

Analysis of Morphometric Parameters and Precipitation Characteristics for Landslides Using GIS

*Toshikazu Fukuba¹, Takashi Oguchi²

1. Department of Earth and Planetary Environmental Science, The University of Tokyo, 2. Center for Spatial Information Science

Morphometric parameters calculated from DEMs have been used for producing landslide hazard maps. This study investigates morphometric parameters of areas affected by landslides due to the August 2014 heavy rain in Hiroshima and the July 2018 heavy rain in western Japan. Altitude, slope angle, slope aspect, slope curvature and geology are chosen for morphometric parameters to be investigated. In addition, precipitation distribution data are used for investigating the relationship among landslides, topography and rainfall amount.

Most landslides caused by the July 2018 heavy rain occurred on slopes gentler than 30 degrees with concave topography in plan curvature. In contrast, most landslides caused by the August 2014 heavy rain are located on slopes steeper than 30 degrees with convex topography in plan curvature. This result indicates locational differences in landslide distribution depending on precipitation characteristics.

Landslides caused by the July 2018 heavy rain in areas underlain by plutonic and volcanic rocks mostly occurred on slopes slightly steeper than 25 degrees, whereas landslides in areas with lithosol and regosol tended to take place on slopes slightly gentler than 25 degrees. This observation suggests that differences in surficial geology should be considered to estimate the threshold slope angle for landsliding.

Keywords: GIS, landslide, morphometric parameters