

**RUSSIAN COMMITTEE OF THE UNESCO INTERNATIONAL  
GEOSCIENCES (IGCP) AND GEOPARKS PROGRAMME**

**ANNUAL REPORT ON IGCP ACTIVITIES FOR 2017**

This report informs on the Russia's activities in the IGCP projects in 2017.

Co-Chairman of the Committee: acad. Mikhail A. Fedonkin

GIN RAS, Pyzhevsky, 7, 119017  
Tel: + 7 495 951-75-00/ 8 495 953 37 91  
Fax: +7 495 953 37 64  
E- mail: igcpcrus@ginras.ru

**Projects with Russian co-leaders:**

**Project 609 Cretaceous Sea-Level Changes (2013-2017).** S.O. Zorina, dr.,  
Central Research Institute of Geology of Industrial Minerals , Kazan`

**Project 610 From the Caspian to Mediterranean: Environmental Change  
and Human Response during the Quaternary (2013-2017).** T.A.Yanina, dr.,  
Moscow State University

**Project 630 Permian-Triassic Climatic and Environmental Extremes and  
Biotic Response (2014-2018).** Yuri D. Zakharov , dr., Far East Geological  
Institute, Far East Branch RAS, Vladivostok.

**Project 653 The Onset of the Great Ordovician Biodiversification Event  
(2016-2020),** O.T. Obut, dr. Institute of Petroleum Geology and Geophysics  
Siberian Branch RAS, Novosibirsk

Russian geoscientists are members of 8 IGCP projects, including 2 started in 2017: Nos.: 608, 609, 610, 630, 648, 653, and **652, 655**. This report has been prepared on the basis of the information submitted by Russian members IGCP projects in response to the Committee's request for information on 'significant' developments in 2017.

Reports were not received from IGCP Projects 652 and 655, as they started in 2017 and so far there were not significant achievements on them.

**Project 608 Asia-Pacific Cretaceous Ecosystems (2013-2017)**

The report was presented by Kirillova G.L (Institute of Tectonics and Geophysics DVO RAS)

Main results of research activities in 2017:

The role of the Cretaceous formations in the evolution of the Russian southeastern continental margin is rather substantial. They represent sedimentary deposits (marine and non-marine), volcanic and intrusive formations accumulated in different geodynamic settings.

In the period under report, the main consideration was given to Cretaceous formations in the sections of the Uda and Torom basins that were the eastern margin of the Asian continent during the Cretaceous. Based on the research results on stratigraphy, paleogeography, tectonic setting some papers were prepared and reports were made.

Also were studied riftogenic processes at the Jurassic/Cretaceous boundary which resulted in the formation of sublatitudinal basins framing the Dzhagdinsky fragment of the Mongol-Okhotsk orogen from north and south, as following: Zeya-Uda and Nora-Selemdzha basins.

### **Publications**

1. Zabrodin V.Yu., Kirillova G.L. Stratigraphy, tectono-stratigraphic systems and paleogeography of the Uda and Torom sedimentary basins (Russian Far East) // *Tikhookeanskaya Geologiya*. 2017, 36(6), 3-14.
2. Kirillova G.L. Late Mesozoic riftogenesis on the flanks of the Dzhagdinsky section of the Mongol-Okhotsk collision orogen: Global and regional aspects // *Geodynamics and Tectonophysics*. 2017, 1, 171-180.
3. Kirillova G.L., Shurygin B.N. Cretaceous ecosystems and their responses to environmental changes in Asia and the Western Pacific // *Tikhookeanskaya Geologiya*. 2017, 36(1), 89-92.
4. Kirillova G.L. Cretaceous tectonic and biotic evolution on the Russian southeastern margin // *Island Arc* (in print).
5. Kirillova G.L., Zabrodin V.Yu. Evolution of the Uda-Torom fragment of the East Asian Mesozoic continental margin: Tectono-stratigraphic systems, paleogeography and geodynamics // *Jurassic system of Russia: Problems of stratigraphy and paleogeography*. 7<sup>th</sup> All-Russian conference, September 18-22,

2017: Scientific materials, Moscow. M.: GIN RAS, 2017. P. 82-85 + report at the conference.

