

Accuracy Evaluation of Laser Scanner Data Depending on Location of GCPs for Monitoring Landslide

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Laser scanner is expected as a useful measurement device for monitoring landslide. The data of the time series is needed to measure the movement phenomenon such as landslides. Therefore, the geometric transformation that makes the same coordinate system for change detection becomes very important. However, coordinates of the control points in laser scanner data cannot be accurately extracted. Authors suggested multi surface measurement to keep accurate control point last year. When three flat surfaces are measured, accurate plane equation can be calculated by least square method using many points data. Next, the coordinates of an intersection of three planes can be calculated. This intersection can be used as a virtual control point of the laser scanner data. The accuracy of geometric transformation showed less than 1/4 precision comparing with catalogue specifications in indoor experiment. Accuracy of control point is depending on width of surface which is number of laser data. Accuracy of geometric transform is depending on the allocation of control points. However, there are limited spaces to set up the surface in the landslide field to keep enough accuracy. Therefore, an expected accuracy must be predicted in each field before laser scanner measurement. The expected accuracy can be calculated by law of error propagation. In this study, method accuracy evaluation for geometric transformation of laser data will be established. By using this method, relationship between location of control point and accuracy of geometric transformation will demonstrated. Then, width of surface for control point can be designed.