

Functionalization of the Average Erosion of Drainage Basin Using DEM

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1.First.

Geomorphic development model of tectonically active and intensive denuded regions in Japan has been discussed.

Yoshikawa (1985) showed the need to discuss as a geomorphic development model considering the changing terrain in the wet variation zone in Japan.

Ohmori (1978), using a 50mDEM, to determine the dispersion of altitude. Moreover, he will evaluate the stages in the geomorphic development of the mountains.

In this study, 10 m DEM available nationwide was used.

The average amount of erosion per basin was obtained by ArcGIS and compared with the data of the dispersion of altitude of Ohmori (1978).

2.Target area

Soya Hill, Taihei Mountain, Abukuma Plateau, Shirakami Mountains, Mikawa Plateau, Hakusan Mountains, Kanto Mountains, Akaishan Mountains, Hida Mountain Range with different stages in geomorphic development is Target areas. Selected from the mountains that are analyzed by Ohmori (1978).

3.Analysis method

This is a procedure with ArcGIS, calculation of average erosion amount per watershed.

First, I made summit level map with grid sizes 3 to 301. The summit level map can be regarded as a virtual ground surface before erosion. For this reason, I set "summit level map - DEM" as the depth of erosion.

4.Functionalization of average erosion amount

We made a function of the relationship between grid size and erosion amount. At that time, graph fitting to the linear function, power function, exponential function, logarithmic function, approximate curve and its error were obtained. As a result, the most fitted function was logarithmic function " $y = a \log(1 + bx)$ ", and the error was the smallest. a is considered to represent the depth of the valley and b is the width of the valley.

5.Evaluation of average erosion amount by mountain area

A scatter diagram based on the coefficients was prepared from the average erosion amount by mountainous area which was functionalized. According to Ohmori (1978), Mikawa Plateau is topography development more advanced than Shirakami mountain range. However, it was found that the Shirakami mountain area is deep in the valley, and the Shirakami mountain area was found to have a steep valley.

6.Evaluation

Functionalization of the average erosion amount has made it possible to identify eroded parts within the same mountainous region. Also, together with Ohmori's topography development classification, you can also grasp the place of erosion from now. Furthermore, it is possible to consider the expansion of the mountainous area, it is possible to estimate the developmental stage, to narrow down the scale to the contrary, also to consider in the catchment area unit, so it is thought that it is possible to evaluate the future topography change.

Keywords: Geomorphic development, Digital elevation model(DEM), Average erosion, Altitudinal dispersion, Geographic Information System(GIS)