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HIGH ELEVATED PEATLANDS IN MONGOLIA INDICATE DESERTIFICATION TRENDS IN CENTRAL ASIA

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SUMMARY

Mongolia is highly elevated country with dominating dry climate and peatlands were not recognized as specific ecosystems there. Our studies found that peatlands cover 27 thousand sq. km or over 1.7% of the country, and data collected demonstrate their dramatically changes during the recent times. Especially peatlands of steppe and forest steppe zone, originated under more favorable climatic conditions in the past are degrading progressively during the last decades. The climate driven desertification of mires is strongly supported by over-pasturing, and wise of peatlands could serve as a key measure for their adaptation to climate change.

Keywords: peatlands, highland, Mongolia, Central Asia, desertification

INTRODUCTIOIN

Peatlands are highly integrated and important natural ecosystems with specific regulation functions, characteristic biodiversity, high value for environment and welfare (Joosten and Clark, 2002; Parish et al. 2008). These ecosystems are especially important under dry continental climate. They store water and regulate hydrology in headwaters and valleys of rivers and streams. Peatlands keep specific flora and fauna and support biodiversity far beyond their borders by regulation adjacent environment and providing temporary habitats for "non mire" species. Lands with wet conditions and relatively fertile peaty soils are characterized by higher productivity of vegetation. This makes them attractive pastures especially under drying conditions but with much less resilience to stock as compared to vegetation cover on mineral soils.

Peatlands located in the critical humidity conditions are the key objects to be affected by desertification processes and could indicate their overall trends in the region. In the constantly accumulating peat, peatlands preserve a unique record of their own development as well as of past changes in regional vegetation and climate. Plant macrofossils tell us about shifts in vegetation cover and ecological conditions of mire including hydrology and geochemistry. Spore-

pollen data supported by radiocarbon dating make a key input to information background for reconstruction of climate in the past. Temporal changes of peat increment and humification provide additional information on the changes of ecological conditions of these ecosystems.

MONGOLIAN PEATLANDS

As often happened in many regions peatlands were not recognized as specific ecosystems in Mongolia. Only in few exceptions they were the objects of floristic and vegetation studies (see Minayeva et al., 2005ab, 2008). The last studies found that peatlands cover 27 thousand sq. km or over 1.7% of the country territory and play the significant socio-economic role providing high productive pastures (Minayeva et al., 2004, 2008). The comparative analysis of peatlands descriptions from 19–20th centuries and peatland relieves studied during field-work in 2003–2004 and in 2006 support the idea about dramatically changes in peatland landscapes during the recent times. The initial data (Sirin et al., 2005) was further supported by recent laboratory testing and complex analysis of the data obtained.

DISCUSSION AND CONCLUSIONS

The paleoecological data based on peat macrofossil, decomposition rate, bulk density and ash content analyses, and radiocarbon dating demonstrates long-term changes in peatlands. Only the sloping mires in highlands, valley mires on permafrost and sphagnum-sedge mires in taiga zone demonstrate stable conditions nowadays. The peatlands of steppe and forest steppe zone, originated under more favorable climatic conditions in the past are degrading progressively during the last decades. This correlates with the overall trend of peat increment decrease during warm periods within last 3 millenniums found for the North Eurasia (Klimanov and Sirin, 1997).

It is expected that carbon sink in the region will likely decline under future climate conditions due to enhanced decay rates of soil organic matter and limited plant C uptake (Lu et al. 2009). Increased temperatures and evapotranspiration rates will make soils much drier and desiccation of peat surfaces will make them more susceptible to erosion. During droughts, the upper peat layers are eroded by wind and the surface becomes deflated, and during intense rainfall peat is moved down slope and lost in runoff. This is already seen in many regions of Mongolia and expected to expand in future.

Human activities can seriously increase the vulnerability of peatlands to climate change. The climate driven desertification of mires is strongly supported by over-pasturing, which leads to disturbance of plant and soil cover, and consequently to the mires drying up, peat degradation and sometimes peat fires. Wise use of peatlands as pastures could serve as a key measure for their adaptation to climate change. Composition of principles of rational nature management and aged traditions of coexistence of human and nature in Mongolia allows finding a balance between exploitation and protection of these valuable ecosystems and to combat desertification and land degradation in the region.

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