

Comparison of latest Kimmeridgian to Early Volgian ammonite faunas of Polish Lowland and Middle Volga area and its significance for paleogeography

Mikhail ROGOV

*Russian Academy of Science, Geological Institute;
Pyzhevski lane 7, Moscow, Russia;
e-mail: russianjurassic@gmail.com*

There are many different approaches which permit to resurrect paleogeographical conditions of the past, including sedimentology, geochemistry, and so on. But most reliable tool for recognition of lost interrelations between different areas is analysis of their fossil contents. Ammonite faunas of the uppermost Kimmeridgian to Lower Volgian are well studied both in Poland (Kutek 1994, Kutek & Zeiss 1997) and Russia (Hantzpergue *et al.* 1998, Rogov 2004, Rogov *et al.* 2006, Scherzinger & Mitta 2006, Rogov *in press*) and include numerous common taxa. Ammonite faunas of these regions were dominated by Subboreal ammonites (especially by members of Virgatitid endemic lineage), but also include certain amount of Submediterranean or Boreal ones. Ammonite immigrational pathways and presence of some straits (such as Pripyat Strait connecting Polish and Russian Seas) still remain a matter of controversy. There are many paleogeographical maps which show different patterns of existence of such strait, from its total absence to presence during the Kimmeridgian or beginning of Volgian (cf. Sasonova & Sasonov 1967, Dembowska 1973, Malinowska 1989, Thierry 2000). But there is little amount of geological evidence pro et contra any models, because in Belarus there are no traces of Upper Kimmeridgian or Volgian deposits which perhaps were removed during the Cretaceous transgressions. Additional questions arise concerning existence of direct connections between both seas and Tethys. These problems can be resolved by precise analysis of Kimmeridgian-Volgian ammonites in European part of Russia and Poland.

Uppermost Kimmeridgian ammonite succession of Polish Lowland (Kutek & Zeiss 1997) and Middle Volga area (Rogov *et al.* 2006) shows not only high proximity of the whole ammonite assemblages, but also the same succession of events marked by brief appearance of immigrational ammonite taxa. So, base of the Autissiodorensis Zone marked in both areas by cooccurrence of *Nannocardioceras krausei* with Aulacostephanids and uncommon *Aspidoceeras* accompanied by *Sutneria ex gr. rebholzi*. This remarkable assemblage followed by those crowded by *Nannocardioceras volgae* overlying the Subboreal ammonite-dominant assem-

blage. Surprisingly, the same ammonite succession has been also observed in Dorset and Wash area of England. Such quick oscillation from Subboreal/Submediterranean ammonite-dominated assemblage to Boreal ammonite dominated-assemblages coinciding in these regions could be explained by climatic nature of it and also by well connections between them.

Bulk of Autissiodorensis Zone in Poland and Volga area is well-correlated using *Sarmatisphinctes* lineage. Again, remarkable appearance of *Neochetoceras* ex gr. *subnudatum* is well recognized near the top of Subborealis Subzone of both regions. As range of Kimmeridgian *Neochetoceras* in the Middle Volga is wider in comparison to those in Poland, possible source of these ammonites may lie southwards from Volga area, at the Tethyan Caucasus.

Beginning of the Volgian in the studied regions is marked by mass occurrences of *Neochetoceras subnudatum*. But at the later portion of Klimovi Chron well-recognized differences appear. If Polish ammonite assemblage includes *Neochetoceras mucronatum*, which follow *N. steraspis* in South Germany, in the Middle Volga area *Neochetoceras* are very rare but numerous dwarf *Paralingulaticeras* (*Rogoviceras*) are flourishing. Recent records of such *Paralingulaticeras* in Crimea support suggestion about an immigration of these ammonites from the Crimean or Caucasian basins.

