Geophysical Research Abstracts, Vol. 8, 01616, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01616
© European Geosciences Union 2006

Monitoring of permafrost in the Hovsgol mountain region, Mongolia

Sh. Anarmaa (1), N. Sharkhuu (1), **B. Etzelmuller** (2), E. Heggem (2), F. E. Nelson (3), N. I. Shiklomanov (3) and C. Goulden (4)

(1)Geo-Ecology Institute, Mongolian Academy of Sciences, (2)Department of Geosciences, University of Oslo, (3) Department of Geography and Center for Climatic Research, University of Delaware, DE, USA, (4) Institute of Mongolian Biodiversity and Ecological Studies, Academy of Natural Sciences, Philadelphia PA, USA

The Hovsgol Mountain Region is located between the coordinates of N 49°-52° and E 98°-102° in territory of Hovsgol Province, Mongolia. The territory is characterized by mountain permafrost, sporadic to continuous in its distribution, and occupies the southern fringe of the Siberian continuous permafrost zone. The main goal of permafrost monitoring in the region is to study recent degradation of permafrost under the influence of climate warming and human activities. Monitoring of permafrost is conducted within the framework of the Circumpolar Active Layer Monitoring (CALM) and the Global Terrestrial Network for Permafrost (GTN-P) programs. The main parameters being monitored are active layer depth and mean annual permafrost temperature at the level of the zero annual amplitude. Long-term CALM and GTN-P programs are based on ground temperature measurements in shallow to deep boreholes. Each borehole for monitoring is installed using instrumentation designed specifically to protect against air convection in them. Temperature measurements in the boreholes are made using identical thermo-resistors at corresponding depths, and carried out on the same dates each year. In addition, temperature dataloggers and thaw tubes are installed in most of the boreholes. At present, there are eight long-term (15-35 years) CALM and GTN-P active borehole sites. Boreholes are located in the Sharga valley (southwest), Burehkhan and Hovsgol phosphorite areas and Hatgal village (central part of the region) and in the Darhad depression. Initial results of the long term monitoring show that average rates of increase in active layer depth and mean annual permafrost temperature under influence of recent climate warming in the Hovsgol Mountain Re-

gion are 5-15 cm and 0.15-0.25°C per decade, respectively. The rate of permafrost degradation in bedrock is greater than in unconsolidated sediments, in ice-poor sediments more than ice-rich ones, and on north-facing slopes more than on south-facing ones. Intensive degradation of permafrost is also caused by human activities associated with land use. For example, initial results of short term (3 years) monitoring of permafrost in the northeastern shore valleys of Lake Hovsgol show that the depth of the active layer varies from 1.4 m in Borsog valley in the south to 4.8 m in Turag valley in the north, apparently in relation to livestock grazing pressure. We have also begun monitor active frost heaving on pingos in the eastern shore valleys and active thaw settlement (thermokarst) in the Darhad depression. In general, the permafrost in the Hovsgol Mountain Region is degrading more intensively than in the Khentei and Khangai Mountain Regions. The recent degradation of permafrost under the influence of climate warming and human activities leads to some changes in natural and ecological balance. In particular, our observations have indicated deforestation in the taiga zone and desertification in the steppe zone of the Hovsgol region.