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Analysis of spatio-temporal variability of C-factor derived from remote sensing data

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In some risk areas water erosion as the present task has got the strong influence on agriculture and can threaten inhabitants. In our country combination of USLE and RUSLE models has been used for water erosion assessment (Krása et al., 2013). Role of vegetation cover is characterized by the help of vegetation protection factor, so-called C- factor. Value of C-factor is given by the ratio of washing-off on a plot with arable crops to standard plot which is kept as fallow regularly spud after any rain (Janeček et al., 2012). Under conditions we cannot identify crop structure and its turn, determination of C-factor can be problem in large areas. In such case we only determine C-factor according to the average crop representation. New technologies open possibilities for acceleration and specification of the approach.

Present-day approach for the C-factor determination is based on the analysis of multispectral image data. Red and infrared spectrum is extracted and these parts of image are used for computation of vegetation index series (NDVI, TSAVI). Acquired values for fractional time sections (during vegetation period) are averaged out. At the same time values of vegetation indices for a forest and cleared area are determined. Also regressive coefficients are computed. Final calculation is done by the help of regressive equations expressing relation between values of NDVI and C-factor (De Jong, 1994; Van der Knijff, 1999; Karaburun, 2010). Up-to-date land use layer is used for the determination of erosion threatened areas on the base of selection of individual landscape segments of erosion susceptible categories of land use.

By means of Landsat 7 data C-factor has been determined for the whole area of the Czech Republic in every month of the year of 2014. At the model area in a small watershed C-factor has been determined by the conventional (tabular) procedure. Analysis was focused on: i) variability assessment of C-factor values while using the conventional procedure and remote sensing, ii) variability assessment of values in different months for selected crops – time variability, growth dynamics and vegetation cover have been taken into account; iii) evaluation of space variability of C-factor values for selected crops – variability of natural conditions, markedly influencing vegetation fitness, has been taken into account. Described methods can be used for the planning of agricultural activities and for the proposing of full-scale land replotting. Presently these activities have been financially supported by the European Structural and Investment Funds.