Progress of IORGC project in northern Mongolia and additional study plan

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I Introduction

The hydrometeorological studies which initiated in 2002, came into its third year. The objective of the present study is to give answer to the following questions.

1) How is the the hydrological response of land surface to the atmospheric forcing at spatial scales of few to 100 km in this region?
2) What is determining the distributions of forested slopes (and glass land) and the characteristics of hydrological and thermal processes occurring there, and its effect to the hydrological cycle?
3) How will the hydrological conditions of land surface change due to global warming through degradation of frozen ground and decrease of snow cover?
4) Is there any strong indication of change in land hydrology including cryosphere due to global warming?
5) What kind of snow-albedo feedback and soil moisture feedback to climate system is occurring in this region?

II Methodology

The basic method of study was observation, since there were no existing data which we can discuss the above questions. Main observation structure were basin water budget study at head-water drainage of Tuul River (SOBA site) in Khentei Mts. with distributed measurement sites, intensive land surface and water/heat exchange observation site within the drainage. These studies were continued from 2003 to 2004 based on observation system set in 2002 and 2003. In order to evaluate the whole drainage water budget, additional sites were set in autumn, 2004 and will be increased in 2005. This will contribute to the study topics 1) to 4).

The Arvaiheer observation site was transferred from GAME-AAN project to IORGC project in 2004. This station will be maintained few more years to obtain surface flux data and vegetation data to clarify especially the interannual variation of interaction of vegetation conditions and climate, and will be used as generalize the characteristics of annual surface water/heat exchange on grass land in addition to the Nalaikh site in SOBA region. This will contribute to the study topic 1). Another measurement site is maintained at Darhan.

Preliminary glacier study was initiated in the western region in order to answer topic 4), which is expected to be showing glacier retreat due to warming. How much of decrease, and difference to other glaciers in northern Eurasia. There is still a possibility of mountain regions showing different climate trend compared to low valley lands.

Modeling the hydrological conditions of the drainge in the Khentei Mts. and simulation using this model have initiated to understand the processes occurring in there and look into the variability of water cycle. This will contribute to topics 1) – 3). The model which will be applied are the models developed at FRCGC by Ma Xiemao and ILTS, Hokkaido University by Hiroyuki Hirashima. The data set for running the data and verifying the results will be radar data-sets and data from observation network within the drainage. This is expected to get certain results next year.

The observation and analysis is proceeding quite well although with minor troubles. We expect to get certain answers to the above questions by 2006. More structural changes will be needed to maintain good quality data.