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Reconstructions of the ecological conditions of the Holocene in the region of Steppe Altay, using sediment archives of the Lake Yarovoe

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The Altai Mountains are located in the center of climatologically sensitive region. Here, major polar and subpolar air masses meet, making Altai Mountain region to an ideal place to record shifts in atmospheric circulation. Due to its position in the center of the Eurasian continent, it is a key region for studying the past variations in the Arctic monsoon strength, the Siberian high pressure system, and the Westerlies that bring North Atlantic moisture to the interior of Eurasia. The precipitation in the Altai Mountains is mainly driven by cyclonic activities and monsoons. Any small change in global atmospheric circulation causes a distinct change in the regional climate, i.e. in temperature and precipitation of this area, and leads to sharp changes of vegetation and landscapes. As a result, there are ecologically contrasting biomes such as mountainous conifer forests, dry steppe and high mountain meadows and tundra vegetation within relatively short distances, depending on elevation, and slope aspect.
Lake Bolshoe Yarovoe (52°56´00˝ N and 78°35´00˝ E.) is the deepest one among the lakes in Kulundin steppe. It is situated in the lowest place of the Alaty region (79 a.s.l.). The total area of the lake constitute 70 square km with the maximal depth averaging at 25 m. Sediments of the lake were investigated with the methods of mineralogical, lithological, palaeomagnetic analysis and using paleolimnological proxies (pollen, diatoms, cladocera, chironomids). After the correlation of our data with the world data (Lake Biwa, Japan), we found that the oldest part of the investigated cores are 4,5 ka old. Preliminary seismographical interpretation of the obtained data allows us to suppose a considerable strong influence of neotectonical, palaeogeographical and other factors on the processes of sedimentation in the lake Bolshoe Jarovoe. Seismoacustical investigations have revealed presence of the mud vulcanism in the lake, areas that are influenced by thermal waters and elevated gases concentrations. Reconstructions of the ecological conditions of the Holocene were made using methods of palaeobioindication and have shown fluctuations in the level of the lake water salinity and related climatical parameters.