MOSCOVIAN-KASIMOVIAN TRANSITION IN DONETS BASIN:
FUSULINID TAXONOMY, BIOSTRATIGRAPHY CORRELATION
AND PALEOBIOGEOGRAPHY

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The Carboniferous succession in Donets Basin is famous on both diverse and abundant marine fossils
and plants, including major for biostratigraphy groups (foraminifera, ammonoids, conodonts, corals) and
the region is important as a link of marine and continental sections [Aizenverg et al., 1963]. Thus, the accurate
and well documented taxonomies and phylogenies in Donets Basin are very critical for such correlation.
Although being within Russian Platform during Carboniferous it was located within subtropical area and
belongs to Tethyan realm [Davydov, 1992].

The aims of this paper are to carefully document taxonomy and distribution of fusulinid faunas in
Moscovian-Kasimovian transition in Kalinovo key-section of Donets Basin and correlate this transition to
the type sections in Moscow Basin.

The fusulinids in Donets Basin became known since 19th century thanks to exceptional preservation
and abundance in limestones throughout Carboniferous. Since 1920 th–30th fusulinids became one of the
important chronostratigraphic tools and are widely utilized in Donets Basin. F.S. Putrja, M.I. Sosnina, and
especially G.D. Kireeva developed fusulinid taxonomy and biostratigraphy for the Moscovian-Kasimovian
transition in Donets Basin.

Following fusulinid assemblages are recognized within Moscovian-Kasimovian transition in Donets
Basin.

\[ \text{N}_1 \text{ Limestone: } Beedeina majiensis (Sheng), Hemifusulina graciosa (Lee), H. boki Moeller, Neostaffella
\text{spaheroidea} (Ehrenberg emend. Moell.), Taitzehoella perseverata (Saf.), Fusiella spatiosa Sheng, F. praefluctiformis Saf.} \]

\[ \text{N}_2 \text{ Limestone — } \text{Protritictes ovatus Putrja, Fusulina intermedia Rauser and Gryzlova, F. mosquensis
(Rauser), Quasifusulinoides quasifusulinoides (Rauser), Fusulina lancetiformis Putrja, F. paradoxa, Lee and
Chen. F. praefluctiformis Safonova, Taitzehoella sp. nov., Pseudostaffella distorta Pogrebnjak.} \]

\[ \text{N}_3 \text{ Limestone — } \text{Pr. manukalovae Kireeva, Pr. parvus Kireeva, Pr. variabilis Bensh, Pr. subovatus Bensh,
Quasifusulinoides quasifusulinoides (Rauser), Q. pulchellus (Gryzlova), Q. intermedius (Rauser and Gryzlova),
Q. bosbiensis Bogush, rare Neostaffella luganskiensis (Pogrebnjak), Ozawainella sp., Fusiella paradoxa Lee
and Chen, Schubertella and Eostaffella.} \]

The rest of Limestone of \( \text{N}_3 \) group contains poorly preserved Fusiella, Protritictites, Obsoletes (in \( \text{N}_3 \)
Limestone) and Quasifusulinoides.

\[ \text{O}_1 \text{ Limestone — diverse Obsoletes and rare Quasifusulina (Q. pseudotenuissima Lev. and Dav.), Montiparush
montiparush} (Ehrenberg emend. Moeller), M. paramontiparush Rosovskaya, Fusiella sacyrdashiensis Davydov,
F. lancetiformis Putrja etc.} \]

\[ \text{O}_1^1 \text{ Limestone — Montiparush become dominant and Obsoletes are rare in this limestone; first
Schwageriniformis, i.e. S. rosoveyi (Kireeva) and S. bellus (Rosovskaya) are also found.} \]

\[ \text{O}_1 \text{ Limestone — contains Schwageriniformis calitvicus (Putrja), S. karavanensis (Bensh), S. rarus
(Shlykova), Quasifusulina pseudotenuissima Leven and Davyдов, Q. eleganta Shlyk., Montiparush rhombiformis
Rosovskaya, M. paramontiparush Rosovskaya, M. umbonoplicatus Rosovskaya, advanced M. subcrassulus
Rosovskaya, and rare Obsoletes paraovoides Bensh.} \]

\[ \text{O}_1 \text{ Limestone — only Quasifusulina and Quasifusulinoides are found there.} \]

\[ \text{O}_1^2 \text{ Limestone — Quasifusulina and Quasifusulinoides are dominated in this limestone; one specimen
of Rauserites dictiophorus Rosovskaya, is also found.} \]

\[ \text{O}_1^2 \text{and } \text{O}_2^1 \text{ Limestone — predominantly Rauserites occur in this limestone, such as R. panteleevi Rauser,
R. triangulus Rosovskaya, R. quasiarcticus (Solovieva), R. elongatissimus Rosovskaya, R. pseudoarcticus
(Rauser), R. irregularis rugosus Rosovskaya, R. henbesti (Igo), R. protorossicus Davydov.} \]

**O₂ Limestone** — the environmental conditions there were not favorable for fusulinids and only small *Schwageriniformis* and rare Rauerites such as *R. elongatissimus* Rosovskaya, *R. triangulus* Rosovskaya, and *Quasifusulina eleganta* Shlyk., are found.

