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Changes of cropland area in the river basins of the European part of Russia for the period 1985-2015, as a factor of soil erosion dynamics

Ivanov M., Prishchepov A., Golosov V., Zalyaliev R., Efimov K., Kondrat'eva A., Kinyashova A., Ionova Y.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The work is devoted to the effect of the change of cropland area on the rate of soil erosion in sites of the European part of Russia located in different climatic, landscape and geomorphological conditions. Using the results of visual interpretation of multi-seasonal Landsat-5 and -8 images, the cultivated cropland areas in 9 river basins for two time slices (mid-1980s and the current period 2013-2015) were calculated, and the changes that occurred over 30 years were estimated. Croplands is the dominant category of land use in almost all regions, and it is in the range of 40-65 % in 2015. The decrease of croplands area was revealed in all studied river basins. An assessment of the effect of cropland reduction on the soil loss rate was carried out. Using the SRMM DEM with a 30 m spatial resolution, the following morphometric characteristics of relief for cultivated and abandoned croplands were calculated: steepness of slopes, flow path length, factor LS. Based on the results of calculations, the average values of the factor LS reduced from 1985 to 2015 on the croplands in all considered basins. The obtained data confirm that the reduction of the croplands area is one of the factors responsible for the decrease of modern soil loss rates observed in field studies.

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Keywords

Cropland, European part of Russia, Landsat, Relief morphometry, Soil loss, SRTM

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