

Extension of the Dynamical Model of a Geyser Induced by Inflow of Gas Having Two Underground Gas Supply Sources to One Having More Than Three Underground Gas Supply Sources

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We have proposed a mathematical model (a static model), a dynamical model and a modified dynamical model of a geyser induced by inflow of gas (a periodic bubbling spring) based on observation and model experiments of a geyser induced by inflow of gas and have also proposed a combined model combining above 2 models. And numerical simulations of the modified dynamical model or the combined model reappear spouting dynamics of a geyser induced by inflow of gas and it becomes possible that parameters (volume of the underground space, depth of spouting hole and so on) under a geyser are estimated due to comparison between results of simulation and those of observation. Moreover we have verified above models through geological exploration, analysis of hot spring water and radioactive prospecting. And we have modified above model as occasion demands. As a result, spouting mechanism of a geyser induced by inflow of gas spouting regularly has been clarified.

But in case of a geyser induced by inflow of gas there is not only one spouting regularly but also one spouting irregularly. In case of a geyser induced by inflow of gas spouting irregularly we cannot explain its spouting mechanism based on above-mentioned usual dynamical model which assumes single underground gas supply source. In such a case it is natural that we think there are plural underground gas supply sources and interaction of them produces irregular spouting period.

Then we proposed a dynamical model which assumes two underground gas supply sources by extension of above-mentioned usual dynamical model. Then we showed irregular spouting dynamics occurred as a result of interaction of two underground gas supply sources through numerical simulation of this model.

In this study, we extend further above extended dynamical model so as to deal with more than three underground gas supply sources. When there are more than three underground gas supply sources, effects of interaction of more than three watercourses form more complicated irregular spouting dynamics. We clarify this irregular spouting mechanism minutely through numerical simulation.

References

- [1] Kagami, H., *Advances in Geosciences Vol. 11 : Hydrological Science (HS)*, 37(2009).