6. Kirillova G.L. Cretaceous tectono-stratigraphic systems of the sedimentary basins on the Russian continental margin //The Fifth International Symposium of International Geoscience Programme IGCP Project 608 “Cretaceous Ecosystems and Their Responses to Paleoenvironmental Changes in Asia and the Western Pacific”, October 22-28, 2017, Jeju Island, Korea. P. 30-33.

### **Participation in conferences**

#### **The V International Symposium on Project N 608 (Korea, Jeju Island, October, 22-28, 2017).**

The following report was presented:

Kirillova G.L. Cretaceous tectonostratigraphic systems of sedimentary basins in the Russian continental margin.

#### **Project 609 Cretaceous Sea-Level Changes (2013-2017).**

The report was submitted by S.O Zorina (Research Institute of Geology and Industrial Minerals, Kazan) and Yu.D.Zakharov (Far East Geological Institute, DVO RAS, Vladivostok)

Main results of research activities in 2017:

- a detailed study of the mineral composition and microstructure of the black shales associated with OAE1a (Eastern Russian Platform), OAE1b (Middle Caspian), and the host rocks has been carried out using X-ray diffraction, scanning electron microscopic, and microprobe analyses. The results provide important constraints for depositional environments in the sedimentary basins. Black shales with pyrite framboids imply euxinic (sulfidic) conditions with increased organic matter preservation. Disintegrating framboids suggest partial or complete dissolution of the organic matter inside the framboids due to increasing water oxygenation. OAE1a on the Eastern Russian Platform is heterogeneous as it includes thin interbeds of concretionary coccolith limestones within the interval of bituminous shales, and correlates with the Lower Aptian *Rhagodiscus angustus* nannofossil zone.

- palaeotemperatures during the late Barremian to early Albian in the Caucasus have been determined on the basis of oxygen isotopic analysis of well-preserved brachiopod, bivalve, gastropod and ammonite shells, and

belemnite rostra. Those obtained from calcitic invertebrate skeletal elements from the upper Barremian Sartousiana, Securiformis, and Waagenoides zones are 19.2 °, 12.0-17.1 °, and 11.3-14.3 °C, respectively. In contrast, lower Aptian fossils of the Weissi and Deshayesi zones reveal significantly higher palaeotemperatures (20.5-22.3 ° and 17.1 °C, respectively), than those obtained from brachiopod shells of the Securiformis Zone. Isotopic palaeotemperature data is absent for the Furcata Zone in the Caucasus. The warmest conditions of our study interval were typical of late Aptian Melchioris-Abichi Chrones according to data on bivalves, gastropods and ammonoid *Parshoplites* (20.8-27.1 °C), and Subnodosocostatum Chrones in question (25.3? °C), according to data on a bivalve *Amphidonta* sp. shell. However, taking into account possible minor freshwater influence within the upper epipelagic zone, inhabited by the oyster bivalve *Amphidonta* sp., and findings of cool-preference ammonites in the Subnodosocostatum Zone, it is possible alternatively to assume that the cooling might take place at the beginning of the late Aptian (Subnodosocostatum Chrones).

### Publications

1. Zorina S.O., Euxinia as a dominant process during OAE1a (Early Aptian) on the Eastern Russian Platform and during OAE1b (Early Albian) in the Middle Caspian [Text] / Zorina, S.O., Pavlova, O.V, Galiullin, B.M, Morozov, V.P., Eskin, A.A. // Science China Earth Sciences. - 2017. - V. 60. Is. 1. P. 58–70. ISSN: 1674-7313
2. Khabipyanov L.S., Zorina S.O., Afanasieva N.I., Sokerina N.V., Perovskiy I.A., Morozov V.P., Eskin A.A. Episodes of anoxic ferruginous conditions in the Coniacian-Campanian on the Eastern Russian Platform. In: Sames B. (Ed.) 10th International Symposium on the Cretaceous. Vienna, August 21–26, 2017 – ABSTRACTS. P. 143.
3. Afonin, M. 2017. Sequoioxylon (Cupressaceae s.l.) fossil woods from the Cretaceous deposits of Primorye and Sakhalin regions, Russian Far East. In: Sames, B. (Ed.), 10<sup>th</sup> International Symposium on the Cretaceous – Abstracts, 21-26 August 2017, Vienna. -. Beirichte der Geologischen Bundessanstalt, Bd. 120, S.3, Wien.
4. Zakharov, Y.D., Kakabadze, M., Sharikadze, M.Z., Smyshlyaeva, O.P., Sobolev, E.S., Safronov, P.P., 2017a. The stable O- and C-isotope record of fossils from the upper Barremian-lower Albian of the Caucasus – palaeoenvironmental implications. Cretaceous Research. <http://dx.doi.org/10.1016/j.cretres.2017.07.023>.

