

Late-Holocene environmental and climatic changes in central part of the Western Sayan Mountain

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The purpose of this collaborative research is to determine how Holocene climate variability affects the landscapes evolution in valley of Buyba River. The work was conducted at the intersection of three disciplines: paleobotany, mineralogy and geochemistry. Data about environmental and climate changes in the Late Holocene in central part of Western Sayan are presented. We analyzed four peatland locations that, related to a single area of the river catchment. Sediment cores were taken from the central part of the peatland landscape. The age was determined by radiocarbon dating.

Start of bog forming occurred asynchronously within the northern macroslope of Western Sayan. Bogs age decreases with the increase in the absolute elevations. On the highest elevation of 1656 m, the process of peat accumulation started 460 ± 80 years ago, after a significant reduction of snowfields. The most ancient peat layers formed at the altitude of 1320 meters and in elevations down the slope, and were aged 2950 ± 110 years or more (up to 5000 years).

Over the period from 5000 to 4000 years ago, there were dryer and warmer climate conditions in the research area. Slopes of trough valleys were covered with sub-alpine shrubs of dwarf birch and alder, tree layer was absent. According to the pollen analysis, the role of tree vegetation (*Pinus* forest with participation of *Pinus sibirica* and *Betula sect. Albae*) was larger at the foothills. At the same time, at an altitude of 1650 m peat deposits are not formed, only isolated remains of plant detritus were found in much younger gravelly-clay sediments.

Shallow flowing pond conditions were characteristic for stages before peat accumulation. Geochemical analysis of the ratio Th / U in loam, underlying peat, allows one to infer about oxidizing conditions during sedimentation. Analysis of the minerals in the peat layer, and the dynamics of accumulation of Na, Al, Ti (INAA-method) indicate that the time interval 500-2200 years was characterized with most stable hydrological conditions. During this period, the flood waters have supplied the least amount of allochthonous contaminants on the surface of the swamp. On the peatlands, sedge and sedge-moss plant communities were developed. Main plant species which grows in the peatlands are *Carex altaica* (Gorodk.) V.Krecz, *Carex limosa* L., *Tomentypnum nitens* Hedw., *Aulacomnium palustre* (Hedw.) Schwaegr., *Warnstorfia exannulata* (B.S.G.) Loeske., *Thelypteris palustris* Schott, *Baeothryon caespitosum* (L.) A.Dietr.

During the last 500 years an increase of allochthonous contaminants inputs to marsh sediments is observed. In our opinion, the main causes of the increase were reduction the forest area, sharper contrast of summer and winter temperatures and more rapid melting of snow in early summer. The last cause lead to increased levels of floods. Eutrophic-mesotrophic sphagnum communities (*Sphagnum warnstorffii* Russ., *Sph.subsecundum* Nees., *Sphagnum angustifolium* Jensen., *Sph. fuscum* (Schimp.) Klinggr.), which are growing at the moment, begin to develop in the peatlands since 500 years ago.