



Developing a methodology to estimate historical sheet erosion rates using exposed roots and terrestrial laser scanner

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In the present paper a new technique for estimating medium-term sheet erosion rates is presented. The methodology is based on analyzing the morphology of tree stems, exposed roots and surface micro-topography using data obtained with a Laser Terrestrial Scanner. A Leica Scan Station C10 was used to capture a surface of 70 000 square meters in a rangeland in southwest Spain. The resulting point cloud presented 20 000 000 points with spatial (x, y and z coordinates) and radiometric (RGB) information with a file size of 1.5 Gb. The point cloud was processed with Cyclone, Realworks and Pointools Edit software to obtain a 3D model of the study area. Afterwards, a Digital Terrain Model with high resolution was elaborated using ArcGIS 10 software. Using the base of tree stems and exposed roots, the initial level of the surface was estimated (initial or antecedent surface). On the other hand, existing tree growth models were applied to the trees in the study area in order to estimate their age. Finally, with the antecedent surface, the current surface and the estimated age of every tree soil erosion rates were calculated and compared with available information on land use and management in the study area.