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## Temporal variations of heat discharge rates from the geothermal area formed during the 2000 eruption of Usu volcano

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We estimate heat discharge rates for a geothermal area formed during the 2000 eruption of Usu volcano, Japan. Airborne surveys and field observations carried out in September 2010 reveal that heat discharge rates from fumaroles, areas of steaming grounds and crater lakes are ~0, 5.6, and ~0 MW, respectively. The total heat discharge rate measured in September 2010 represents below 1% of the rate immediately following the eruption.

Integration of the heat-discharge rate from April 2000 to September 2010 yields an accumulated discharge, corresponding to cooling of several percent of the total intruded magma volume estimated from analyses of ground deformation associated with the 2000 eruption. Compared with the 1977 eruption, the 2000 eruption involved the discharge of large amounts of heat from fumaroles. Fumaroles that developed during the 2000 eruption showed a decline in activity in short time. Areas of steaming ground associated with the 2000 eruption showed more rapid growth compared with those of the 1977 eruption but discharged less heat. We suspect that differences in the hydrological environments of the two eruptions (e.g., permeability around the intruded magmas) led to contrasting patterns of propagation of the hydrothermal systems around the intruded magmas.

Keywords: heat discharge rate, Usu volcano, steaming ground, airborne IR survey, hydrothermal system