Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)
©2009. Japan Geoscience Union. All Rights Reserved.

AGE030-05 Room: 202 Time: May 26 10:00-10:15

Identifying Arsenic Contamination Process in Groundwater in Consideration of Water-Rock Spatial Correlation

Irwan Iskandar[1*], Katsuaki Koike[1]

[1]GSST, Kumamoto University, Japan

Host rock leaching by deep geothermal water and oxidation of high Arsenic (As) rocks may be occurred under water environment of high As concentration. This research uses mineral identification to interpret the contamination mechanism by considering As-related alteration of some minerals. In addition, spatial correlation analysis of As in rocks and groundwater was adopted to clarify As distributions in the environment. The study area is located at border of South Minahasa and Bolaang Mongondow district, North Sulawesi, Indonesia. Geological features of the area are the presence of a fault zone accompanying hydrothermal alterations in the Miocene sedimentary rock-hosted disseminated gold deposit (SRHDG. In the 8 x 10 km of the mineralized area, we found high As concentrations in the hot springs, springs and shallow groundwater, which has caused a serious environmental problem under this geological setting. Based on petrography and spectroscopy observations, jarosite were identified in the rock cracks. This occurrence can be interpreted as an alteration mineral of pyrite or As-rich pyrite by geothermal water or oxidation of sulfide minerals. The alteration and rock leaching release much As from pyrites. Another result of this study is good correlation of As concentrations in rocks and groundwater (linear correlation coefficient: 0.7) in the mineralization area. Using this correlation, detailed spatial As concentrations in the groundwater was clarified by co-kriging technique. Co-kriging could express local anomalies of the As concentrations in groundwater over the permissible limit (10 ppb) were appeared: ordinary kriging could not specify these anomalies. From the co-kriging result, the contamination mechanism of As in groundwater may as result of leaching of mineralized rocks.

Keywords: water-rock interaction, Arsenic, co-kriging, mineralization