5. Zakharov, Y.D., Seltser, V.B., Kakabadze, M., Smyshlyaeva, O.P., Safronov, P.P., 2017b. Isotope composition of Mesozoic mollusks from the Saratov-Samara region and main Early Cretaceous climate trends at the Russian Platform-Caucasus area. In: Sames, B. (Ed.), 10<sup>th</sup> International Symposium on the Cretaceous – Abstracts, 21-26 August 2017, Vienna. - Beirichte der Geologischen Bundessastalt, Bd. 120, S. 310, Wien.

### **Participation in conferences**

#### **The 10<sup>th</sup> International Symposium on the Cretaceous (Austria, Vienna, 21-26 of August, 2017).**

The following reports were presented:

1. Khabipyanov L.S., Zorina S.O., Afanasieva N.I., Sokerina N.V., Perovskiy I.A., Morozov V.P., Eskin A.A. Episodes of anoxic ferruginous conditions in the Coniacian-Campanian on the Eastern Russian Platform.
2. Afonin M. 2017. Sequoioxylon (Cupressaceae s.l.) fossil woods from the Cretaceous deposits of Primorye and Sakhalin regions, the Russian Far East.
3. Zakharov, Y.D., Seltser, V.B., Kakabadze, M., Smyshlyaeva, O.P., Safronov. Isotope composition of Mesozoic mollusks from the Saratov-Samara region and main Early Cretaceous climate trends at the Russian Platform-Caucasus area.

### **Field work activities**

Y.D. Zakharov took part in the 4-day field trip “Upper Cretaceous and Paleogene at the northwestern Tethyan margin (Austria, S. Germany): Boundary, Events, Cycles, and Sequences”. Y.D, Zakharov has collected material from the Upper Cretaceous of the Alps for his isotopic investigations.

#### **Project 610 From the Caspian to Mediterranean Environmental Change and Human Response during the Quaternary (2013-2017)**

The report was submitted by T.A, Yanina (Moscow State University, Geographical Faculty).

Main results of research activities in 2017:

- In the Middle Volga region on the territory of Saratov and in the north part of the Volgograd region sediments of the Khvalyn transgression of the Caspian Sea in the outcrops along the river were studied. In the Lower Volga region on the territory of the Volgograd region the key sections of the Caspian Pleistocene Srednyaya Akhtuba, Leninsk, Raigorod were studied; on the territory of Kalmykia – section of the Tsagan-Aman; in the Astrakhan region – section of Seroglazka.

- Investigations covered the Eastern coast of the Caspian Sea The work was conducted in Turkmenistan to the Gulf of Kara-Bogaz-Gol and the Uzboy river, and in Kazakhstan, on the Mangyshlak Peninsula. The studies were preliminary in nature, in subsequent years they will continue. For arid regions of Turkmenistan and Kazakhstan, dendrochronological and dendroclimatic studies has carried out.

- The cores of two boreholes from of the North Caspian Sea were studied by lithological, malacofaunas, partially palynological and geochronological methods. The study allowed us to add the picture of paleogeographic development of the Caspian Sea in the Late Pleistocene and the reaction of its natural environment on the global climate events.

### **Publications**

1. Yanina T., Sorokin V., Bezrodnykh Yu., Romanyuk B. Late Pleistocene climatic events reflected in the Caspian Sea geological history (based on drilling data). *Quaternary International*, 2017.
2. Sorokin V., Yanina T., Bezrodnykh Yu., Romanyuk B. Identification and age of submarine Girkanian sediment beds (upper Pleistocene) in the Caspian Sea. *Quaternary International*. 2017.
3. Bezrodnykh Yu., Romanyuk B., Sorokin V., Yanina T. First data on the radiocarbon age of the Atelian deposits in the North Caspian region. *Doklady Earth Sciences*. 2017. Vol. 473, no. 1. P. 277–280.
4. Yanina T.A., Svtoch A.A., Kurbanov R.N., Murrey A., Tkach N.T., Sychev N.V. Experience in Pleistocene deposits dating in the lower Volga region by the method of optically stimulated luminiscence. *Vestnik of the Moscow State University. Ser.5, Geography*. 2017. N1, p. 21-29.

