[JJ] Evening Poster | H (Human Geosciences) | H-GM Geomorphology

[H-GM03]Geomorphology

convener:Tsuyoshi Hattanji(Faculty of Life and Environmental Sciences, University of Tsukuba), Masayuki Seto(Fukushima Future Center for Regional Revitalization, Fukushima University), Hiroshi Shimazu(立正大学地球環境科学部地理学科)

Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

The main subject of this session is the whole range of themes relating to geomorphology, especially geomorphic processes, landform development and its relation to environmental changes, geomorphological hazards and their mitigation and reports of recent events of disaster occurred in Japan, various kind of hazard maps, relationships among geomorphic processes, other natural phenomena and human activities, and various techniques of geomorphological measurements and automatic landform classification. Japanese can be used in this session.

[HGM03-P03]Assessment of the Average Erosion of Drainage Basin Using DEM

*Rei Yamanaka[1], Tatsuto Aoki[1] (1.Kanazawa Univ.)

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

1. Introduction

Geomorphic development model of tectonically active and intensive denuded regions in japan has been discussed by Ohmori (1978), using a 1: 50,000 topographic map, to determine the dispersion of altitude. Moreover, he will evaluate the stages in the geomorphic development of the mountains and makes predictions in the future.

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

The target areas are Soya Hill, Taiping Mountain, Abukuma Plateau, Shirakami Mountains, Mikawa Plateau, Hakusan, Kanto Mountains, Akaishan Mountains, and Hida Mountain Range with different stages in geomorphic development.

The Selected mountains were analyzed by Ohmori (1978).

3. Analysis method

This is a procedure with ArcGIS.

(1) making of watershed.

(2) making of summit level map.

(3) calculation of erosion depth.

(4) calculation of average erosion amount per watershed.

(5) change grid sizes from (1) to (4) and calculate average erosion amount.

(1) decided about a threshold value using an accumulation flow and river data.Moreover create a Watershed over the secondary river.

(3) The erosion depth was calculated as follows.[summit level map(2) - DEM]

(4) The average erosion amount for each Watershed was calculated by the following method.

Average amount of erosion per Watershed
= (Total amount of erosion contained in Watershed * Area of 1 grid) / (Number of grids in Watershed * Area of 1 grid)
= Total amount of erosion contained in Watershed / Number of grids in Watershed
(2) to (5) used arcpy and processed automatically.

4. Average amount of erosion in each mountain region.
The average erosion amount of each mountain area was compared.
The average erosion amount of Soya Hills (Earliest First stage period), Taihei Mountains (Early period), Mikawa Plateau (Middle period), Akaishi mountain region (Later period) is about 2.63, 6.36, 7.29, 11.46 (m3 / m2) in the grid size 3
Moreover, it is about 18.14, 45.32, 52.86, 97.87 (m3 / m2) in the grid size 21.
The correlation between the data obtained in this study and the dispersion of altitude of Ohmori (1978) showed a positive correlation.There are somewhat differences for amount of erosion in the mountain region.
However, the amount of erosion by mountainous area was obtained along stages in geomorphic development classified by Ohmori (1978).

5. Evaluation and Issues
Until now, the stages in geomorphic development and the state of the mountainous had been discussed in units of mountains. In this study, the average erosion amount was formulated. As a result, it was able to evaluate geographically on a units of basin.By effectively utilizing the function of ArcGIS, these analyzes can also be automated and work efficiency is improved.
Mathematical formulation considering conditions of topography development is a future issue.

Bibliography
Ohmori,H.(1978):Relief Structure of the Japanese Mountains and their Stages in Geomorphic Development.Bull.Dept.Geogr.Univ.Tokyo,10,31-85.
YOSHIKAWA Torao(1985):Geomorphology of Tectonically Active and Intensely Denuded Regions.University of Tokyo Press,132