

THE APPLICATION OF OBJECT-BASED CLASSIFICATION OF SATELLITE IMAGES FOR VERIFYING SOIL TEXTURE BOUNDARIES

Summary

Soil is the main element of the plant development habitat, hence the possession of information about its properties and spatial distribution (affecting the development of crops) is the basis for conscious and rational agricultural production. The main source of information about the spatial location of soil texture boundaries in Poland are soil maps and soil and agricultural maps. We are currently looking for quick and cheap methods of verifying and updating the content of these maps. One of such methods is the use of satellite imagery of the top layer of the earth.

As part of this dissertation, it was possible to apply the technique of object-based classification of satellite imagery to determine the boundaries of soil texture, as well as to evaluate the effectiveness of the use of time series of remote sensing and numerical terrain models in the object classification process. The numerical terrain models as well as the minimum, maximum, median and average time series of images obtained from the Landsat 8 satellite were used for the study, for which remote sensing indicators were calculated: normalized difference vegetation index (NDVI), normalized difference water index (NDWI), ground radiation temperature. The research was carried out in the area of four municipalities with diverse natural conditions.

As a result of the conducted research, it was found that the application of the object-based classification technique, to determine the topsoil texture based on satellite imagery from the Landsat 8 satellite and the numerical terrain model gives results slightly less accurate or close to the information on species included in soil agricultural maps on a scale 1:25 000. Due to the conducted research, technical and methodological factors have been noticed that have an impact on the accuracy of the results and an opportunity to improve them has been proposed. The conclusions from the work prove the further need to look for methods for fast and cheap updating the information of the topsoil texture.

Key words: remote sensing, spatial information systems (GIS), soil science, soil and agricultural map, object-based classification (OBIA), Landsat 8.