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TITLE: Land cover for Ukraine: the harmonization of remote sensing and ground-based data

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ABSTRACT BODY: This study focuses on the development of a land cover map of the Ukraine through harmonization of remote sensing and ground-based data. At present there is no land cover map of the Ukraine available that is of sufficient accuracy for use in environmental modeling. The existing remote sensing data are not enough accurate. In this study we compare the territory of the Ukraine from three global remote sensing products (GlobCover 2009, MODIS Land Cover and GLC-2000) using a fuzzy logic methodology in order to capture the uncertainty in the classification of land cover. The results for the Ukraine show that GlobCover 2009, MODIS Land Cover and GLC-2000 have a fuzzy agreement of 65%. We developed a weighted algorithm for the creation of a land cover map based on an integration of a number of global land cover and remote sensing products including the GLC-2000, GlobCover 2009, MODIS Land Cover, the Vegetation Continuous Fields product, digital map of administrative units and forest account data at the local level. This weighted algorithm is based on the results of comparing these products and an analysis of a dataset of validation points for different land cover types in the Ukraine. We applied this algorithm to generate a forest land cover type map. This raster map contains a forest expectation index that was calculated for each pixel. Forest land was then allocated based on forest statistics at the local level. Areas with a higher forest expectation index were allocated with forest first until the results matched the forest statistics. The result is the first digital map of forest (with a spatial resolution of 300m) for the Ukraine, which consistent with forest and land accounts, remote sensing datasets and GIS products. The forest land was well defined in forest rich areas (i.e. in the northern part of the Ukraine, the Carpathians and the Crimea); well less accurate areas were identified in the steppe due to heterogeneous land cover.
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