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Soil erosion modelling of the Mediterranean basin in the context of land use and climate changes.

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Hydric erosion is one of the major causes of soil degradation. It results from the interaction of several parameters which vary in space and time. Global warming and the land use changes expected during the 21st century are going to influence the soils deterioration and the erosion processes. In order to protect the soil resource under the current bioclimatic context and prevent the future consequences, it is essential to apprehend the erosion risk. Many studies developed the soil erosion risk modelling at various scales from regional to European scale. The MESOEROS project is the first which aims to understand the soil loss risk on the whole Mediterranean basin for the current climate context and also for the predicting climate changes expected for the 21st century. Two models are used: MESALES (expert rules model) and PESERA (physical based model). Both provide the soil erosion risk into five classes. Model inputs, soils properties (crusting and erodibility), climate data, DEM and land use data, come from the most recent and validated datasets, homogenised on the whole study area. After being calibrated with watersheds data and the PESERA modelling on Europe, the two modelling results are analysed. Both MESALES and PESERA present an erosion risk contrast around the Mediterranean basin. MESALES estimates Italia, Andalusia, Catalan and Aragon regions, western part of Greece and Balkan region as threatened areas while PESERA models the arable region of Castellan y Leon, Near East and the high atlas range in Morocco as subjected to an erosion risk. The two methods model parts of northern Morocco, centre and European part of Turkey, Lebanon and northern Portugal at risk while southern France, Libyan coasts and southern Greece are never threatened. Analyses of the parameter influences on the models and the modelling validation allow understanding the integration of climate change on modelling results. MESALES and PESERA point out an evolution of the soil erosion risk between the 20th and the 21st centuries around the Mediterranean basin. The two models assess a global augmentation of the soil loss risk at the Mediterranean scale. They both show an increase – in intensity and surface - of the soil erosion risk on areas already sensitive during the 20th century.