Improvement of erosion risk modelling using soil information derived from aerial Vis-NIR imagery

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The aim of this research is to test the benefit of the hyperspectral imagery in soil surface properties characterisation for soil erosion modelling purposes. The research area is the Lebna catchment located in the in the north of Tunisia (Cap Bon Region). Soil erosion is evaluated with the use of two different soil erosion models: PESERA (Pan-European Soil Erosion Risk Assessment already used for the soil erosion risk mapping for the European Union, Kirkby et al., 2008) and Mesales (Regional Modelling of Soil Erosion Risk developed by Le Bissonnais et al., 1998, 2002); for that, different sources for soil properties and derived parameters such as soil erodibility map and soil crusting map have been evaluated with use of four different supports: 1) IAO soil map (IAO, 2000), 2) Carte Agricole – CA – (Ministry of Agriculture, Tunisia), 3) Hyperspectral VIS-NIR map – HY – (Gomez et al., 2012; Ciampalini t al., 2012), and, 3) a here developed Hybrid map – CY – integrating information from Hyperspectral VIS-NIR and pedological maps.

Results show that the data source has a high influence on the estimation of the parameters for both the models with a more evident sensitivity for Pesera. With regard to the classical pedological data, the VIS-NIR data clearly ameliorates the spatialization of the texture, then, the spatial detail of the results. Differences in the output using different maps are more important in Pesera model than in Mesales showing no-change ranges of about 15 to 41% and 53 to 67%, respectively.