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The method of an estimation of underground parameters of a geyser induced by boiling using the dynamical model

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We have proposed a static model, a dynamical model and a modified dynamical model of a geyser induced by gas inflow based on observation and model experiments of it and have also proposed a combined model combining above two models. And numerical simulations of the modified dynamical model or the combined model reappear spouting dynamics of a geyser induced by gas inflow and it becomes possible that parameters (volume of the underground space, depth of spouting hole and so on) under a geyser are estimated through comparison between results of numerical simulation and those of observation. Moreover we proposed a dynamical model which assumed more than two underground gas supply sources by extension of above-mentioned usual dynamical model. As a result, irregular spouting dynamics of a geyser induced by gas inflow could also be reappeared by the modified model. As a result, spouting mechanism of all kinds of geysers induced by gas inflow has been clarified.

However, in general, geysers are classified into two types dependent on inducer. That is, one is a geyser induced by inflow of gas and the other is a geyser induced by boiling. The latter is more popular and many ones exist all over the world. Though qualitative spouting models of a geyser induced by boiling have been proposed, its dynamics has not been discussed sufficiently. Therefore, then we derived a dynamical model of a geyser induced by boiling applying the above-mentioned dynamical model of a geyser induced by inflow of gas. Then we tried to estimate time derivation of spouting rate of a geyser induced by boiling through numerical simulations. Using the model we can estimate underground parameters of a geyser induced by boiling by comparison of results of numerical simulation of the model and those of observation of a geyser induced by boiling.

In this presentation, after we review above-mentioned models of a geyser induced by gas inflow and one induced by boiling in outline, we explain the method of an estimation of underground parameters of a geyser induced by boiling using the dynamical model.