

Distribution and chemical characteristics of hot springs in Japan

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Fluids of hot springs generally show different chemical characteristics from surface or meteoric waters because they are chemically reacted with surrounding host rocks in a cracks or interstitial spaces, and/or heated directly or indirectly by thermal source in the crust.

Although it is no doubt that chemical properties of hot-spring are regulated by mode of distribution of various kinds of crustal rocks and their physical/chemical conditions, they are believed to have less diagnostic potential to understand crustal condition due to both complicated distribution of various kinds of crustal rocks and uncertainty of fluid paths in the crust.

However, recent development of technology of isotope measurement and accumulation of chemical (including isotope) data of crustal fluids enables to analyze origin and source of the crustal fluids.

It is recently recognized that fracture zone developed along faults have a function of fluid path due to higher permeability than surrounding less damaged host rocks. On the other hand, hot springs are frequently observed along fault zones. These two facts indicate that fluids upwelling from fracture zone are classified as one of the common type of hot spring, although the origin of fluids may have large variations (meteoric origin or deep-seated slab origin and/or their mixture).

In order to understand chemical characteristics of fault zone passing fluids and their variation with time, we have been focusing on development of in-situ chemical analyzing technology of fluids at the observation site, which is located along the Atotsugawa fault zone. Some of the results are reported by Murakami et al., and Tsunomori et al., in this meeting.

Along with technical developments of monitoring apparatus, we have been searching the fault zones, which are suitable for fluid monitoring. Based on hot spring report from ministry of the environment, total numbers of hot springs are more than 27,000 in Japan. We are continuing to obtain locations and depths, chemical and physical data of hot springs. Some of the results are reported by Sugimoto et al., and Terusawa et al., in this meeting.

This presentation purpose to demonstrate the chemical map of hot-spring in Japan and to discuss the implications of the data, which would support the presentations by Tsunomori et al., Murakami et al., Sugimoto et al., and Terusawa et al., in this meeting.

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