5. Svitoch A.A., Makshaev R.R. Interactions of paleogeographic events in the Pont-Manych-Kaspian system in the late pleistocene-holocene. *Vestnik of the Moscow State University. Ser.5 Geography*.2017. N2. P. 24-32.
6. Velichko A.A., Borisova O.K, Kononov Y.M., Konstantinov E.A., Kurbanov R.N., Morozova T.D., Panin P.G., Semenov V.V., Tesakov A.S., Timireva S.N., Titov V.V., Frolov P.D. Reconstruction of late Pleistocene events in the periglacial area in the southern part of the East European plain. *Doklady Earth Sciences*. 2017. Vol. 475, no. 2. P. 896–900.
7. Velichko A., Borisova O., Zakharov A., Kononov Yu., Konstantinov E., Kurbanov R., Morozova T., Panin P., Timireva S. Change of landscape settings in the south of the Russian plane in the late Pleistocene as suggested by the results of the investigations of loess-soil series in the Azov region. *Isvestia of the Russian Academy of Sciences. Geography series*. – 2017, No1. C.74-83.
8. Bolikhovskaya N.S., Porotov A.V., Richards K., Kaitamba M.D., Faustov S.S., Korotaev V.N. Detailed reconstructions of Holocene climate and environment changes in the Taman peninsula (Kuban river delta region) and their correlation with rapid sea-level fluctuations of the Black Sea. *Quaternary International*. 2017. P. 1–15
9. Richards K., Mudie P., Rochon A., Athersuch J., Bolikhovskaya N., Hoogendoorn R., Verlinden V. Late Pleistocene to Holocene evolution of the Emba delta, Kazakhstan, and coastline of the north-eastern Caspian Sea: Sediment, ostracods, pollen and dinoflagellate cyst records. *Palaeogeography, Palaeoclimatology, Palaeoecology*. 2017. Vol. 468. P. 427–452.

### **Participation in conferences**

#### **The Fifth Conference on the IGCP Project N610 (Italy, Palermo, October 1-9, 2017)**

The Fifth Plenary Conference and Field Trips on IGCP 610 held jointly with the First Meeting of the INQUA Focus Group SACCOM: 1709F “Ponto-Caspian stratigraphy and Geochronology (POCAS)” (2017-2019) . The Russian participants presented 22 reports on the project.

### **Field work activities**

Field investigations were conducted in the Manych valley. The natural outcrops in the Eastern Manych valley near the Chograysky dam, near settlement Zunda-

Tolga, in the coast cliffs of the Manych-Gudilo lake were studied. Burtasskie (middle of the Late Pleistocene), Khvalynian and Holocene outcrops were exposed in these outcrops. In the Manych valley the deep boreholes were drilled (70-40 m) with a full core receiving. Two boreholes were drilled in the central part of the Manych depression, in the area of the lake Manych-Gudilo. Four boreholes drilled in the eastern part of the depression. The core is currently being studied by complex of methods.

Field investigations were on the Kerch Peninsula, in the outcrop Eltigen. Malacofaunas analysis and dating of sediments by OSL were carried out.

### **Project 630 Permian-Triassic Climatic and Environmental Extremes and Biotic Response (2014-2018)**

The report was submitted by Yu.D.Zakharov (Far East Geological Institute Far East Branch RAS, Vladivostok)

Main results of research activities in 2017:

- Carbon and nitrogen isotope results have been obtained for the Induan and lower Olenekian in one of reference sections (Abrek) in South Primorye ;
- new Olenekian brachiopod taxa from South Primorye have been described ;
  - inner shell structure of some Olenekian ammonoids from the Kamenushka River basin, South Primorye was described ;
- olenekian conodonts from the *Anasibirites nevolini* Zone of the Abrek section (South Primorye), were described ;
- data on  $\delta^{13}\text{C}_{\text{org}}$  and  $\delta^{15}\text{N}$  values for Permian-Triassic deposits of the Kolyma-Omolon area, Balygychan Basin (North-East Russia) were obtained.

