

Laplacian map representation method for landform lineament elements by LiDA DEM

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In the case of obtaining landform lineament elements such as knick lines (convex and concave) and valley and ridge lines from Laplacian maps by LiDAR DEM, because landform elements intended to be obtained are buried due to noise of minute irregularities in the ground surface if detailed data is used as it is, it becomes necessary to perform averaging in a certain range. For identifying stepped landforms of a few tens of centimeters or more formed on a slope having random irregularities on the order of 20 to 30 cm in the ground surface using DEM with a grid spacing of 1 m, the most effective method is averaging a range of 5 to 9 grids square and using a Laplacian value $0.05 \sim 0.1$ as a threshold. For a more quantitative evaluation of the stepped landforms, it becomes necessary to also use averaging in a range of 3 grids simultaneously. When DEM with coarser grid spacings are used, almost equal results are obtained in averaging ranges of 5 grids up to a grid spacing of 2 to 3 m, but with a spacing of 4 m or more, it is difficult to identify stepped landforms on the order of a few tens of centimeters or more.

Keywords: LiDAR DEM, Mass Movement, Laplacian, Convex, Concave