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The Holocene environmental changes are well recognizable in the south of Western Siberia where the major natural divide of humid to arid conditions and forest to steppe vegetation take place. Migration of this boundary can be reconstructed by palynological studies of the lacustrine and palustrine sediments. However, the Novosibirsk region is lacked by detailed studies of the Holocene pollen records; the conclusive publication (*Levina, Orlova, 1993*) summarize information of several sections. Thus, careful study of key sections will allow us more deep substantiation of this issue. One of such key objects is the Beloe Lake (55°23′ N, 82°41′ E), which multiproxy study was launched in 2002. Nine cores from two drilling sites were collected by joint Russian-Japanese team. More than 25 analytical methods were applied for these cores. Results are partially published *(Bobrov et al., 2005; Yamamuro et al., 2005)*. Main achievements were recently reported in the joint Korean-Japanese workshop in Gyeongju *(Krivonogov et al., 2005)*. In this paper we represent results of palynological study.

Beloe Lake occupies a small depression on the ancient terrace of the Ob' River. This area was not under influence of the river processes during the Holocene, and its environment is close to the intervalley one. Lake has rounded shape and approximate diameter of 800 m. Water depth in the center is 1.1 m. Research area has continental climate with the following average characteristics: annual temperature -1^0, annual precipitation 350-450 mm, July temperature $+19^0$, and January temperature $-19{,}5^0$. Modern zonal vegetation is represented by birch and aspen-birch forests essentially perlaced by crop fields and pastures. The lake itself is surrounded by swampy birch forest and reed rings. Pondweeds, duckweed and other aquatic plants are abundant in the lake.

Two cores were studied palynologically. First, 3.9 m long sediment core was obtained in the central part of the lake. The core was opened in the laboratory and sampled for pollen analysis in different spacing modes along the core: 0-10 cm - every one cm, 10-150 cm – three to five cm, and 150-390 cm – every 10 cm. Pollen analysis was made in the Laboratory of Forest Dynamics, Kyoto Prefectural University. Standard technique was used for the treatment of unified one ml sediment samples *(Faegri et al., 1989)*. Second, 2.5 m long core was obtained in near-shore position in the boundary of reed and birch rings. Samples for pollen analyzes were collected with spacing of every 2 cm. This core was studied in the Laboratory of the Mesozoic and Cenozoic paleontology and stratigraphy. Chemical treatment was made by different method *(Grichuk, Zaklinskaya, 1948)*.

Core from the central part of the lake has three sedimentary units. The lower part (390 – 134 cm) consists of grey to blue-grey loess-like loam, middle part (134-53 cm) of brown peaty gyttja, and upper part (53-0 cm) of calcium-rich gyttja. Age of lacustrine sediments is estimated by two radiocarbon dates of 5120±50 (Beta-175243) and 3190±40 (Beta-190690) collected respectively near the lower and upper boundaries of the peaty gyttja. Sediments of the near-shore borehole are coarse peat of the boggy area; however, upper 20 cm of this core are composed by gyttja and probably represent a transgressive phase of the lake. Correlation of the central part and near-shore sediments is currently based on the pollen data, but additional radiocarbon dates will be received soon.

Four local pollen assemblage zones were discovered for the central core sediment sequence (pre-lake loess-like sediments from lower part are devoid of pollen):

Local pollen assemblage zone 1 (130-102 cm): prevalence of *Betula* sect. *Albae*, *Pinus sylvestris* and hydrophytes (*Typha*, *Potamogeton*, *Sparganium*, *Myriophyllum*, *Nymphaea*, *Nuphar*, *Lemna*) pollen; *Artemisia*, Poaceae, Cyperaceae pollen are also typical. In general, this pollen assemblage shows local terrestrial vegetation similar to the modern one: surrounding birch forest, reed and sedge associations, and various aquatic plants inside the lake.

Local pollen assemblage zone 2 (102-52 cm): pollen association is similar to the first one, however, increase of spores presented by *Thelypteris palustris* and other forms of Polypodiaceae allow us to propose some drying. However, part of this assemblage is presented by wetland and mire plants.
Local pollen assemblage zone 3 (52-32 cm): pollen of *Betula* sect. *Albae* is still abundant, but it's concentration considerably decreased (same trend we observe for *Pinus sylvestris*); however, we observe increase of *Betula* sect. *Nanae* pollen, while pollen of hydrophytes decreased and spores of Polypodiaceae almost disappeared. The birch forest remained to be the main type of vegetation, but local plants around the Beloe Lake has been changed. We suppose some cooling for this period (appr. 3000 2000 yr.).
Local pollen assemblage zone 4 (32-0 cm): the main feature is the abundance of *Betula* pollen (up to 75%). Herbs are presented by *Artemisia*, Poaceae, Cyperaceae and other families. Hydrophyte pollen is presented also. This assemblage corresponds to the modern vegetation.
Pollen proxy from the second core is also divided in four local pollen assemblage zones, which have good correlation with those from the center. The main difference is higher content of *Thelypteris palustris* spores because of its near-shore position.

CONCLUSIONS

Thus, palynological record from the Beloe Lake slightly represents regional changes in vegetation since the middle Holocene Atlantic time. We did not find distinctive shifts of vegetation zones: birch-tree was permanently dominant. However, some decrease in the *Betula* pollen concentration is registered for the period of 3000-2000 yrs. BP that probably can be recognized as a cooling event. Pine-tree, which pollen is also rich in the assemblages, does not represent local vegetation. According to the studies of surface pollen samples, this is a transitional component.
More distinctively pollen assemblages show changes in the local lacustrine and near-water communities. Hydrophytes and reed-sedge associations were dominant in the beginning of Subboreal time (since 5 000 yrs. BP) and some drying can be suggested for the second half of this time. Watered area was probably decreased and extending waterlogged parts were occupied by Polypodiaceae, *Thelipteris palustris,* and *Equisetum.* Aquatic plants were disappeared in the end of Subboreal period (appr. 3 200 yrs. BP), which accompanied by decrease of Polypodiaceae and *Thelipteris palustris*. *Betula* sect. *Nanae* was settled around the lake. We can suggest some cooling for this period that could be accompanied by transgression, as recognized by other analythical methods *(Krivonogov et al., 2005)*.

ACKNOWLEDGEMENTS

This research was carried out within the UIGGM SB RAS Young Scientists Project (VMTK-1738) and partially supported by RFBR 04-06-80058_a and RFBR-JSPS 05-05-66942_a grants. Analysis of the first core was provided by fellowship in the Kyoto Prefectural University in 2003 under supervision of Prof. Hikaru Takahara and kind help of his personnel (special regards to Mrs. Kioko Tanida for her help in chemical treatment).

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