**O₁² Limestone** with silicified *Rauerites* and *Quasifusulina eleganta* Shlykova, also contained one incomplete specimen of *Rauerites rossicus rossicus* (Schellwien).

**O₁ Limestone** — *Rauerites rossicus rossicus* (Schellwien), *R. jucundus* Leven and Davydov, *R. fortissimus* (Rauser), *R. postarcticus* (Rauser) etc.

Limestone N₁ contains typical Moscovian forms that in Moscow Basin characterized upper Myachkovian Domodedovo Fm [Davydov, 1997; Makhлина et al., 2001]. In N₁ Limestone rare *Quasifusulinoides* and yet primitive *Protriticites*, the first elements of Kasimovian fauna, appear along with typical Moscovian forms such as *Fusulina mosquensis* Rauser, *Taitzehoella perseverate* (Rauser) and single specimen of *Pseudostaffella distorta* (Pogrebniak). Presence of *Quasifusulinoides* and primitive *Protriticites* suggest correlation of this limestone with Peskovian Horizon in Moscow Basin [Davydov, 1997, 2003]. Fusulinids in N₁ Limestone changed dramatically. Advanced *Protriticites* with thick wall penetrated with coarse pores (see Fig.) and *Quasifusulinoides* are dominated there. Only one specimen of *Neostaffella luganskiensis* (Pogrebniak) has been found. In Moscow Basin similar assemblage of advanced *Protriticites* found starting from “lyska” local unit at the top of Peski Fm and extended into the Lower Krevyakian Suvorovo Fm [Davydov, 1997; Goreva et al., 2007]. Abundant *Obsoletes* that are found in O₁ Limestone suggest its correlation with the Upper Krevyakian Voskresensk Fm where *Obsoletes* first occur. However, *Montiparus montiparatus* and *M. paramontiparatus* that are also found in O₁ Lm of Donets Basin, in Moscow Basin occur only in top of Ratmirovo Fm [Davydov, 1997] or basal Nevero Fm [Goreva et al., 2007] of Khamovnikian Horizon. It seems that analogue of Voskresensk Fm in Donets Basin is he upper part of Isaevskaya (N) Fm (N₁ and N₁). O₁ Limestone correlates in Moscow Basin with basal and lower Neverovo Fm. Middle Neverovo of Moscow Basin where *M. subcrassulus* is found [Goreva et al., 2007] can be correlated with O₁ Limestone. The correlation of O₁ Limestone is uncertain because no characteristic faunas are found there. O₁ Limestone with first *Rauerites* definitely correlates in Moscow Basin with lower Dorogomilovian Perkhurovo Fm where *Rauerites* first occur [Makhлина et al., 1979]. O₁ through O₅ Limestone correlate with middle and part of Dorogomilovian Horizon in Moscow Basin although fusulinids there are not well studied. Correlation of O₁ Limestone is not clear. Based on occurrence of *Rauerites rossicus*, O₁ and O₅ Limestone correlate with the Lower Gzhelian Upper Rusovkian Fm in Moscow Basin [Davydov et al., 2008], O₅ Limestone conventionally correlates with the Lower Rusovkian Fm.

**Conclusions**

1. Within the Donets Basin succession, the traditional base of Krevyakian can be placed at N₁ Limestone in Kalinovo section; the upper part of Krevyakian Horizon, Suvorovo Fm, correlates with N₂ and N₂¹ interval; Ratmirovo and Lower Neverovo of Khamovnikian Horizon correlate with O₁ and O₁¹ Limestone; Middle and Upper Neverovo — with O₂ and O₃ Limestone.

2. Only advanced *Protriticites* can be used to define the traditional base of Kasimovian Stage. The FAD of *Obsoletes* is higher at the base of Voskresensk Fm. Thus, Krevyakian Horizon in Moscow Basin can be divided into two fusulinid zones: *Protriticites pseudomontiparatus* (Suvorovo Fm) and *Obsoletes obsoletus* (Voskresensk Fm). Consequently, in Donets Basin these two zones correspond to N₃ — N₄ (*Protriticites pseudomontiparatus*) and N₄ — N₅¹ (*Obsoletes obsoletus*) intervals.

**References**


