Measurement of soil loss affected by rainfall and slopes with different rocks and slopes from Andong, Korea

JEONG GYO-CHEOL[1]*, LEE JUN-JEONG[2], NAM KOUNG-HOON[3], AND CHOO CHANG-OH[4]

[1]Andong National University, Andong, Korea(*correspondence: jeong@andong.ac.kr)
[2]InForworld, Seoul, Korea (jklee8103@paran.com)
[3]Andong National University, Andong, Korea (namsoil@naver.com)
[4]Andong National University, Andong, Korea (mineralogy@hanmail.net)

Since several factors such as the movement pattern of soil mass, intensity of rainfall, surface relief, soil mineralogy, or geology can affect the process of soil loss or landslide[1], it is not easy to predict them in the field. Here, we present some important factors that affect the behaviors of soil loss related to rock types, slopes, rainfall, and mineralogy. In recent years, there has been growing increase in annual rainfall in Korea and it is interesting to mention that more than 90 % of the total rainfall is recorded during the summer ranging from June to September, possibly due to climate change over the world. As a result, especially soil erosion or soil loss on natural slopes by such torrential rains became a matter of some concern on the rise. We investigated the characters of soil loss in four sites with different slope angles: two sites are gneiss, other two sites are sedimentary rocks, respectively.

Based on XRD data, constituent minerals in soils are quartz, feldspars, and clay minerals such as illite, kaolinite, and vermiculite. Soils tended to be much coarser as erosion proceeded, and especially the amount of fine particles (0.1~0.01 mm) decreased by 10 % while that of coarse particles (1.0~10 mm) increased drastically by more than 30~40 %. The rate of soil loss becomes high while the slope is steeper. As the process of soil erosion repeats, the grain sizes in soil tend to be coarser, which in turn acts as weakening the strength of the moisture holding ability in soil.

This study was supported by the GAIA Project (RE201202051), Ministry of Environment, Korea.

[1] Jeong *et al.* (2011) *Nat Hazar*ds **59,** 347-365

The distribution map of lead isotope compositions for galena from ore deposits in South Korea

Y.-J. JEONG [1], C.-S. CHEONG [1], H.J. CHO [1], J.Y. CHOI [1], Y.M. AN[1], D.B. SHIN [2], S.J. KIM[3 A] AND J.J. HWANG [3]

[1]Korea Basic Science Institute, Daejeon 305-333, Korea (hero0123@kbsi.re.kr)
[2]Department of Geoenvironmental Sciences, Kongju National University, Kongju 314-701, Korea.
[3]Division of Conservation Science, National Research Institute of Cultural Hertage, Daejeon 305-380, Korea

In this study, we report the distribution map of lead isotope compositions for galena from ore deposits(n=91) in the southern part of the Korean peninsula with new and published data. The ore deposits are mostly skarn and hydrothermal-type deposits formed in close relation to the Mesozoic magmatic activities. The lead isotope compositions plot around the growth curve of the upper crust and orogene in the plumbotectonic model.

The comprehensived lead isotope data of this study indicated may be subdivided into four discrete zones that were reconized by geological consideration and statistical analysis for the ore lead composition.

Zone I geotectonically comprises the Gyeongsang basin in South Korea. Their $^{207}Pb/^{204}Pb$ ratios were characteristically low for the given $^{206}Pb/^{204}Pb$ rations, suggesting an involvement of reservois with low time-intergrated U/Pb and Th/U ratios such as the mantle or low crust. Zone II covers the northeastern Yeongnam massif and eastern Taebaeksan basin, lead isotopic composition of those had the most radiogenic in South Korea($^{206}Pb/^{204}Pb$ = 18.66–20.48, $^{207}Pb/^{204}Pb$ = 15.71–16.07, $^{208}Pb/^{204}Pb$ = 37.73–40.46). Zone III corresponds to the middle and southwestern parts of the Precambrian Yeongnam massif, the western part of Cambro-Ordovician Taebaeksan basin, and the Okcheon metamorphic belt. Galenas of these deposits showed the less radiogenic signature and limited variations in lead isotopic composition. The lead isotopic difference between zone II and zone III could be ascribed to the spatially-selective involvement of highly radiogenic crustal materials represented by the basement rocks($^{206}Pb/^{204}Pb$ up to 76) in the northeastern Yeongnam massif. Zone IV comprises the Gyeonggi massif of Precambrian craton in central parts of the Korean peninsula.

Such distribution map of lead isotope composition in South Korea may be useful of application for mining exploration, estimation of ancient artifacts, and environmental tracer.

DOI:10.1180/minmag.2013.077.5.10