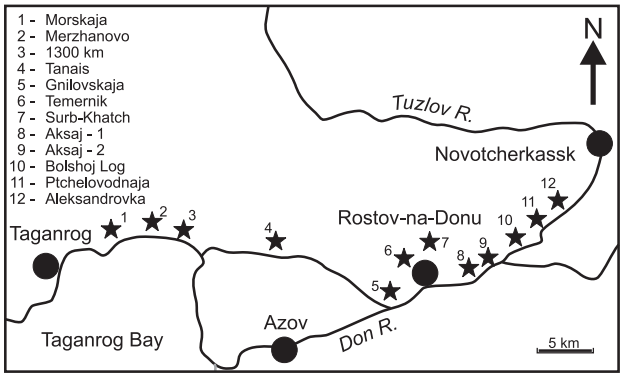

Fig. 2. Location of the studied sections of the Upper Miocene deposits of the Rostov Dome.

The author studied 12 sections of the Upper Miocene strata of the Rostov Dome (Fig. 2) and made a lithostratigraphic framework (Figs. 3, 4). Taganrogskaja, Rostovskaja, Donskaja, Merzhanovskaja and Aleksandrovskaja Formations were formally defined (RUBAN, 2002b). The Janovskaja Formation was established previously by RODZJANKO (1986). Additionally, RUBAN & YANG (2004) proposed a first sequence stratigraphic framework for the Upper Miocene deposits of the Rostov Dome.

Bivalves from the Upper Miocene deposits were studied (RUBAN, 2002b). Identification of the species was made according to general overviews (with taxonomic descriptions and figures) of Neogene bivalves of the Eastern Paratethys presented by ILINA *et al*. (1976) and NEVESSKAJA (1986).

Implication of the chronostratigraphic scale to the Eastern Paratethys

Normalization of the general stratigraphic framework of the Eastern Paratethys, i.e. to correlate global and regional stages, is an important task, because this will enable correlations of biostratigraphic units, which may be defined in the Upper Miocene of the Rostov Dome, to be made to adjacent and even far-located regions.

When in the XIX century differences between the Mediterranean and the Paratethys were established, the general problem of Neogene strata correlation between

Fig. 3. Generalized lithostratigraphy of the Upper Miocene deposits of the Rostov Dome.

these territories appeared. Differences in the stratigraphy between the Western and the Eastern Paratethys arose. In the 1980s and 90s, the Mediterranean stratigraphic scale of the Neogene coupled with world-wide data underwent revision by the International Comission on Stratigraphy (ICS) in order to develop a globally-significant chronostratigraphic scale. This procedure is ongoing, and a new precise chronostratigraphic scale is "under construction". When the development of the recent chronostratigraphic scale began, the difficulties in making a correlation between the global and the regional Eastern Paratethys stratigraphies strengthed again.

The "International stratigraphic Guide" (SALVADOR, 1994) proclaims stages as units with a global sense. Thus, it cannot be defined essentially for a particular region, because the geologic time was not different in the palaeospace. Meanwhile, when stratigraphers begin to define further global units, there is often insuficient data to enable the consideration of globally-recognized horizons in the studied interval. In this way, separate standards of stages appear. Each of them is valid for a single region. The stages in such standards are regional stages.

Nowadays, there are at least two intervals for which regional stages are widely used: Cambrian (PALMER, 1998; ZHURAVLEV, 1995) and Carboniferous (MENNING *et al*., 2000, 2001; WAGNER & WINKLER PRINS, 1983). Discussions about which regional stages are preferable are ongoing. However, every time, when evidence is obtained which enables larger global units to be defined (as in the case of the Upper Miocene), it is not necessary to use regional stages. It is clear that different chronostratigraphies for particular regions should no

