**Research on Mapping Levee Lines Using LiDAR Data in the Nakdong River Basins, South Korea**

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A levee line is defined as the line located along the levee surface where slopes are sharply changed from the crown plate toward the slope plates. Mapping the levee lines is important for describing the levee shapes and identifying erosions occurring on the levee surfaces. Historically, mapping the levee lines has been carried out using the ground surveying method in South Korea. This research aims at mapping levee lines using the LiDAR data, taken in Nakdong River Basins, South Korea.

In this research, we suggested a procedure for mapping levee lines using the LiDAR data. Multiple methods are included in the procedure for mapping the levee lines. The LiDAR DSM (Digital Surface Models) was generated using the linear interpolation method and median filtering. Then, the slope map was generated from the refined LiDAR DSM by calculating the maximum rates of elevation difference between each pixel of the refined LiDAR DSM and its neighboring pixels. The levee crown plates and the levee slope plates were separately generated from the slope map by the slope difference analysis. The levee slope plates were used to identify the locations of the levees in Nadong River Basins. The levee crown plates were used to extract the levee lines from the LiDAR data. The modified convex hull algorithm was employed to extract the points that are located along the boundary of the generated crown plate. Finally, the smoothing spline function was applied to generate the levee lines using the extracted boundary points. The generated levee lines have high accuracies in horizontal and vertical directions.

Keywords: LiDAR, Levee lines, Slope map