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# Eco-geomorphological digital model of Moscow city

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The project "Eco-geomorphological digital model of Moscow city" includes stages: 1) digitizing of the paper-based eco-geomorphological map (i.e. scanning and vectorization of each list of the map); 2) transformation of the obtained seamless layer (in order to fit it with the elements of the Unified State Cartographic Base of Moscow (digital base map, made by Mosgorgeotrest, map scale 1:10 000); 3) vector data verification (in order to reduce digitizing errors). The resulting vector polygon data layer (modeled in AcrInfo, ESRI, Inc., USA) consists of more than 3 000 features with attributes according to the map legend. The map legend shows: 1) genetic types and forms of relief; 2) hazardous engineering-geological processes that already happened or could happen soon. The scale of the created digital eco-geomorphological map is 1:50 000.

An additional component of the digital eco-geomorphological model of Moscow is detailed digital elevation model (DEM). 3D Analyst (ArcGIS) was used to visualize DEM in 3D-pictures, to extract simple derivates (hypsometry, slope and aspect datasets, plan and profile curvature, roughness). These data allowed us to create some geomorphic maps of the tested area – the territory of Moscow protected area «Vorobyovy Gory». Statistical analysis of the geomorphic data distribution was done. The obtained surface information was used for detail surface description and could help to define geomorphological structure of the area.

The advantages of suggested technique are: 1) compatibility with other digital datasets of the area because of using Unified State Cartographic Base; 2) DEM was made into widespread and multifunctional ESRI software (AcrInfo); 3) possibility of further reuse in a variety of purposes in this study and in other applications; 4) multiple-choice presentation of derived data and results. Processing of the obtained data, including spatial analysis of the DEM and its derivatives, can produce results that are not possible (or very difficult) to extract by traditional tools like visual map analysis or cartometric analysis.

DEM allows the to the newest approaches in the area of spatial-analytical research of the urban territories, including eco-geomorphological zoning, and applications for specific tasks such as karst-suffosion-, suffusion-, landslide- and other processes modeling, ensuring the receiving of new fundamental knowledge. The quality of the model provides not only the solution of the complex eco-geomorphological estimation of the urban agglomeration and acquiring knowledge about it, but also the solution of urban planning and management.