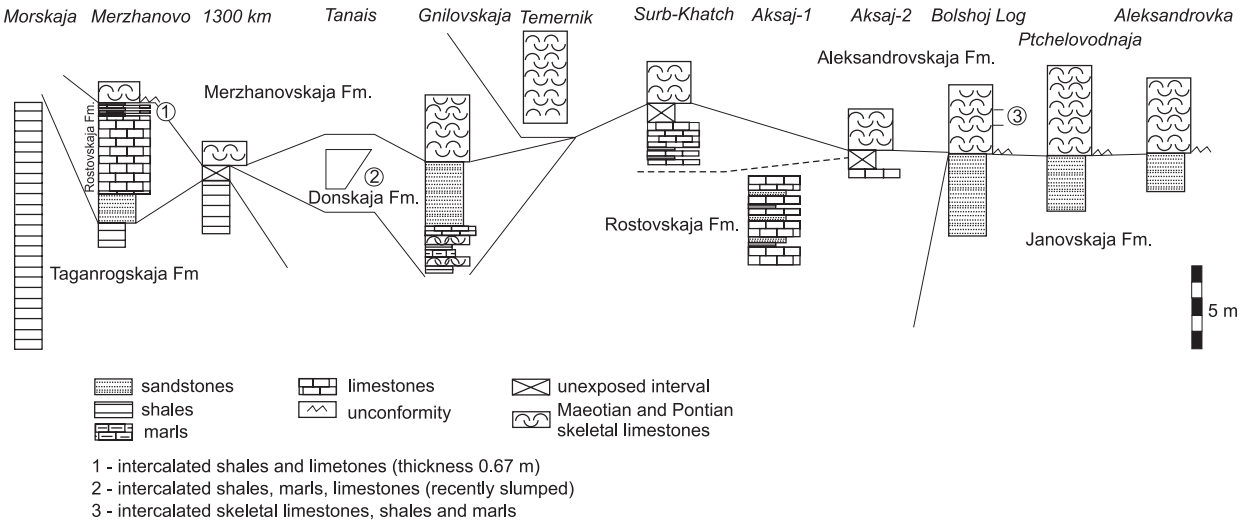

Fig. 4. Correlation of the sections of the Upper Miocene deposits of the Rostov Dome.

longer exist, because the geological time was the same at every point on the Earth's surface. Otherwise, chaotic nomenclature, not representing the true geologic history will result.

In the meantime, Russian stratigraphers traditionally continue to use the regional stratigraphic scale for the Neogene deposits, which includes regional stages differing from chronostratigraphic (i.e., global) stages (Fig. 5). A widely accepted version of such a regional scale was proposed by NEVESSKAJA *et al*. (1984, 1986) and NEVESSKAJA (1986) . Therefore, there is an urgent need to correlate global and regional stages and to implicate the chronostratigraphy to the Eastern Paratethys in order replace the regional standard and abandon it forever.

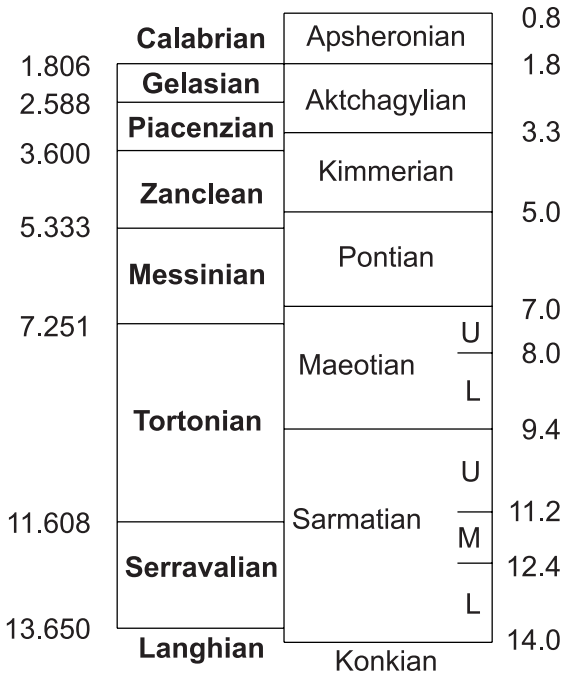

Fig. 5. Correlation between the chronostratigraphic units of the Upper Miocene–Pliocene and the regional stages of the Eastern Paratethys (see text for sources of the absolute ages).

