

Robust multi-temporal DEM matching for debris-flow hazard assessment

T. Zhang (1), X. Wu (1)

(1)School of Civil Engineering, Southwest Jiaotong University, China

Debris-flow is a typical natural mountain hazards, and it has caused a great number of casualties and property losses, and it also is the most potential threat in mountainous. The time variable information of the terrain surface contained in the multi-temporal DEM, derived from the aerial- or satellite- remote sensing data sets, is very valuable for solid Earth hazard assessment. Such time variable information can be extracted only when DEMs obtained in different epochs are in the same coordinate frame. However, DEM obtained in different epochs may use various types of sensors, or techniques. And then there will be some bias in their coordinate systems more or less in case of no ground control points used. Focusing on debris-flow hazard assessment, this paper proposed a robust method for matching multi-temporal DEM by combining the least trimmed squares (LTS) estimator and least Z-difference (LZD) algorithm without any feature extraction or ground control points. And some modifications are also made for improving the performance efficiency. The experimental results illustrate that it is effective tool for debris-flow hazard assessment, and validate its advantages.