Mapping croplands with a long history of crop cultivation using time series of MODIS vegetation indices

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Abstract

In the study, a method of automated detection of croplands and natural grasslands using multi-year time series of the vegetation indices was developed and implemented. The methodology is based on a new recognition feature enabling identification of all lands cultivated over a long period. The new recognition feature was calculated from time series of the MODIS vegetation indices. It takes into account both intraseasonal and interannual characteristics of the vegetation period for arable lands with spring and winter crops, as well as for natural grasslands. The methodology determines: the procedure of obtaining time series of the NDVI and EVI vegetation indices for the period from March to November in the given years; generalization of the time series by land cover categories and agro-climatic zones; dates for calculating the recognition feature in each zone; calculation of the recognition feature; adaptation of the decision rules to the regional environmental conditions (threshold values for the agro-climatic zones); procedure of classification into croplands and grasslands. Croplands within the territory of the European part of Russia were mapped for the period from 2000 to 2016. The assessment of recognition accuracy and comparison of the results with the existing products confirm that the developed recognition feature can be successfully used for cropland detection and can improve the accuracy of data interpretation when applied along with other features.

Keywords: MODIS, NDVI, EVI, cropland, European part of Russia

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