A possible way to correlate the Neogene chronostratigraphic and regional stages is to compare the absolute ages of their boundaries. For the Eastern Parathethys these ages were evaluated precisely by TCHUMAKOV *et al*. (1992), and then discussed several times (TCHUMAKOV, 2000a, b). For the recently employed chronostratigraphic units, the absolute ages are recommended by the ICS (GRADSTEIN *et al*., 2004) and some of them have been defined in the Global Stratotype Sections and Points (GSSPs) (CASTRADORI *et al*., 1998; HILGEN *et al*., 1998, 2000a, b; RIO *et al*., 1998; VAN COUVERING *et al*., 2000). For the formal definition of absolute ages of the Messinian, all the Pliocene stages were preferred. ICS recommendations (GRADSTEIN *et al*., 2004) were used for the Laghian, Serravalian and Tortonian stages.

The results of a correlation by absolute ages (Fig. 5) suggest the Sarmatian regional stage corresponds to the upper part of the Langhian, the entire Serravalian, and the lower part of the Tortonian global stages. The Maeotian regional stage embraces the upper part of the Tortonian and the lowermost horizons of the Messinian global stages. And finally the Pontian regional stage mostly corresponds to the Messinian with only the uppermost part corresponding to the lowermost Zanclean. It is evident, that Miocene/Pliocene boundary, located at the base of the Zanclean in the global scale, has a different position in the Eastern Paratethys, where check meaning the Zanclean is established at the base of the Kimmerian.

Bivalvia-based biostratigraphy of the Rostov Dome

Abundant bivalves remains are the characteristic feature for all the Upper Miocene strata of the Rostov Dome. The analysis of taxa ranges allows the development of the regional biozonation based on this fossil group. Previous studies of the Eastern Paratethys (ILINA *et al*., 1976; NEVESSKAJA, 1986; NEVESSKAJA *et al*., 1986) resulted only from malacofaunal support for the regional stages and their substages and from the occasional identification of specific units, called "beds with", which, in fact, are something like acme-zones or assemblage zones. The present study of the Rostov Dome, however, permits the development of a Bivalvia-based biostratigraphy.

The definition of the biostratigraphic units (biozones) was made according to the recommendations of the ICS (SALVADOR, 1994). The difference of terms "first occurence level" (FOL) and "last occurence level" (LOL) from "first appearance datum" (FAD) and "last appearance datum" (LAD) is assumed as the one proposed by PAVIA & MARTIRE (1997). Five distinct biozones have been defined in the Upper Miocene strata of the Rostov Dome (Fig. 6). The correlation established between regional and chronostratigraphic stages helped in the asignment of these biozones to global stages.

***Tapes vitalianus* Interval Zone** corresponds to the interval from the pre-Upper Miocene malacofauna assemblage (not represented in the studied sections) to the LOL of *Tapes vitalianus* ORBIGNY. Further studies are necessary to revise this zone, as its lower boundary is undefined. Age: Langhian–Serravalian; Lower Sarmatian. Reference sections: Morskaja, Merzhanovo.

***Cerastoderma fittoni* – *Cerastoderma subfittoni* Total Ranges Zone** corresponds to the interval from the FOLs of *Cerastoderma fittoni* (ORBIGNY) and *C. subfittoni* (ANDRUSOV) to the LOLs of these taxa. Age: Serravalian–Tortonian; Middle Sarmatian. Reference section: Merzhanovo.

