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PLEISTOCENE CLADOCERA: A REVIEW

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Cladocera is a very important group of the microscopic animals in continental water bodies (Forró et al., 2008). They are well-known models of recent evolutionary biology. It is known that after death, the chitineous remains of some cladocerans (head shield, valves, appendages) are defragmented and preserved in the sediments (Frey, 1964; Smirnov, 2010). There are records of fossil cladocerans from Mesozoic (Smirnov, 1992; Kotov, 2007) and even from Palaeozoic (Smirnov, 1970; Womack *et al.*, 2012) age, although the latter are dubious (Van Damme, Kotov, 2016). But Quaternary subfossils of the Cladocera are better preserved than in previous periods, and much more numerous.

Remains of several groups of the Cladocera are usual in the bottom sediments of large lakes. Because of their high preservation potential in the Holocene deposits, cladocerans are informative in the reconstruction of past aquatic food webs, in which they occupy a key role (Smirnov, 2010). Tens, even hundreds of papers concerning the cladoceran remains from different Holocene cores are published annually.

But the community composition of cladocerans sometimes are unchanged in last 130,000 years (Frey, 1964). In Pleistocene sediments, the cladoceran remains are common, mainly chydorids and bosminids (head shields, valves, postabdomens). If the value of the chydorid remains for such studies is well-known, only recently the daphniid ephippia become to be objects of such detailed works. An unusual, new direction in the studies of Quaternary cladoceran fossils deals with remains associated with excrements (Kirillova et al., 2016a) and hair (Kirillova et al., 2016b) of the "Mammoth fauna".

The aim of this presentation is to make a review of such records and provide some comments on their using in palaeoecological reconstructions.

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CHARACTERIZATION OF SAPROPELIC DEPOSITS OF NOVOSIBIRSK REGION, SOUTH-WESTERN SIBERIA

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Sapropel is an important biogenic resource usable in agriculture and industry, and it is an alternative to hydrocarbon resources. There are few examples of sapropel explorations in the south of Western Siberia: Lake Puchay on Omsk region (liquidated in 2016) and Lake Beloye in Novosibirsk Region. Experts explain low effectiveness of these enterprises by relatively high net costs and limited product market. Our project run in 2017 is aimed to investigate perspective of sapropelic business in Novosibirsk Region in terms of Earth science research: structure of sapropel deposits, regularities of their accumulation, composition, valuable properties, and also to propose new technologies of their processing. There were several lakes investigated by our team in Novosibirsk region; among them, the largest deposits are Lake Minzelinskoe, Lake Bolshie Toroki, Lake Itkul, Lake Malye Chany, and a minor deposit is Lake Beloye (Fig. 1).

Our field investigations allowed us to recalculate reserves of sapropel in Lake Minzelinskoe, which the geological survey (1998) claims as the largest, 8 million tons, sapropel deposit of the region. According to our data, total stock of sapropel in this lake is no larger than 3 million tons. Consequently, Lake Bolshie Toroki seemingly hosts the largest sapropel deposit of Novosibirsk Region.

Our investigated lakes show the following regularities of their sediment structure and development. Biogenic sedimentation started in the lakes since the beginning of middle Holocene, 8-7 cal. ka BP according to the radiocarbon dating. The sediments include several layers of different origin indicating variations of the sedimentation environments. Usually brown color peaty sapropels lay in the bottom parts and greenish color macrophytogenic sapropels occur in the upper parts of the sediment sequences. This suggests boggy or marshy (wetland) stage in the beginning of the lakes history followed by lacustrine stage. Change of the sedimentation environments is individual for each lake and its time vary from ca. 6 to 4 cal. ka BP. Dating gives estimates of sedimentation rates of these two parts