

ESTIMATION OF HYDRODYNAMIC ROUGHNESS OVER LAND USING LIDAR DATA: A CASE STUDY IN HUTAN REKREASI AYER KEROH, MELAKA

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Abstract

Parameterization of flood modeling overland have benefited from Airborne LiDAR technologies in many ways for example in the estimation of hydrodynamic roughness. Low density airborne LiDAR and low penetration over the vegetation canopy under leaf-on condition further complicate the estimation of hydrodynamic roughness in tropical zone. This paper will present a detail investigation on the capability of airborne LiDAR data for hydrodynamic roughness estimation over tropical region in Air Keroh, Melaka, Malaysia. The study area is divided into four landcover classes i.e. building, vegetation, grassland and paved road, producing landcover classification using Support Vector machine at overall accuracy 96.1%. Each landcover requires different approaches in estimating hydrodynamic roughness values and this value is represented by Manning's (n), Chezy (c), and Darcy (f) coefficients. Validation result on grass height and diameter at breast height (DBH) produce RMSE 0.215 and 0.333 respectively. Finally the composite hydrodynamic roughness map is generated at a 20m resolution that combines the roughness value from different landcover classes.

Keywords: Hydrodynamic roughness, LiDAR, Orthophoto, Support Vector Machine, Manning.