***Congeria panticapaea* Interval Zone** corresponds to the interval from the FOL of *Congeria panticapaea*

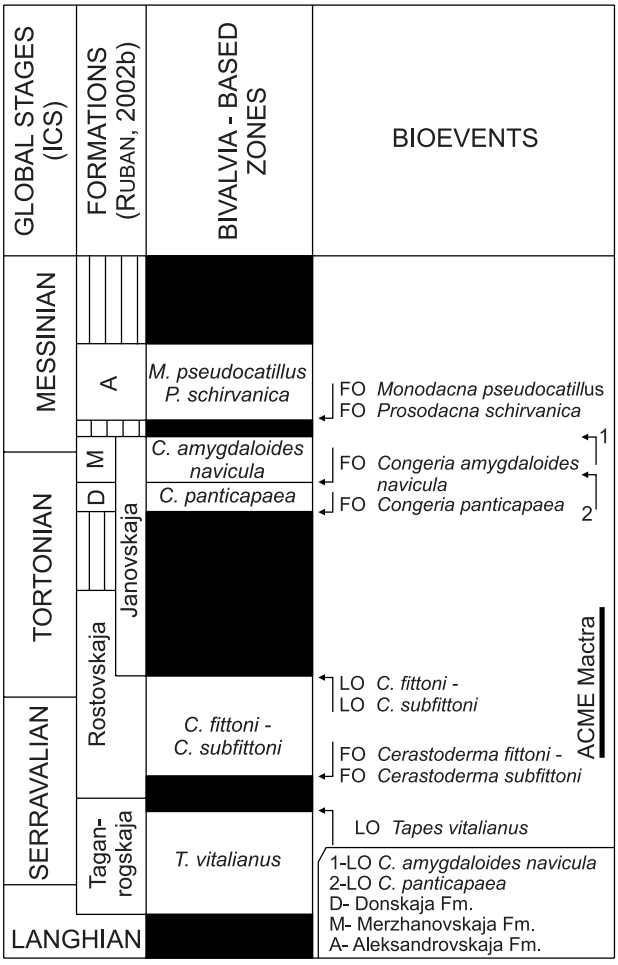

Fig. 6. Proposed Bivalvia-based biostratigraphy of the Upper Miocene of the Rostov Dome.

ANDRUSOV to the FOL of *C. amygdaloides navicula* ANDRUSOV. It is important to note that the LOL of *C. panticapaea* ANDRUSOV is above the upper boundary of this zone. Age: Tortonian; "beds with *C. panticapaea*", lower part of the Upper Maeotian. Reference section: Gnilovskaja.

***Congeria amygdaloides navicula* Total Range Zone** corresponds to the interval from the FOL to the LOL of *Congeria amygdaloides navicula* ANDRUSOV. Age: Tortonian–Lowermost Messinian; "beds with *C. amygdaloides navicula*", upper part of the Upper Maeotian. Reference sections: Merzhanovo, 1300 km.

***Monodacna pseudocatillus – Prosodacna schirvanica* Interval Zone** corresponds to the interval from the FOLs of *Monodacna pseudocatillus* BARBOT and *Prosodacna schirvanica* ANDRUSOV to the upper disconformal boundary of the Upper Miocene sedimentary complex. Age: Messinian; Lower Pontian. Reference sections: Bolshoj Log, Ptchelovodnaja, Aleksandrovka.

Unzoned intervals include hiatuses (at the base of the Donskaja and Aleksndrovskaja Formations) and short intervals where zonality could not be established because of the scarcity of fossils remains (the transition between Taganrogskaja and Rostovskaja Formations, upper part of Rostovskaja Formation, and Janovskaja Formation).

All the above mentioned zones were defined by characteristic taxa bioevents. The last ones are very easy to be determined in the stratigraphic record. All these events seem to be isochronous at least within the area of the Rostov Dome.

Conclusions

The comparison of absolute ages permits a correlation of the global and regional stages for the Eastern Paratethys to be made.

Studies of the Upper Miocene deposits of the Rostov Dome resulted in the definifion of five distinct Bivalvia-based biozones. The implicated chronostratigraphy coupled with the Bivalvia-based biozonation seems to be a real alternative for replacing the previously developed regional stratigraphy, based on the definition of regional stages.

Further research should be aimed at extending the defined biozones to the entire territory embraced by the Eastern Paratethys.

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Appendix

In addition to the formal definition of the Merzhanovskaja Formation (RUBAN, 2002b), a detailed indication of particular beds of skeletal limestones in the Merzhanovo stratotype section is presented below (see this section location and whole composition in Fig. 2, 4). The Beds are numbered from base to top.

LOWER MEMBER (beds 1–10) – 1.26 m
bed 1 – 0.05 m
bed 2 – 0.15 m
bed 3 – 0.04 m
bed 4 – 0.08 m
bed 5 – 0.02 m
bed 6 – 0.11 m
bed 7 – 0.08 m
bed 8 – 0.18 m
bed 9 – 0.40 m
bed 10 – 0.15 m

UPPER MEMBER (beds 11–16) – 0.32 m
bed 11 – 0.03 m
bed 12 – 0.03 m
bed 13 – 0.04 m
bed 14 – 0.06 m
bed 15 – 0.06 m
bed 16 – 0.10 m
Total thickness 1.58 m.

