Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

HTT033-04 Room:202 Time:May 25 09:15-09:30

Study of slope-angle frequency distribution by LiDAR DEM as classification indices of slope angles

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A slope angle is considered to be one of the important evaluation indices in the study of the formation process of a slope. Particularly, various types of mass movement believed to have the greatest effect on the process of slope formation and slope angles are considered to have a close relationship with each other.

It has been pointed out that the frequency distribution of slope angles in widely spread mountain ranges indicates an almost normal distribution, and in mountainous areas such as the Japanese Alps where erosion is active, the slope angles are summarized to a mode of about 35 degrees, and in mountainous areas in Taiwan, the average slope is on the order of 35 degrees.

A certain regularity is thus recognized in the slope angles of mountainous areas, but there are few cases for studying in detail slope angles as quantitative judgment indices to be associated with such various mass movements affecting slope formation. This is due also to the fact that it has been difficult to obtain data of detailed quantitative slope angles reflecting the types of various scales of mass movement.

This time, because we have had an opportunity to create detailed slope classification maps using LiDAR DEM in several areas, a small experimental study on the relationship of slope frequency distribution characteristics, local mass movement and geological characteristics will be conducted in terms of a study range classified so as to reflect mass movement characteristics of the area.

The study regions are all in areas where erosion is very active, and areas where slopes mainly of rocks having a slope frequency distribution with a mode exceeding 40 degrees are widely distributed, and evaluation of characteristics such as mode, mean, median, and standard deviation of a frequency distribution will be attempted according to geological characteristics.

Keywords: slope angle, frequency distribution, mass movemnt, LIDAR DEM