

Detection of cavities developed inside the debris front the glacier landform using ground penetrating radar

*Yoshitaka Mori¹, Chiyuki Narama², Mirlan Daiyrov¹, Hideyuki Takadama¹

1. Environmental Science and Technology, Graduate School of Science and Technology, Niigata University, 2. Faculty of Science, Niigata University

In the northern region of the Tianshan Mountains (Republic of Kyrgyzstan), there is a type of glacial lake, called short-lived glacier lake, which emerges and floods in just a few months to a year, causing flood disasters in the downstream area. In 2008, the Western Zyndan glacial lake of the Teskey Mountains expanded in two and a half months and three floods came out of the flood (Narama et al., 2010). The appearance and discharge of short-lived glacial lakes are thought to be due to the opening and closing of the ice tunnel which develops inside the debris topography including the buried ice in front of the glacial lake. It suddenly appears when the water inside the tunnel freezes in winter and closes the tunnel, and in the spring melting ice water suddenly appears when it is stored in a depression. And sudden flooding occurs at the opening of the ice tunnel in summer. However, the development process, location, scale, the actual state of closure and opening of the ice tunnel related to this flood is not clear. In this research, in order to grasp the underground structure including the location and the scale of the ice tunnel, the reflection characteristics of the cavity developed inside the debris glacier were investigated using the underground radar. Also, based on the results of the study, We estimated the location and size of the cavity in the debris topography of the Kara Kungoy glacier that had been flooded in 2015.

Keywords: ground penetrating radar, debris landform, glacier lake, ice tunnel