

Mapping Methods Used to Predict Soil Textural Properties Across Two Large Areas of the Baltic Region of Eastern Europe

The goal was to predict soil textural properties across two large areas of the Baltic region of eastern Europe based on their landform characteristics. The inferred particle size distributions of the different landform units are useful to assess terrain conditions in terms of vehicle mobility or improvised landing zones. The project was conducted at DRI using remotely sensed imagery of the area of interest (AOI) and results were reported in 2019. Our analyses produced geomorphic maps showing the distribution of landforms and particle size characteristics of those landforms. The results from this project produced landform and unit designations assembled specifically for the area mapped, which included large areas of continental glaciation.

Summary of Project Details: We first had to develop an approach to mapping inferred particle size distribution from existing soils data, knowledge of soil-landform relations, and expert-based recognitions of landforms. We began with the soil and terrain prediction model approach for military operations in desert terrain, which we modified for eastern Europe. We analyzed Shuttle Radar Topography Mission (SRTM) data, Light Detection and Ranging (LiDAR) data along with digital soils maps and Quaternary geology maps, some of which were available only on paper and had to be scanned and georeferenced. A total of 18 classes of landforms and deposits resulted from the analyses. Seventeen map unit designations with correlative soil types and particle size distributions were established. Our approach to mapping glaciated landscapes for landform and soil texture over the region of interest integrated multiple types of data, but ultimately relies on expertise in geomorphology and soil science to complete the interpretation.

Management Implications:

The maps that we produced were comprehensive and represented an innovation in mapping geomorphology of the Baltic region of eastern Europe but should be viewed as preliminary. We relied on readily available data and were able to locate no-cost data for this proof of concept, which produced a product useful for predicting soil conditions for estimating terrain mobility for military activities. To improve the maps and the overall process to generate the maps, we recommended that high resolution topographic data such as from LiDAR be obtained to refine the resulting maps. No field validation was conducted and thus we suggested performing ground truthing to validate our output.



