

Notes and Comments

# Environmental geological mapping and some problems in Korea

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Gyo-Cheol JEONG and Won-Young KIM (1998) Environmental geological mapping and some problems in Korea. *Bull. Geol. Surv. Japan*, vol. 49(2/3), p. 125-126, 1 fig., 2 tables.

**Abstract:** Environmental geological map including various thematic maps such as hazard geotechnical map, hydrogeological map, geochemical map, quaternary geological map, material property map and construction material map etc. plays important roles in optimal land-uses in terms of foundation engineering, surface and ground water, natural and artificial hazards and construction material etc. (refer to Fig.1).

Environmental geology in Korea is, as elsewhere, an interdisciplinary field. As such, it is being utilized for site selection of radioactive waste disposal and underground space development, water resources development and optimal land-use plan for the future etc. Environmental geological mapping project in Korea has been conducted by Korea Institute of Geology, Mining and Materials (KIGAM). Up to now, applied geological maps (8 areas), scaled in 1:25000, including various thematic maps such as engineering geological map, slope class map, soil and land resources map, drainage density map and documentation map, and hydrogeological maps (7 areas) were published by KIGAM. Recently environmental geologic map, (Kimpo-Ilsan area) at 1:25000 scale, consisting of basement level map, groundwater level map, topographic map, soil map, relief map and slope map were published in 1993 by KIGAM.

Environmental geological mappings for topics and problems represent only the tip of the iceberg. Nevertheless, they might shed some light on the existing environmental problems which must be resolved.

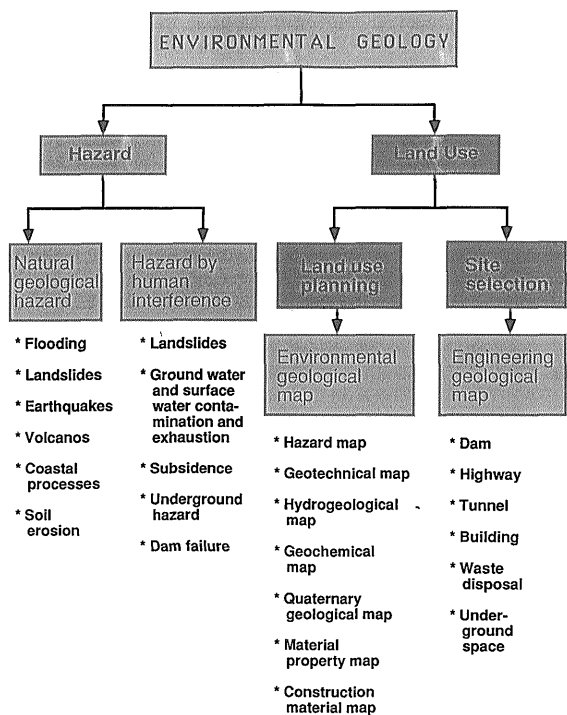


Fig. 1 Synoptic environmental geology

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## 1. Land-use planning and site selection

Geological infrastructure is being made to convince the planning authorities to include environmental considerations in future planning. Parameters that should be considered in general land-use planning and site selection are geotechnical parameters, slope stability, geometrical characteristics of fracture zone, permeability tensor and vulnerability to recent tectonic movements.

For example, in applied geological map of Song Dong Area, nine environmental geologic units were established in accordance with the lithogenetic characters and geotechnical properties of geologic materials (Yu *et al.*, 1990). Each unit is characterized on the map by a unique color and pattern, and possesses specific and geotechnical properties. The main purpose of applied geologic mapping is to provide information on many aspects of engineering and environmental geology. Such information can play an important role in optimal land-use planning within the area where big construction works like installation of subway and motor way as well as heavy structures have been carried out. Next, in environ-

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mental geologic map of Kimpo-Ilsan Area, seven engineering geological units are established to interpret engineering characteristics of the rockmass and the soils in accordance with their geotechnical and lithogenetic properties (Kim *et al.*, 1993). Three units for the rock mass, Bgn1, Bgn2 and Bgn3 (Table 1) are classified on the basis of their physical properties and weathering degrees. The surface soils of the area divided four units into PT, SC, CS and SS (Table 2) based on the USCS method (Peck, 1987).

It is expected that these maps will provide the potential users with the basis for the information of general policy through a concise presentation of the natural geological condition of the area in the planning process, and could be utilized in the formulating regional land development plan.

## 2. Hydrological problems and pollution of water resources

Flooding plays an important role, mainly in the arid part of the world, but is one of the most universally experienced natural hazard. Most flooding is a function of the total amount and distribution of precipitation and the rate at which it infiltrates the rock or soil and the topography; thus, flow regimes and peak floodings must be monitored and studied. Development of groundwater also plays an important role in drought-stricken area and surface water-shortage area, but overexploitation of groundwater causes land subsidence.

The industrial, agricultural, and urban development of the country is resulting in the gradual pollution of water resources (e.g., river and groundwater) in some regions. Urban sources of pollution include disposal sites of both sewage and solid waste. Industrial sewage and solids wastes also play an important role in contamination of water resource. Recently, drinking groundwater qualities in Kimpo-Ilsan area were investigated,

Table 1 Engineering classification of the rock mass

Class	Lithology	Weathering Degree of Surface	Remarks
A(Bgn1)	Biotite Gneiss	Moderately weathered	
B(Bgn2)	Biotite Gneiss	Highly weathered	
C(Bgn3)	Mica Schist	Highly to completely weathered	

Table 2 Engineering classification of Quaternary deposits

Class	Lithology	Material Description
A(PT)	Peat	1-10m thickness, dark gray to dark blue
B(SC)	Silty Clay	2-5m thickness, reddish brown
C(CS)	Clayey Silt	2-5m thickness, brownish dark gray
D(SS)	Silty Sand	1-10m thickness, light gray

the qualities showed relatively high value in electric conductivity and low in pH in general. Contents of nitrate from all samples of drinking groundwater were over the threshold level of 10mg/l, indicating the groundwater pollution was more serious than expected. Now, environmental geologic project for recovery of polluted water resources is being carried out in Taegu area.

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## 韓国の環境地質図

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### 要 旨

災害図等多種類の主題図を含む環境地質図は、自然及び人的災害の軽減等に重要な役割を果たす。さらに、放射線廃棄物処分地の選定や地下空間利用等国土利用の観点からも重要な情報を与えるものである。韓国における環境地質図計画は、KIGAMによって実施され、25000分の1縮尺で8地域を対象として行われている。例えば、1993年には、KIMPO-Ilsan地域を対象に地質図、基盤レベル図、地下水レベル図、地形図、土壌図、起伏図、傾斜図などの主題図として出版された。