References

ABICH, H., 1865. *Einleitende Grundzuge der Geologie der Halbinseln Kertsch und Taman*. Sankt-Petersburg, 80 pp.

ANDRUSOV, N.I., 1884. A note on the geological studies around the town of Kertch. *Zapiski Novorossijskogo obtschestva jestestvoispytatelej*, 9: 14–15 (in Russian).

ANDRUSSOW, N., 1911. *Die fossilen Bryozoenriffe der Halbinseln Kertsch und Taman*. Kiev, 148 pp.

CASTRADORI, D., RIO, D., HILGEN, F.J. & LOURENS, L.J., 1998. The Global Standard Stratotype-section and Point (GSSP) of the Piacenzian Stage (Middle Pliocene). *Episodes*, 21: 88–93.

GRADSTEIN, F.M., OGG, J.G. & SMITH, A.G., 2004. *A Geologic Time Scale 2004*. Cambridge University Press, Cambridge, 500 pp.

HILGEN, F.J., KRIJGSMAN, W., LANGEREIS, C.G., LOURENS, L.J., ZACHARIASSE, W.J., IACCARINO, S., VILLA, G., BENSON, R. H. & DAHMANI, M., 1998. The Global Boundary Stratotype Section and Point (GSSP) of the Messinian Stage (Uppermost Miocene): A proposal. *Neogene Newsletter,* 5: 55–77.

HILGEN, F.J., IACCARINO, S., KRIJGSMAN, W., VILLA, G., LANGEREIS, C. G. & ZACHARIASSE, W. J., 2000a. The Global Boundary Stratotype Section and Point (GSSP) of the Messinian Stage (uppermost Miocene). *Episodes*, 23: 172–178.

HILGEN, F.J., BISSOLI, L., IACCARINO, S., KRIJGSMAN, W., MEIJER, R., NEGRI, A. & VILLA, G., 2000b. Integrated stratigraphy and astrochronology of the Messinian GSSP at Oued Akrech (Atlantic Morocco). *Earth and Planetary Science Letters*, 182: 237–251.

ILINA, L.B., NEVESSKAJA, L.A. & PARAMONOVA, N.L., 1976. *Trends of molluscs development in the Neogene brackish basins of Eurasia (Late Miocene–Early Pliocene)*. Nauka, Moskva, 288 pp. (in Russian).

IVANITSKAJA, V.B. & POGREBNOV, N.I., 1962. *Geology of the Lower Don and Lower Volga*. RGU Edition, Rostov-na-Donu, 64 pp. (in Russian).

LEBEDKO, G.I., 1980. *The Basement of the northern Caucasus*. RGU Edition, Rostov-na-Donu, 128 pp. (in Russian).

MENNING, M., WEYER, D., DROZDZEWSKI, G., VAN AMEROM, H.W.J. & WENDT, I., 2000. A Carboniferous Time Scale 2000: Discussion and Use of Geological Parameters as Time Indicators from Central and Western Europe. *Geologisches Jahrbuch A*, 156: 3–44.

MENNING, M., BELKA, Z., CHUVASHOV, B., ENGEL, B.A., JONES, P.J., KULLMANN, J., UTTING, J., WATNEY, L. & WEYER, D., 2001. The optimal number of Carboniferous series and stages. *Newsletters on Stratigraphy,* 38: 201–207.

NEVESSKAJA, L.A. (ed.), 1986. *History of the Neogene molluscs of the Paratethys*. Nauka, Moskva, 208 pp. (in Russian).

NEVESSKAJA, L.A., VORONINA, A.A., GONTCHAROVA, I.A., ILINA, L.B., PARAMONOVA, N.P., POPOV, S.V., TCHEPALYGA, A.L. & BABAK, JE. V., 1984. The history of the Paratethys. *In*: LISITSYN. A.P. (ed.), *Paleookeanologija. Doklady 27 Mezhdunarodnogo Geologitcheskogo Kongressa*, 3: 91–101. Nauka, Moskva (in Russian).

