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Assessment of current and future soil erosion risk in Romania

Cristian Valeriu Patriche, Rosca Bogdan, Radu Gabriel Pirnau, and Ionut Vasiliniuc

Romanian Academy, Iasi Branch, Geography Research Center

Our study attempts to estimate current and future rill and interrill soil erosion in Romania using RUSLE model in GIS environment. We used the 25 x 25 m resolution EUDEM to derive terrain slope, while the SAGA GIS software was used to derive the slope and slope length (LS) factor. The rainfall erosivity (R) factor was extracted from RUSLE2015 European soil erosion model. For the computation of the crop and crop management (C) factor we used detailed crop information for arable lands for the year 2021. Soil erodibility (K) factor was computed in four different manners. Therefore, four spatial models of soil erosion were achieved and the optimum one was selected by correlations of estimated erosion with measured erosion values for several locations throughout the country. To estimate the possible future changes in soil erosion rates due to climate change, we extracted monthly rainfall data from CHESLA database for the Romanian territory for two climate change scenarios (RCP 4.5 and 8.5) and two time periods (2014-2060 and 2061-2080) and computed the modified Fournier index. A statistical relationship between rainfall erosivity and the current modified Fournier index was computed and then applied to future Fournier index values in order to estimate future rainfall erosivity values. Our results show that rainfall erosivity is likely to enhance during the 2041-2060 period, especially in the western, south-western and eastern part of the country, causing a corresponding increase in soil erosion rates with 1-2 t ha⁻¹ yr⁻¹ on average. During the 2061-2080 period, rainfall erosivity is likely to decrease in the central and eastern Romania.