

## Palynological study of Lake Kotokel' bottom sediments (Lake Baikal region)

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### Abstract

Pollen and AMS<sup>14</sup>C analyses of bottom sediments from the upper nine meters of the Lake Kotokel' section were carried out. The regional climate and landscape dynamics during the Late Glacial and Holocene has been reconstructed with an average time resolution of ~120 years. It is shown that the climatic conditions in the Kotokel' basin during Termination I (~15.5–11 ka) were characterized by short drastic changes resulting in the reorganization of landscapes and vegetation. Five short (400–1200 years) intervals have been recognized: 15.5–14.7, 14.7–14.3, 14.3–13.2, 13.2–12.5, and 12.5–11.7 ka. In the early Holocene (~11 ka), the climate became less continental and stayed such till ~7 ka. Later on, it again became more continental, which led to a significant decrease in average annual precipitation and winter temperatures and an increase in average summer temperatures. The pollen record from Lake Kotokel' agrees with the general climatic trend for the Northern Hemisphere. The amplitude of vegetation and climatic variations during the Late Glacial is best expressed as compared with the previous regional pollen records. This is probably because the ecosystem of the small lake localized deep inside the continent, at the boundary of two large ecotones (forest and steppe), is highly sensitive to moisture deficit.

The new dated detailed pollen record from the Lake Kotokel' bottom sediments might be regarded as a key section for the reconstruction of variations in regional vegetation and climatic dynamics for the last 15–15.5 kyr. The results obtained refined the kind of changes in regional vegetation, and the reliable age model permitted intra- and interregional correlations of environmental changes.

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### Introduction

Paleoclimatic, especially palynological, records for intra-continental regions are important for understanding the past climatic changes on the Earth and estimating the sensitivity of the regional ecosystems to future climatic variations. Pollen records for the key object of northern Central Asia—bottom sediments of Lake Baikal and its basin peat bogs—showed the general tendency of the response of the regional vegetation to the global climatic changes in the Late Glacial and Holocene (Bezrukova et al., 1991, 1996, 2008a; Bradbury et al., 1994; Demske et al., 2005; Horiuchi et al., 2000; Takahara et al., 2000; Tarasov et al., 2007). But some of the

pollen records are of low temporal resolution (Bezrukova et al., 1991; Bradbury et al., 1994); the others are of poor chronological control (Bezrukova et al., 1996) despite the obvious progress in absolute dating (Krivonogov et al., 2004). Some records lack part of the Late Holocene information (Demske et al., 2005) or show only the dynamics of few abundant pollen taxa of tree and shrub flora determined up to the genus, which significantly reduces the reliability of paleoreconstructions (Horiuchi et al., 2000). Moreover, the reconstruction of the Late Glacial paleoenvironment by the Baikal pollen records was difficult because of the small amount of pollen and spores in the sediments accumulated in that epoch (Tarasov et al., 2007). The low content of organic material in the sediments complicates a reliable chronological control of the reconstructions, which makes one to search for new objects of study. For this purpose we decided to use the recently obtained palynostratigraphic sequence of the bottom

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