NEVESSKAJA, L.A., BAGDASARJAN, K.G., BOGDANOVITCH, A.K., BJALOV, O.S., GABUNIJA, L.K., ZHGENTI, JE.G., ILINA, L.B., NOSOVSKIJ, M.F., PARAMONOVA, N.P. & TAKTAKISHVILI, I.G., 1986. Paratethys. Introduction. *In*: MURATOV, M.V. & NEVESSKAJA, L.A. (eds.), *Stratigrafija SSSR. Neogenovaja sistema. Polutom* 1, 29–54. Nedra, Moskva (in Russian).

NOSOVSKIJ, M.F., 2001. The geologic time of the origin of eastern Paratethys. *Doklady Rossijskoj Akademii Nauk*, 379: 235–236 (in Russian).

PAFFENGOLTS, K.N., 1959. *Geological outline of the Caucasus*. AN ASSR Edition, Jerevan, 507 pp. (in Russian).

PALMER, A.R., 1998. A proposed nomenclature for stages and series for the Cambrian of Laurentia. *In*: LANDING, E. (ed.), Cambrian subdivisions and correlations. *Canadian Journal of Earth Sciences*, 35: 323–328.

PAVIA, G. & MARTIRE, L., 1997. The importance of taphonomic studies on biochronology: examples from the european Middle Jurassic. *Cuadernos Geología Ibérica*, 23: 153–181.

POGREBNOV, N.I., POTAPOV, I.I. & SMIRNOV, B.V., 1970. Tectonics. *Geologija SSSR*, 46: 515–577 (in Russian).

RIO, D., SPROVIERI, R., CASTRADORI, D. & DI STEFANO, E., 1998. The Gelasian Stage (Upper Pliocene): A new unit of the global standard chronostratigraphic scale. *Episodes,* 21: 82–87.

RODZJANKO, G.N., 1970. Neogene system. *Geologija SSSR,* 46: 410–447 (in Russian).

RODZJANKO, G.N., 1986. Southern part of the central regions of the East-European Platform. *In*: MURATOV, M.V. & NEVESSKAJA, L.A. (eds.), *Stratigrafija SSSR. Neogenovaja sistema. Polutom* 1, 268–287. Nedra, Moskva (in Russian).

RÖGL, F., 1998. Palaeogeographic considerations for Mediterranean and Paratethys Seaways (Oligocene to Miocene). *Annales der natur-historisches Museum Wien A,* 99: 279–310.

RÖGL, F., 1999. Mediterranean and Paratethys. Facts and hypotheses of an Oligocene to Miocene paleogeography: short overview. *Geologica Carpathica*, 50: 339–349.

RUBAN, D.A., 2002a. Tanaiss Palaeobay and Eastern Paratethys in the Maeotian. *Nautchnaja mysl Kavkaza, prilozhenije*, 7: 104–105 (in Russian).

RUBAN, D. A., 2002b. Lithostratigraphy of the Upper Miocene deposits of the Rostov Dome. *Nautchnaja mysl Kavkaza, prilozhenije*, 14: 133–136 (in Russian).

RUBAN, D.A. & YANG, W., 2004. Upper Miocene Sequence Stratigraphy of Rostov Dome, Russian Platform, Eastern Paratethys. *American Association of Petroleum Geologists 2004 Annual Convention. Abstracts Volume*, p. 121. American Association of Petroleum Geologists, Dallas.

SALVADOR, A. (ed.), 1994. *International Stratigraphic Guide. A Guide to Stratigraphic Classification, Terminology, and Procedure*. International Subcommission on Stratigraphic Classification and Geological Society of America, 214 pp.

TCHUMAKOV, I.S., 2000a. Towards the problem of the Miocene/Pliocene boudary in the Euxinian area. *Stratigrafija. Geologitcheskaja korreljatsija*, 8: 84–92 (in Russian).

TCHUMAKOV, I.S., 2000b. Towards the problem of the Lower Pontian (Novorossijskij Substage) in the Euxinian-Caspian area. *Vestnik Moskovskogo Gosudarstevennogo Universiteta. Serija 4*, 3: 17–23 (in Russian).

