

Impact assessment of groundwater flow and surface warming affect subsurface thermal environment in high latitude region

Akinobu Miyakoshi[1]; Makoto Taniguchi[2]; Yasukuni Okubo[3]; Takeshi Uemura[4]

[1] Graduate School of Science and Technology, Chiba University; [2] RIHN; [3] AIST; [4] Science Education, Nara-edu Univ

Subsurface thermal environment is affected by heat advection due to groundwater flow and surface temperature changes. To evaluate their effects, it was implemented the measurements of temperature-depth profile (T-D profile) and the continuous monitoring of soil temperature in southern part of the Kamchatka peninsula. Additionally, stable isotopic ratio of oxygen and hydrogen of surface water and groundwater were analyzed.

Stable isotopic ratio shows the existence of groundwater flow system, which is different between the shallow and the deep part. In the shallow aquifer, the T-D profile is affected by upward groundwater flow.

On the other hand, the annual variation of soil temperature is divided into the large variation period (LVP) and the stable period (SP) by the magnitude of daily and seasonal variation. LVP and SP correspond to the summer and the winter season, respectively. The difference between LVP and SP is caused by the effect of snow cover. The T-D profile in shallow aquifer is affected by not only upward groundwater flow but also the surface warming in the summer season (LVP).