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Comparison of soil erosion models (USLE, RUSLE) and a new adapted model in a basin of central Spain

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Soil erosion by runoff is one of the most important environmental problems in Mediterranean climate (Martínez-Casasnovas & Sánchez-Bosch, 2000) especially because of changes in agricultural practices. This phenomenon has an important impact in the biomass production, water quality and in the landscape (Omuto & Vargas, 2009). Areas with a Mediterranean climate have strong variations in the intensity and the volume of rainfalls during the year, which influence in soil moisture and in vegetation cover. These factors affect soil erosion (López-Vicente et al., 2007).

Soil erosion models are useful tools to evaluate the impact caused by agricultural activities over soils and water. They are frequently used to carry out some decisions in conservations plans. This study analyzes the application of three different models: The USLE (Universal Soil Loss Equation) and his revised version RUSLE 1.06c. We propose a third model, which is an USLE adaptation, to join the advantages of the two other equations. On one hand we look for simplicity to make calculations easier. On the other hand precision to estimate soil losses with the best accuracy.

To use these models we choose a basin located in the centre of Spain. It is a semiarid zone with an average temperature of 12,5ºC and an average rainfall of 630mm. It is a highly degraded area where agriculture was abandoned and now lands are occupied by native shrubs like Rosmarimus officinalis, Thymus vulgaris, Ganista scorpia and Lavandula latifoila.

Multiple samples and data have been taken in the study area to calculate soil losses in this basin. In this study it has been used as well GIS to represent these soil losses in maps that can help in the decisions taken in order to reduce the impact caused by water erosion.

The results show that the new model can obtain accurate results with a precision similar to RUSLE but with more simple calculations that allow us to obtain data more quickly.

These results are adequate to this area but need a calibration with real results obtained in the field to compare the results calculated in this study.