Ammonite assemblages of uppermost zones of the Lower Volgian Substage include the same succession of *Ilowaiskya* – “*Pseudovirgatites*” species continued to *Zaraiskites* in the Middle Volgian. Nevertheless ammonites of Submediterranean affinities of these regions are markedly differing from each other. In the Middle Volga area there are two remarkable levels fixed within Pseudoscythica Zone s.l., which aren't traced in Poland. These are *Franconites* event near to base of Pseudoscythica Zone, marked by appearance of *Franconites*, which possibly invaded this area from south, i.e. from Northern Caucasus. Basal portion of Tenuicostatum Subzone (or Zone), so-called *neoburgense* horizon, in the Central Russia (from Belgorod and Moscow regions to Middle Volga and Orenburg areas) characterized by mass occurrence of mollusks of Submediterranean origin, including *Anaspidoceras neoburgense* (which attain more than 50% of the whole assemblage, cf. Rogov 2005), *Sutneria asema* and *Pseudolissocebras*. Again there are no analogues of such events fixed in Polish Lowland, thus faunal exchange through Pripyat Strait is restricted to Subboreal *Ilowaiskya* – “*Pseudovirgatites*” only.

Terminal part of the Lower Volgian in both regions again reveals very close faunal contents dominated by Subboreal “*Pseudovirgatites*” (which seem to be homoeomorphs of Submediterranean *Pseudovirgatites*) and uncommon *Danubusphinctes*.

Unequivocal connection through Pripyat Strait between Russian and Polish seas remains also at the beginning of the Middle Volgian providing existence of the same lineage of *Zaraiskites* species within these regions, terminated by regressive phase (“*Serpulit*” in Poland and sandstone succession of the Middle Volgian in Russia).

This study has been supported by grants of RFBR 06-05-64284 and of the President of Russian Federation no. MK-856.2008.5.

Literatura

- Dembowska J., 1973. Portland na Niżu Polski. *Instytut Geologiczny, Prace*, 70, 1–107.
- Hantzpergue P., Baudin F., Mitra V., Olferiev A. & Zakharov V., 1998. The Upper Jurassic of the Volga basin: ammonite biostratigraphy and occurrence of organic-carbon rich facies. *Mémoire Museum nath. Histoire naturelle*, 1998. 179, 9–33.

- Kutek J., 1994. The Scythicus Zone (Middle Volgian) in Poland: its ammonites and biostratigraphic subdivisions. *Acta Geologica Polonica*, 44, 1–2, 1–33.
- Kutek J. & Zeiss A., 1997. The highest Kimmeridgian and Lower Volgian in Central Poland; their ammonites and biostratigraphy. *Acta Geologica Polonica*, 47, 3–4, 107–198.
- Malinowska L., 1989. Biostratigraphy and palaeozoogeography of the lowermost Tithonian in the Extra-Carpathian, Poland. *Bulletin of Polish Academy of Sciences, Earth Sciences*, 37, 1–2, 1–25.
- Rogov M.A., 2004. Ammonite-Based Correlation of the Lower and Middle (Panderi Zone) Volgian Substages with the Tithonian Stage. *Stratigraphy and Geological Correlation*, 12, 1, 35–57.
- Rogov M.A., 2005. Molluscan associations of the Late Jurassic Seas of the East-European Platform. *Transactions of the Geological Institute of the Russian Academy of Sciences*, 516, 178–199.
- Rogov M., *in press*. Precise ammonite biostratigraphy through the Kimmeridgian-Volgian boundary beds in the Gorodischi section (Middle Volga area, Russia), and the base of the Volgian Stage in its type area. *Volumina Jurassica*.
- Rogov M., Schepetova E., Ustinova M., Price G.D., Guzhikov A., Pimenov M. & Dzyuba O., 2006. A multi-proxy study of the Kimmeridgian/Volgian boundary beds in the Gorodischi section (Middle Volga area, Russia), the lectostratotype of the Volgian Stage. *Volumina Jurassica*, 4, 208–210.
- Sasonova I.G. & Sasonov N.T., 1967. Paleogeografia Russkoj platfotmy v jurskoe i ranne-melovoe vremya. *Trudy Vserossijskogo nauchno-issledovatel'skogo geologičeskogo neftyanogo instytuta*, 63, 1–260.
- Scherzinger A. & Mitta V.V., 2006. New data on ammonites and stratigraphy of the Upper Kimmeridgian and Lower Volgian (Upper Jurassic) of the middle Volga Region (Russia). *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen*, 214, 225–251.
- Thierry J., 2000. Early Tithonian. W: Crasquin S. (coord.), *Atlas Peri-Tethys*, Palaeogeographical maps-Explanatory notes, CCGM/CGMW, Paris, 99–110.