### **Publications**

1. Biakov A.S., Horacek M., Goryachev N.A., Vedernikov I.L., Zakharov Y.D., 2017a. The first detailed  $\delta^{13}\text{C}_{\text{org}}$  record in Permo-Triassic boundary deposits in the Kolyma-Omolon region Northeast Asia..Doklady Earth Sciences 474 (1), 591-594.
2. Biakov A.S., Horacek M., N.A., Vedernikov I.L., Brynko, I.V., 20017b. Deep-water Upper Permian boundary sediments in the north-east Asia (Balygychan Basin,KolymaOmolon region) new  $\delta^{13}\text{C}_{\text{org}}$ ,  $\delta^{15}\text{N}$ ,



palaeontological and geochronological data. 5<sup>th</sup> IGCP 630 International conference and field workshop, 8-14 October 2017. Erevan, Armeniya, p. 14-15.

3. Popov A.M., Zakharov Y.D., 2017. Olenekian brachiopods from the Kamenushka River basin, South Primorye: new data on the brachiopod recovery after the end-Permian mass extinction. *Paleontological Journal* 51 (7), 49-59.

4. Smyshlyaeva, O.P., Zakharov, Y.D., 2017. Phylogenetic relationships of Early Triassic ammonoids (new data on the inner shell structure of some Olenkian ammonoids of Southern Primorye). *Paleontological Journal* 51 (7), 41-48.

### **Participation in conferences**

#### **The Fifth conference on IGCP Project 630 (Armenia, Erevan, 8-14 of October 2017)**

The following report was presented:

Biakov A.S., Horacek M., N.A., Vedernikov I.L., Brynko, I.V. Deep-water Upper Permian boundary sediments in the north-east Asia (Balygychan Basin, Kolyma Omolon region) new  $\delta^{13}\text{C}_{\text{org}}$ ,  $\delta^{15}\text{N}$ , palaeontological and geochronological data.

### **Field work activities:**

Field works were organized in South Primorye to investigate Early Triassic fossils (brachiopods, ammonoids, bivalves and conodonts from Zhitkov, Chernyshev, and Schmidt sections on the Russian Island and SMID section in the Artyom area. Field works were carried out together with Japanese colleagues from the National Museum of Nature and Science (Tsukuba) according to the agreement on scientific collaboration.

#### **Project 648 Supercontinent Cycles and Global Geodynamics (2015-2019)**

The report was presented by D.P. Gladkochub and T.V. Donskaya, (Institute of Earth Crust, Siberian Branch RAS, Irkutsk)

The main results of the research activities in 2017

Mesoproterozoic dike swarms were investigated in details on the Southern flank of the Baikal protrusion in the Siberian craton basement, situated in the coastal outcrops in the west shore of the Baikal lake, near Listvyanka village (“Listvyanka” swarm) and about 15 km northward – northwestward from Bolshoe Goloustnoe village (“Goloustnoe” swarm). It was found out that the age of the dolerite, taken from a large dike of the “Listvyanka” swarm, is  $1350 \pm 6$  mln years. The age of the dolerite of the dike from the “Goloustnoe” swarm is  $1338 \pm 3$  mln years. By the chemical composition, dolerites of the “Listvyanka” and “Goloustnoe” dike swarms correspond to basalts of normal alkalinity. The geochemical characteristics of dolerites indicate that they were formed in the conditions of intracontinental extension associated with the activity of Mesoproterozoic mantle plume. The investigated dykes are probably part of a large Mesoproterozoic magmatic province, which along with dike swarms of the Siberian craton, included, similar in composition and age, basic dyke swarms of the Canadian Shield northern part.

