



Doctoral Thesis Title: IMPROVED STOCK UNEARTHING METHOD (ISUM) ASSESSES SOIL EROSION PROCESSES IN GRAFTED PLANTS USING IN SITU TOPOGRAPHICAL MEASUREMENTS

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Abstract: Policymakers, stakeholders and rural inhabitants must be aware of the relevance of soil erosion as an irreversible land degradation process. This is key to achieve the land degradation neutrality challenge and the sustainability of humankind and natural ecosystems. Agricultural areas are being affected by soil erosion threatening soil quality and, subsequently, food security. Therefore, it is necessary to develop new techniques and methods visually friendly and easy to be accessed to survey and assess the soil erosion concerns. ISUM (Improve Stock Unearthing Method) is a well-contrasted procedure to estimate and map soil mobilisation and erosion rates. To achieve this goal, using the plant graft union as a biomarker conducting in situ topographical measurements along perpendicular transects allow us to i) explain key factors related to the activation of soil erosion processes such as tillage, the age of plantation, parent material or hillslope positions; ii) complete other well-contrasted methods such as RUSLE (Revised Soil Loss Equation), IC (Index of connectivity) or Structure from Motion; and, iii) identify hotspot areas affected by soil depletion, accumulation or mobilisation. In this PhD thesis, we will show how we developed a new improvement of this method in different crops (vineyards, citrus, persimmons or almonds), under different environmental conditions (parent material, vine ages, soil management, or slope angle) with diverse geomatic procedures (interpolation methods and geostatistical analysis, topographical measurements and models) using GIS and geomatic techniques.

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