PIXE analysis of the stream water in Mt.Hakone erupted in June, 2015

– seasonal changes of element concentration –

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Abstract

On 30 June 2015, Japanese Meteorological Agency raised the volcanic alert to a Level 3 for Mt.Hakone, after a small eruption. Hakone is a very popular tourist spot, located in southwest of Tokyo. But after the eruption, the tourist agency suffered big economic loss for the sharp decrease of the tourist. For the purpose of grasping the volcanic activity degree in the Owakudani fumarolic area, we analyzed elements of three kinds of water of stream, hot spring and lake, by using PIXE method. It is thought that composition in stream water and hot spring water are reflecting the volcanic activity, because stream water is flowed directly from the Owakudani fumarolic area and hot spring water is made in a process of a mixing between volcanic hot gases and surface stream in the nearby Owakudani fumarolic area. Water samples were collected approximately once a month from June 2015 to May 2016. In stream water, the concentrations of S and Cl elements derived from magma, and these of Al, Ca, Fe, K, Mg, Mn and Na elements originated in rock, were decreasing with a weakening of volcanic activities. In hot spring water, the concentration of five element, Ca, K, Mg, Na, and S, showed the similar seasonal change to these of stream water. These results suggest that nine elements (S, Cl, Al, Ca, Fe, K, Mg, Mn and Na) in stream water and five elements (Ca, K, Mg, Na, and S) in hot spring water are useful as the index of the magnitude of volcanic activities in Mt. Hakone. PIXE method is suitable for grasp of the volcanic activity degree, because PIXE is high sensitive and multi-element analysis at the same time.