

Role of geology toward the search for the solution of small-scale mining problems

Satoshi Murao[1]

[1] GSJ

During the 1990s artisanal/small-scale mining came to one of the typical production measures of gold. Recent social concern on this type of mining includes many facets like deforestation, water pollution, soil contamination, child labor, status of women, accidents of miners, poisoning of miners, conflicts between miners and local residents or mining company, waste of resources, and smuggling of products. This paper observes the present state of artisanal gold mining in Baguio district of the Philippines, and discusses the role of geology in order to address this complex problem. This presentation is based on the study under the auspices of Japan Environmental Agency

During the 1990s artisanal/small-scale mining came to one of the typical production measures of gold. It is defined as a method to recover minerals/rocks without using heavy equipments and without organizing a company. Based on our observation, geologists' role can be summarized as follows. Firstly geology can identify ore-bearing area with many dimensions. This work gives administration officers the ability to predict the distribution and behavior of artisanal miners. On a small-scaled geologic map, geologists can circumscribe a large area such as metallogenic province which might be better administrated by national laws, e. g., presidential decree. Within such large area they can identify smaller area of mineralization like ore knot and ore field (typically 3 km by 3km) using larger-scaled geologic map. Local-level rules such as governor's ordinance would be effective to regulate such dimension.

Opposition by artisanal miners' groups to the presence of large mining companies stems from the rivalry in exploiting the available mineral deposits. In order for the government to have a reasonably accurate information about artisanal mining activities to help resolve this friction, knowledge of the geology of the deposits can be used as one of the tools. Placer and thin vein-type deposits are suitable for small-scale exploitation. Thus, government geologists can recommend that certain areas be reserved for artisanal miners. Another possible geologic approach is to strive to develop Geographic Information Systems (GIS) to predict not only the miners' distribution but also the possible pollution and accidents in mineral land by artisanal mining. Such multi-layer maps can summarize the distribution of deposits suitable for artisanal mining, the identification of possibly mercury- and cyanide-contaminated drainage systems, the magnitude of agricultural lands susceptible to contamination, and the limits of ground favorable for mining from the mineral deposit models in the district. It is also useful to secure available land-use and land condition maps which can be analyzed by GIS. With knowledge on solubility, transport and deposition of toxic elements in water, geochemists can refine the GIS system. However, the artisanal mining is a complex problem including social and human dimension, and thus geologists need to cooperate experts from other fields. Especially specialists from mining engineering, medical science and risk communication seem to be necessary to totally transform the activity into environmentally sound and sustainable activity. In order to realize this, international, multidisciplinary and multi-institutional framework of research is indispensable.