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LARGE AREA CLASSIFIACTION OF LAND USE/LAND COVER FOR UKRAINE WITHIN SIGMA PROJECT

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FP-7 SIGMA project is part of Europe's contribution to GEOGLAM aiming to develop innovative methods and indicators to monitor and assess progress towards "sustainable agriculture", focused on the assessment of longer term impact of agricultural dynamics on the environment and vice versa [1].

One of the main tasks of Space Research Institute within the project is large scale classification and mapping of Land Use/Land Cover (LULC). We have developed four-level deep learning architecture for classification of LULC and crop types based on multi-temporal satellite imagery [2-4]. These levels are pre-processing, supervised classification, post-processing and geospatial analysis.

The developed methodology was used to generate land cover maps for the whole territory of Ukraine based on the Landsat-4/5/7 images for three decades: 1990s, 2000s and 2010s [5]. Reliable crop maps can be used for more accurate agriculture statistics estimation, stratification purposes, better crop yield prediction and drought risk assessment. During the last decades, satellite imagery became the most promising data source for solving such important tasks as land use/land cover mapping. And taking into account huge amount of available free satellite data (both optical and SAR) powerful computers and special technologies could provide significand improvements [6-8]. Using those maps, it is possible to estimate general trends of different land cover/land use in Ukraine in these time periods. For example, comparison of cropland areas for 1990, 2000 and 2010 revealed the increase of grassland instead of cropland, in particular, in the northern part of Ukraine (Fig. 1).

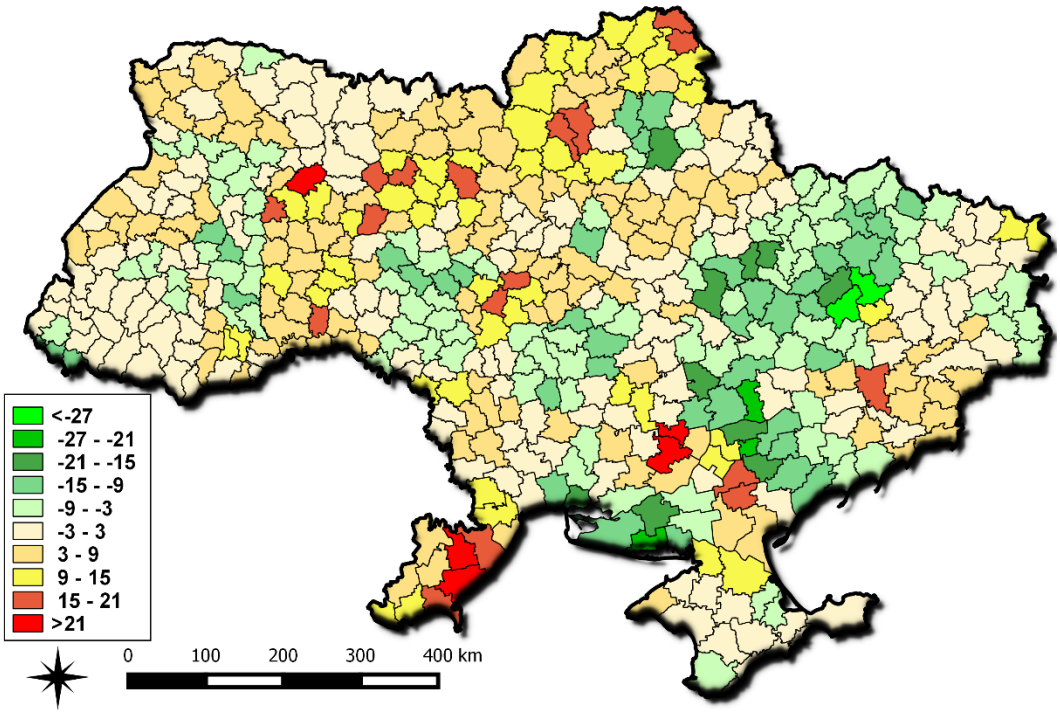

Figure 1. Land cover changes for Ukraine from 1990 to 2010

Maps of land use changes are used within UN program on desertification UNCCD (United Nations Convention to Combat Desertification) as a national dataset for estimation of land degradation indicators.

This paper presented a retrospective land cover and land use mapping methodology for the territory of Ukraine based on Landsat data at 30 m resolution. The proposed methodology allows one to automatically obtain land cover maps for the territory of Ukraine on a regular basis that is extremely important for many applications and this allows us to evaluate trends in land cover changes [9].

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