

EGU2020-3925, updated on 28 Oct 2021

<https://doi.org/10.5194/egusphere-egu2020-3925>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Mapping soil formation in Lithuania. A national-scale analysis.

Paulo Pereira¹, Eric Brevik^{2,3}, Miguel Inacio¹, Marius Kalinauskas¹, Katarzyna Miksa¹, and Eduardo Gomes¹

¹Mykolas Romeris University, Environmental Management Centre, Vilnius, Lithuania

²Department of Natural Sciences, Dickinson State University, Dickinson, ND, USA

³Department of Agriculture and Technical Studies, Dickinson State University, Dickinson, ND, USA

Soil formation is vital for the existence of life. Soil provides a wide range of direct and indirect ecosystem services (ES) such as carbon sequestration, water and flood regulation, food provisioning, raw material culture, and heritage. Soil formation is complex and depends on the parent material, climate, topography, biological activity, and time. This intricate process is strongly affected by human activities (e.g., agriculture, urbanization) that generally result in a degradation process. Mapping soil formation is challenging due to a large number of variables involved and the complexity of their interaction. The objective of this work is to map soil formation in Lithuania. Several variables were selected to assess soil formation such as lithology, time (glacial retreat), slope, topographic wetness index, roughness, slope length, soil mineralogy, depth, texture, available water capacity, pH, organic carbon, nitrogen, potassium, phosphorous, January average temperature, June average temperature, annual average precipitation, and land use. To validate the model, we used soil cation exchange capacity. The variables were ranked according to the least to the most favorable conditions. The weight of the variables was assessed using the Analytic Hierarchical Process and ranked by 20 international experts on the soil. The results of the model are acceptable ($r^2=0.48$), owing to the complexity involved in soil formation.

This work was funded from the European Social Fund project LINESAM No. 09.3.3-LMT-K-712-01-0104 under grant agreement with the Research Council of Lithuania (LMTLT).