

## Estimation and Evaluation of Drainage Basins Including Landslide Masses Using Data Mining Techniques and ASTER Data

# Hitoshi Saito[1]; Daichi Nakayama[2]; Hiroshi Matsuyama[2]

[1] Dept. Geography, Tokyo Metropolitan Univ; [2] Dept. Geography, Tokyo Metropolitan Univ.

The purpose of this study is to estimate drainage basins including Landslide masses in the Akaishi Mountains using data mining techniques which does not need any hypotheses. To estimate drainage basins including landslide masses, topographic characteristics and geology data were used as explanatory variables. Topographic characteristics were calculated by the digital elevation model of EOS-Terra/ASTER. Objective variable is Landslide Maps Database provided by National Research Institute for Earth Science and Disaster Prevention. In this study, Decision tree, Regression tree and Model tree, which are one of the data mining techniques, were adopted. Decision tree was used to estimate drainage basins including landslide masses. Regression tree and Model tree were used to estimate the ratio of the landslide mass area to the drainage area (Landslide mass area ratio). The characteristic of these techniques is that estimation processes are explicitly represented by Tree-structures. Therefore, Tree-structures of each estimation model were also analyzed.

Correctness of the estimation by Decision tree is 71.2 %, which has enough accuracy in comparison with previous studies. As for the estimation by Regression tree and Model tree, both correlation coefficients between estimated landslide mass area ratio and average of actual landslide mass area ratio are 0.99. Also, both inclination of regression line between estimated landslide mass area ratio and average of actual landslide mass area ratio are about 1.0. Namely, Decision tree, Regression tree and Model tree which does not need any hypotheses, can estimate drainage basins including landslide masses or landslide mass area ratio with high accuracy.

Tree-structures of each estimation model indicate that Mikura group and Chichibu group are characterized by frequent occurrences of landslides. In this respect, drainage basins where landslides occur frequently tend to have lower relief surface and lower slope angle than drainage basins where landslides occur not so frequently. It is concluded that Tree-structures of each estimation model can indicate the quantitative relationship between landslide and topography/geology which were already pointed out by previous studies in a qualitative sense.