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Monitoring of the hydrothermal system in Kamojang Geothermal Field, Indonesia

Yayan Sofyan[1*], Yasuhiro Fujimitsu[1], Jun Nishijima[1], Sachio Ehara[1], Makoto Taniguchi[2]

[1]Kyushu University, [2]Research Institute for Human Nature

Kamojang area in the West Java, Indonesia, hosts an active hydrothermal system that includes some hot springs, fumaroles and mineral deposits. The combination of heat source, ground water and geological system in the Kamojang area drives a typical vapour dominated hydrothermal system of Kamojang Geothermal Field (KGF). According to more than one quarter century of exploitation in KGF, there are a lot of mass movements in the geothermal reservoir. From 1983 to 2005, more than 160 million tons of steam has been exploited from KGF and more than 30 million tons of condensed water and river water were injected to the reservoir system. Some natural recharge also entered to the reservoir along with pressure difference and permeability. The changes in the hydrologic system were caused by geothermal development that was installed capacity of 140 MWe in 1987 and 200 MWe in 2007.

Repeat gravity measurement can be used to monitor the subsurface condition. It is an important method to monitor mass travels and phase change of fluid in the hydrothermal system. Gravity change in a certain period describes a change of subsurface condition. The gravity changes were found in KGF derived from repeat gravity measurement in 1999 and 2008. The corrected gravity change data between 1999 and 2008 range from -310 ?gal to 260 ?gal for 9 years. The distribution of the gravity changes helps us to obtain a picture of the mass movements that have occurred as a result of the production and injection activities between 1999 and 2008 and natural recharge from outside of the reservoir.

And an A10 absolute gravimeter (Micro-g LaCoste, Inc) was introduced in 2009 as the combination measurement with a relative gravimeter to detect the gravity changes in KGF. This absolute gravity measurement also assessed the gravity changes at some reference stations. We set 11 absolute gravity benchmarks in KGF.

Keywords: Monitoring, Hydrothermal System, Repeat Gravity Measurement, Kamojang Geothermal Field