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Sensitivity analyses for the DTMs derived from Unmanned Aerial Vehicle (UAV) in gully erosion mapping: Nallihan badland area (Ankara, Turkey)

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The main purpose of this study is to evaluate the spatial resolutions for the Digital Terrain Models (DTMs) derived from Unmanned Aerial Vehicle (UAV) in gully erosion mapping. For the purpose, Nallihan badland area (Ankara, Turkey) was selected to be the experimental site. The investigations were carried out in 3 stages; (i) production of the DTMs having 3 cm and 9 cm spatial resolutions by using the orthophoto imagery acquired from the UAV at 97.5 m and 292.4 m altitudes, respectively, (ii) Terrestrial Laser Scanning (TLS) of the experimental site and production of the DTMs derived from the TLS data resampled at 3 cm and 9 cm spatial resolutions, and (iii) spatial and profile comparisons of the derived data. The average altitude differences were obtained on the intervals (-0.1, 0.1) m and (-0.2, 0.2) m for the comparisons between TLS-3cm and UAV-3cm, and TLS-9cm and UAV-9cm data, respectively. Additionally, considering the profile comparisons, it is revealed that depending on the decreasing of spatial resolution, the erosion rates calculated from the DTMs increase artificially.