### **Publications**

1. Gladkochub D.P., Donskaya T.V., Ernst R.E., Pisarevsky S.A. Main mafic dyke swarms of the southern Siberian craton: their ages and geochemical features // Goldshmidt 2017, Abstract.
2. Donskaya T.V., Gladkochub D.P., Mazukabzov A.M., Pisarevsky S.A. Paleoproterozoic granitoids related to the Siberian craton assembly // Goldschmidt 2017, Abstract.
3. Gladkochub D.P., Donskaya T.V., Zhang S., Pisarevsky S.A., Stanevich A.M., Mazukabzov A.M., Motova Z.L. Early stage of the Central Asian Orogenic Belt building: evidences from the southern Siberian craton // *Geodynamics & Tectonophysics*, 2017, v. 8, no. 3, p. 461-463.

### **Project 653 “The Onset of the Great Ordovician Biodiversification Event” (2016-2020)**

The report was presented by Dr. A.V. Dronov, Geological Institute RAS

The main results in 2017:

- traces of *Rusophycus carleyi* life characteristic of Gondwana and *Lavrentia* were investigated in the southern Siberia near the boundary with the Baikal-Vitim fold area;

- permafrost traces were studied in the upper Cambrian deposits in the Saint Petersburg suburbs

### **Publications**

1. Dronov A.V. 2017. Traces of permafrost degradation in the conformity surface near the base of the Furongian (upper Cambrian) of the St. Petersburg region, NW Russia. In: Żylińska, A. (Ed.) 2017. 10<sup>th</sup> Baltic Stratigraphic Conference, Chęciny 12-14 September 2017, Abstracts and Guide Book. Warszawa, pp.30-31.
2. Dronov A.V., Kushlina V.B. 2017. *Rusophycus carlei* on the edge of the Siberian Platform. In: Zhang, Y.D., Zhan, R.B., Fan, J.X., Muir, L.A. (eds.) Filling the gap between the Cambrian Explosion and the GOBE – IGCP Project 653 Annual Meeting 2017, Extended summaries. Hangzhou: Zhejiang University.
3. Shatsillo, A.V., Kuznetsov, N.B., Dronov, A.V. 2017. Paleomagnetic data for Siberia and Baltica in the Context of Testing Some Geodynamic Models of the Formation of the Central Asian Mobile Belt. *Izvestiya, Physics of the Solid Earth*, v.53, N5, pp. 769-782.
4. Dronov A.V. 2017. Chapter 5. – Ordovician Sequence Stratigraphy of the Siberian and Russian Platforms. In: Montenari M. (Ed.) *Advances in Sequence Stratigraphy. Special Issue. Stratigraphy & Timescale. V. 2*, Elsevier, pp. 187-241.

### **Participation in conferences**

#### **10th Baltic Stratigraphic conference (Poland, Chęciny September 12-14, 2017)**

The following report was presented:

Dronov A.V. Traces of permafrost degradation on the unconformity surface near the base of the Furongian (upper Cambrian) of the St. Petersburg region, NW Russia.

#### **The conference on the project 653 (China, Yichang, 8-18 October 2017)**

The following report was presented:

Dronov A.V., Kushlina V.B.. *Rusophycus carlei* on the edge of the Siberian Platform

### **IGCP Committee's Activities in 2017**

During 2017 the Russian Committee maintained contacts with the Commission of the Russian Federation for UNESCO. There were also close interactions with Russian members of IGCP projects.

Co-chairman of the Russian National Committee for the International Geosciences and Geoparks Program

Academician

A handwritten signature in black ink, appearing to read 'M. Fedonkin', with a stylized flourish at the end.

Mikhail A. Fedonkin

**IGCP Projects, in which Russian scientists participated in 2017**

**Project 608** Asia-Pacific Cretaceous Ecosystems (2013-2017)

**Project 609** Cretaceous Sea-Level Changes (2013-2017)

**Project 610** From the Caspian to Mediterranean: Environmental Change and Human Response during the Quaternary (2013-2017)

**Project 630** Permian-Triassic Climatic and Environmental Extremes and Biotic Response (2014-2018)

**Project 648** Supercontinent Cycles and Global Geodynamics (2015-2019)

**Project 653** The Onset of the Great Ordovician Biodiversification Event  
(2016-2020)

**Project 652** Reading Geologic Time in Paleozoic Sedimentary Rocks  
(2017-2021)

**Project 655** Toarcian Oceanic Anoxic Event Impact on Marine Carbon Cycle and Ecosystems (2017-2019)