TCHUMAKOV, I.S., BYZOVA, S.L. & GANZEJ, S.S., 1992. *Geochronology and correlation of the Late Cenozoic of the Paratethys*. Nauka, Moskva, 95 pp. (in Russian)

ULANOVSKAYA, T.E., 1998. Paleogeography of the northern foreland basin of the Black Sea and the Greater Caucasus in the late Mesozoic and Cainozoic. *6th Zonenshain Conference on Plate Tectonics, Moscow, February 17–20, 1998 and Europrobe Workshop Uralides, Moscow, 15–16, 1998: Program and Abstract,* 133–134. Moscow.

VAN COUVERING, J.A., CASTRADORI, D., CITA, M.B., HILGEN, F.J. & RIO, D., 2000. The base of the Zanclean Stage and of the Pliocene Series. *Episodes,* 23: 179–187.

WAGNER, R.H. & WINKLER PRINS, C.F., 1983. The Cantabrian and Barruelian stratotypes: A summary of basin development and biostratigraphic information. *In*: LEMOS DE SOUSA, M.J. & WAGNER, R.H. (eds.), *Papers on the Carboniferous of the Iberian Peninsula (Sedimentology, Stratigraphy, Palaeontology, Tectonics and Geochronology)*, 359–410. Porto.

ZHURAVLEV, A.YU., 1995. Preliminary suggestions on the global Early Cambrian zonation. *In*: GEYER, G. & LANDING, E. (eds.), *The Lower-Middle Cambrian Standard of Western Gondwana. Beringeria, Special Issue,* 2: 147–160.

Резиме

Горњи миоцен Ростовске доме (Источни Паратетис): значај за хроностратиграфију и биостратиграфија на основу шкољака

Ростовска дома налази се на југу руске платформе. За време касног миоцена ова област припадала је Танајском палеозаливу Источног Паратетиса. И ако се миоценски седименти ове области проучавају око 100 година њихова детаљна стратиграфска подела још није приказана. На основу проучавања 12 изданака горњомиоценских успостављена је литостратиграфска (укупно 6 формација) и секвентна стратиграфија.

Регионални катови се углавном употребљавају и имају предност у Источном Паратетису. Њихова корелација са хроностратиграфским катовима предложених од стране Интернационалне комисије за стратиграфију је неопходна, зато што ће то омогућити корелацију стратиграфских јединица, као што се то може дефинисати за касни миоцен ростовске доме, са суседним или чак удаљеним областима. Када су катови, који су глобално препознатљиви, предложени, изгледа да није потребно да се употребљавају регионалнои катови, који су прихватљиви само у оним случајевима када се расправља о хроностратиграфској подели.

Покушана је примена недавно установљене неогене хроностратиграфије на област Ростовске доме. Ово је остварено кроз упоређење апсолутних старости граница две поменуте врсте катова. Сарматском регионалном кату одговара горњи део лангиана, целом серавалиану и доњем делу тортона. Меотском регионалном кату одговара горњи део тортона и најнижи хоризонти месиниана. Понтском регионалном кату одговара већи део месиниана и најнижи занклеан. Установљено је да граница миоцен/плиоцен, која се налази у бази занклеана, има различит положај у Источном Тетису, где је успостављена у бази кимеријанског регионалног ката.

У горњомиоценских седимената ростовске доме нађени су многобројни остаци шкољака. Анализа распрострањења таксона дозволила је по први пут успостављење биостратиграфије на основу шкољака за територију Ростовске доме. У оквиру интервала серавалиан-месиниан установљено је пет биозона: *Tapes vitalianus*, *Cerastoderma fittoni–Cerastoderma subfittoni*, *Congeria panticapaea*, *Congeria amygdaloides navicula* и *Monodacna pseudocatillus––Prosodacna schirvanica*. Интервали без зона укључују хијатусе (у бази Донске и Александровске формације) и краћих интервала где зоналност није могла бити успостављена због ретких фосила (прелаз између Таганрогске и Ростовске формације, горњи део ростовске формације и јановске формације).

Наредна проучавања би требала бити усмерена на дефинисању биозона целе територије која је припадала Источном Паратетису.