

Paleolimnological Studies in Russian Northern Eurasia: A Review

D. A. Subetto^{a, b, *}, L. B. Nazarova^{c, d, e}, L. A. Pestryakova^f, L. S. Syrykh^{b, e}, A. V. Andronikov^g,
B. Biskaborn^d, B. Diekmann^{c, d}, D. D. Kuznetsov^h, T. V. Sapelko^h, and I. M. Grekov^b

^a Northern Water Problems Institute, Karelian Research Center, Russian Academy of Sciences, Petrozavodsk, 185030 Russia

^b Herzen State Pedagogical University of Russia, St. Petersburg, 191186 Russia

^c University of Potsdam, Institute of Earth and Environmental Sciences, Potsdam-Golm, 14476 Germany

^d Alfred Wegener Institute, Helmholtz Center for Polar and Marine Research, Potsdam, 14473 Germany

^e Kazan (Volga) Federal University, Kazan, 420008 Russia

^f Ammosov Northeastern Federal University, Yakutsk, 677000 Russia

^g Branch of Geochemistry and Laboratories, Czech Geological Survey, Prague, 15200 Czech Republic

^h Institute of Limnology, Russian Academy of Sciences, St. Petersburg, 196105 Russia

*e-mail: subetto@mail.ru

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Abstract—This article presents a review of the current data on the level of paleolimnological knowledge about lakes in the Russian part of the northern Eurasia. The results of investigation of the northwestern European part of Russia as the best paleolimnologically studied sector of the Russian north is presented in detail. The conditions of lacustrine sedimentation at the boundary between the Late Pleistocene and Holocene and the role of different external factors in formation of their chemical composition, including active volcanic activity and possible large meteorite impacts, are also discussed. The results of major paleoclimatic and paleoecological reconstructions in northern Siberia are presented. Particular attention is given to the databases of abiotic and biotic parameters of lake ecosystems as an important basis for quantitative reconstructions of climatic and ecological changes in the Late Pleistocene and Holocene.

Keywords: paleolimnology, lakes, bottom sediments, northern Eurasia, Russian Arctic, databases

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INTRODUCTION

Bottom sediments of lakes as a variety of geological archives are records that contain and store the information on ecological situations of the past at the regional and planetary level with a resolution from thousands and hundreds of years to 1 year (Subetto, 2009). In recent years, the interest to paleoecological, especially paleolimnological studies of the Northern Hemisphere has grown significantly, which is primarily due to the problem of global climate change, especially in high latitudes (*Climate Change*, 2007). The polar regions of the Northern Hemisphere include a vast number of lakes of different genesis and morphometry; their bottom sediments archived detailed data on changes of the climate, landscapes, and hydrology during the Pleistocene and Holocene.

Paleolimnological studies in the Russian Arctic were initiated by scientists of the Arctic and Antarctic Research Institute in 1960–1970 (Govorukha et al., 1965). In the 1980s, the Institute of Limnology of the Academy of Sciences of the Soviet Union and the related institutes carried out studies as part of the project “History of Lakes of the Soviet Union,” which included investigation of a number of lakes in the Kola

Peninsula, Bolshezemelskaya tundra, Taimyr Peninsula, and other northern regions of Eurasia (*Istoriya ozer Vostochno-Evropeskoi...*, 1992; *Istoriya ozer Severa Azii...*, 1995). At the present time, an intensive study of Arctic lakes of Siberia is being carried out within the framework of international cooperation. However, although paleoecological studies are carried out in many Russian regions, the level of knowledge about paleoclimatic and paleoecological changes in the Russian part of northern Eurasia is much lower compared to Europe and the American continent.

The special issue of the *Siberian Journal of Ecology* “Paleoecological Studies in Russia” presents the latest studies of the leading Russian specialists who are engaged in the area of paleoecology and paleoclimate. The articles of the special issue provide the most recent data on paleological and paleoclimatic reconstructions, as well as the historical development of natural conditions in the areas of the northern Urals (Nazarova et al.), the south of the Taimyr Peninsula (Syrykh et al.), Central Siberia, central (Frolova et al.; Pavlova et al.) and northern (Rashke et al.) Yakutia, the Novosibirsk archipelago (Palagushkina et al.), the Baikal region (Bezrukova et al.), and the Far East (Razhigaeva et al.).