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Semiarid landscapes response to Aeolian processes during Holocene in Baikal Region

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Arid and semiarid landscapes play a significant role in global climate, biogeochemical, and hydrological processes. Regional analysis of the past aeolian processes is essential for improve our understanding of how various landscape and ecosystems responded to climate change in the past.
Our investigation presents details on sand dunes and on loess-like sediments. The study areas are situated in the northern part of Baikal Region (Eastern Siberia). In its depressions, the so-called Barguzinskaya and Tunkinskaya Valley surrounded mountain ranges local dunefieds and loess-like sediments have developed. Present climate in the study areas is continental, characterized by low precipitation(mean annual 250-450 mm) and wide annual range of temperature.
Field investigations indicate that the Holocene deposits of the Barguzinskaya and Tunkinskaya Valley are sealed the pedo-sedimentary interface. The analytical results suggest that one's represents a changeover from intensified soil formation to accelerated aeolian dust accumulation. The original content of calcium carbonate and gypsum at the base of some sections of loess-like sediments indicates the aeolian origin of these sediments.
In whole, the soil horizons are a proof for humid phases. The change was forced by climatic aridity. Absolute dating of the organogenic components of soils (14C) indicate the age positions of the arid and humid climate phases. Our results indicate not only 1-4 long-time episodes of aeolian dust accumulation during the Holocene, but shot-time aeolian accumulation episodes, that were specific for Late Holocene. For example, in the Tunkinskaya Valley the Late Holocene soil formation replaced by aeolian deposit at 1700 – 1900, 800 and 200-250 years ago, in the Barguzinskaya Valley – about 3100 – 2900, 2300 and 600 years ago.
It can be concluded that a periodical formation of the aeolian deposits in the semiarid landscapes during Holocene can be postulated. Aeolian and loess-like sediments of the semiarid landscapes in Baikal Region can be used as palaeoclimatic indicators. It can also be supposed that several smaller arid phases occurred during Late Holocene indicating an arid climate in the region. The high dynamicity of natural processes in the semiarid landscapes holds much promise in studying their Late Quaternary evolution and dynamics for reconstruction and forecasting the global and regional environmental changes.
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