

Analysis of water level change of hot crater lake: Application to the 1st crater at Nakadake, Aso Volcano

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We have developed a model of water temperature-level change of a crater lake on volcanoes. Our model suggests that topography of a crater is an important role in the process of the lake formation. If the area of lake surface is significantly changed because of the heavy rain or some eruptions, the sense of the water level variation may change even if the heat input from the crater bottom does not change.

To apply the model to the 1st crater at Nakadake, Aso volcano, we built detail digital surface model 'DSM' using the data of aerial survey by pulsed laser. Combining the DSM and our continuous observations of water level, we estimate water volume change in each hour.

On August 2006, water level was constant with water surface temperature in 60 degrees measured by infrared camera, and little rain was observed. If the seepage of the heat and volume from the crater bottom is small relative to that from the lake surface, our model shows that heat and vapor input into the lake were 120 MW and 34 kg/s, respectively, and input vapor temperature is estimated about 700 K.