Hillslope Erosion and Sedimentation on Like Catchments in South Korea

HILLSLOPE EROSION AND SEDIMENTATION ON LAKE CATCHMENTS IN SOUTH KOREA

Orkhonselenge ALEXANDER[a], Tamai MATSUOKA[b], Yukiya TANAKA[c] and Kenji KASHIWAYA[d]

[a, c] *Department of Geography, Kyung Hee University, Seoul 130-701, KOREA*

[b, d] *Institute of Nature and Environmental Technology, Kanazawa University, Kanazawa 920-1192, JAPAN*

An important source of sediments in stream channels or lake basins is delivered soil particles from slope surface. Consequently the sediments deposited in lake bottom can be the primary objects for the evaluation to consider the erosion rate of slope surface, sediment delivery ratio and sedimentation rate within catchments. The soil erosion, sediment transportation and sediment deposition rates in the lake are related on difference of soil properties, bedrock weathering intensity and catchment area.

The present study was carried out the slope surface erosion and sediment deposition on different rock based lakes such as the underlain by Sedimentary rock (Se lake) and the Granite rock (Gr lake) in South Korea (Fig 1). In order to determine the seasonal variations for sedimentation on lake, the sediment traps were set in the deep parts of the lakes as to respond sensitively to sediment movement. The lake sediments have been sampling with sediment traps in each month since July, 2004 in both lakes.

As a prediction, the large sediment flux and USLE sediment erosion which estimated in Se catchment indicate that slope surfaces are eroded by perennially without due to only rainfall events (Table 1). The properties such as more mineral content, fine particles and high particle density of sediments deposited in Se lake can say that intensive soil erosion, sediment transportation and deposition dominate in catchment for long term period. The large sediment yields deposited in lake based on Granite rock are caused by rock weathering intensity and extreme surface soil erosion by water due to seasonal rainfall amount. Consequently, erosion and sedimentation rates in Gr lake were revealed as greater than in Se lake during observation period (Fig 2). The negative relationship between catchment/lake ratio and sedimentation rate was determined distinctly in both lakes. For short term period, the result shows that intensive erosion and sedimentation rates in Gr lake were associated with large rainfall amounts, low catchment area and extreme vulnerability to ephemeral erosion by water comparing with Se lake catchment. The results showed that both lakes have been characterized by not only different geomorphic factors (bedrock, slope and catchment area), but also different erosion and sedimentation processes. The different properties of sediments deposited in lakes (particle density, particle size, mineral content and organic content, etc) could be the basic factors to reveal the ephemeral, perennial erosions and sedimentations on lake catchments.

[a] *E-mail address*: alorsel@khu.ac.kr
[b] *E-mail address*: tamai421@nihonkai.kanazawa-u.ac.jp
[c] *E-mail address*: ytanaka@khu.ac.kr
[d] *E-mail address*: kashi@kenroku.kanazawa-u.ac.jp

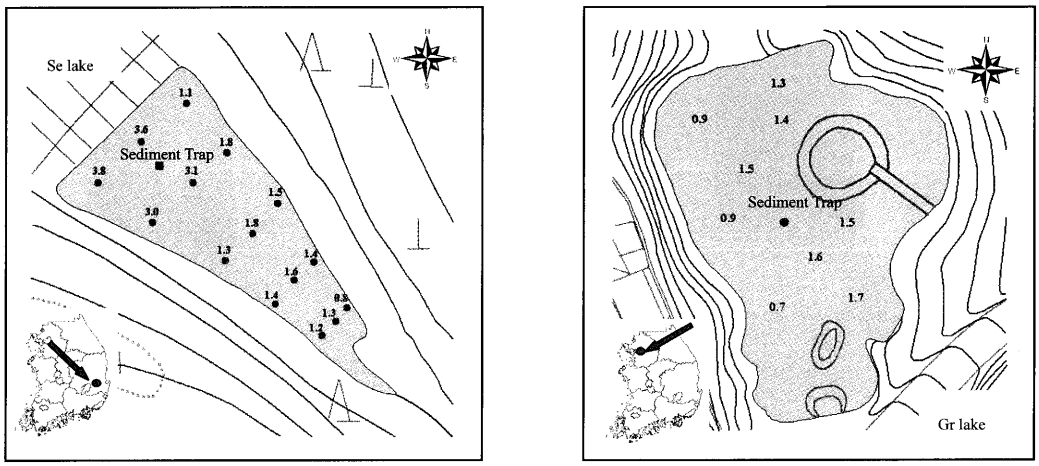

Fig 1 Topography and Water level (1.5 m) of the Gr lake and Se lake

Table 1. Predicted sediment flux and catchment yields

Number	Parameter	Gr lake	Se lake
1	Lake sediment yield, t/km^2 yr	0.35	0.019
2	Lake sediment flux, t/yr	0.65	1.25
3	USLE slope length factor	5.75	5.43
4	USLE sediment erosion, t/km^2 yr	5x10^{-3}	2.7x10^{-2}
5	USLE sediment erosion* Catchment area, t/yr	3.3x10^{-4}	9.4 x10^{-4}
6	SDR (Sediment Delivery ratio)	1.02	1.07
7	USLE erosion*SDR, t/km^2 yr	7 x10^{-4}	5.7 x10^{-3}
8	USLE sediment flux, t/yr	1423.8	1522.1
9	USLE sediment yield	0.005	0.027
10	K	14.02	13.95
11	R	0.035	0.026

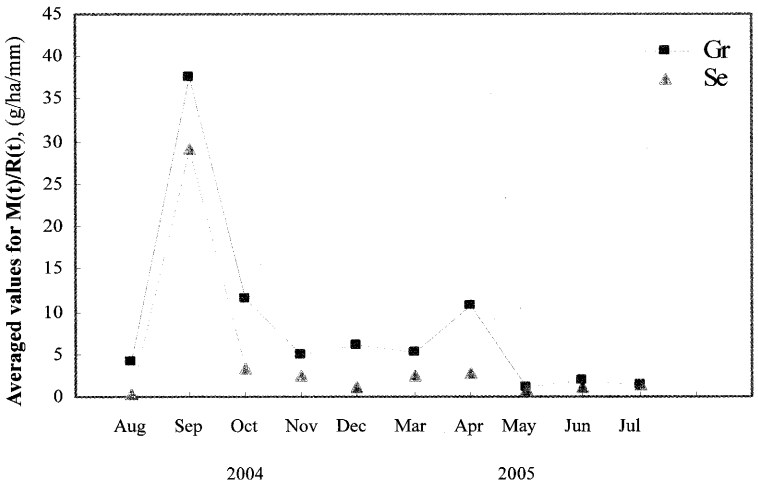

Fig 2 The measured changes in the catchment factor, *M(t)/R(t)*