

Chemical characteristics of glacial melt water in Tianshan Mountains in the central Asia

*YOICHIRO HORI¹, Nozomu Takeuchi¹, Zhongqin Li²

1.Chiba University Graduate School of Science, 2.Chinese Academy of Science

In arid or semi-arid regions of the central Asia, melt water from mountain glaciers has played an important role as a water resource for the ecosystems and human societies in the regions. Although a number of studies on contributions of melt water runoff to the local discharge have been conducted in this regions, studies on influence of the melt water on chemical solutes in the discharge is still limited. This study aims to describe the characteristics of the chemical solutes of the snow, ice, and meltwater on a glacier and of the downstream river and rain water in the Tian Shan Mountains, China, and to discuss chemical processes of melt water on the glacier and river.

Fresh snow, old snow, surface ice, running meltwater on Urumqi No.1 Glacier, and water at the glacier terminus, and of the downstream river and rain water were collected in August 2015. Major ions in the collected samples were analyzed with ion chromatography systems.

Results showed that most of chemical solutes were higher concentration in river water compared with those in snow, ice and the meltwater on the glacier. In particular, the concentrations of Mg^{2+} , Ca^{2+} , SO_4^{2-} , K^+ in river water were approximately 6.5 to 19 times higher than those in snow or ice on the glacier. The concentrations of Na^+ , Cl^- , NO_3^- were 1.3 - 3.0 times higher in river water compared with those of the glacier. In contrast, concentration of NH_4^+ was higher on snow and meltwater on the glacier, but not detected in river water. These results show that the chemical concentrations does not simply increase as water flow from glaciers to the downstream river, but that chemical processes affecting the concentration are different among the solutes and areas of the basin.

Keywords: biogeochemistry, mountains glacier, melt water