Propagation of DEM Varying Accuracy into Terrain-Based Analysis

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Abstract : Terrain-Based Analysis results in derived products from an input DEM and these products are needed to perform various analyses. To efficiently use these products in decision-making, their accuracies must be estimated systematically. This paper proposes a procedure to assess the accuracy of these derived products, by calculating the accuracy of the slope dataset and its significance, taking as an input the accuracy of the DEM. Based on the output of previously published research on modeling the relative accuracy of a DEM, specifically ASTER and SRTM DEMs with Lebanon coverage as the area of study, analysis have showed that ASTER has a low significance in the majority of the area where only 2% of the modeled terrain has 50% or more significance. On the other hand, SRTM showed a better significance, where 37% of the modeled terrain has 50% or more significance. Statistical analysis deduced that the accuracy of the slope dataset, calculated on a cell-by-cell basis, is highly correlated to the accuracy of the input DEM. However, this correlation becomes lower between the slope accuracy and the slope significance, whereas it becomes much higher between the modeled slope and the slope significance.

Keywords : terrain-based analysis, slope, accuracy assessment, Digital Elevation Model (DEM)
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