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Thermal properties of the active layer soil of Antarctica

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In the global climate model, the parameterization of the interactions between soil and atmosphere requires quantitative analysis of the processes underlying the thermal dynamics of permafrost soils. We measured borehole temperatures of different depths at the active layer of the Sejong Station, Antarctica, for about an year using Baro-Diver temperature data logger. The thermal dynamics of active layer is analyzed in the soil temperature with high accuracy and high temporal resolution. The thermal diffusivity is approximately $8\times10^{-7}\mathrm{m}^2\mathrm{s}^{-1}$. The shallow geothermal gradient data showed the changes from heating processes to cooling processes. In permafrost area, production of latent heat is closely correlated with the evaporation and freezing of excess water. From the cold period to the warming period, the pattern of heat production changes at the depth of 50 cm. Since the water content also radically varies at the same depth, it is presumed that the heat production is closely related with the water content of permafrost soil.