Mapping of wet areas in forest using LiDAR and multispectral imagery

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Atbalsts LVMI Silava starptautiskās sadarbības projektiem pētniecībā un inovācijās, Eiropas Reģionālās attīstības fonda projekts (Nr. 1.1.1.5/18/I/010)

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Pētījums veikts a/s "Latvijas valsts meži" un LVMI Silava 2011. gada 11. oktobra memoranda "Par sadarbību zinātniskajā izpētē" ietvaros

LATVIJAS VALSTS MEŽI

Introduction

Surface topography and potential energy of gravity of the Earth are main aspects that determines water flow direction and accumulation.

Introduction

Poorly drained and wet soils are important for biodiversity, water exchange, chemical and other processes, but may be a challenge in forestry, agriculture and similar fields.

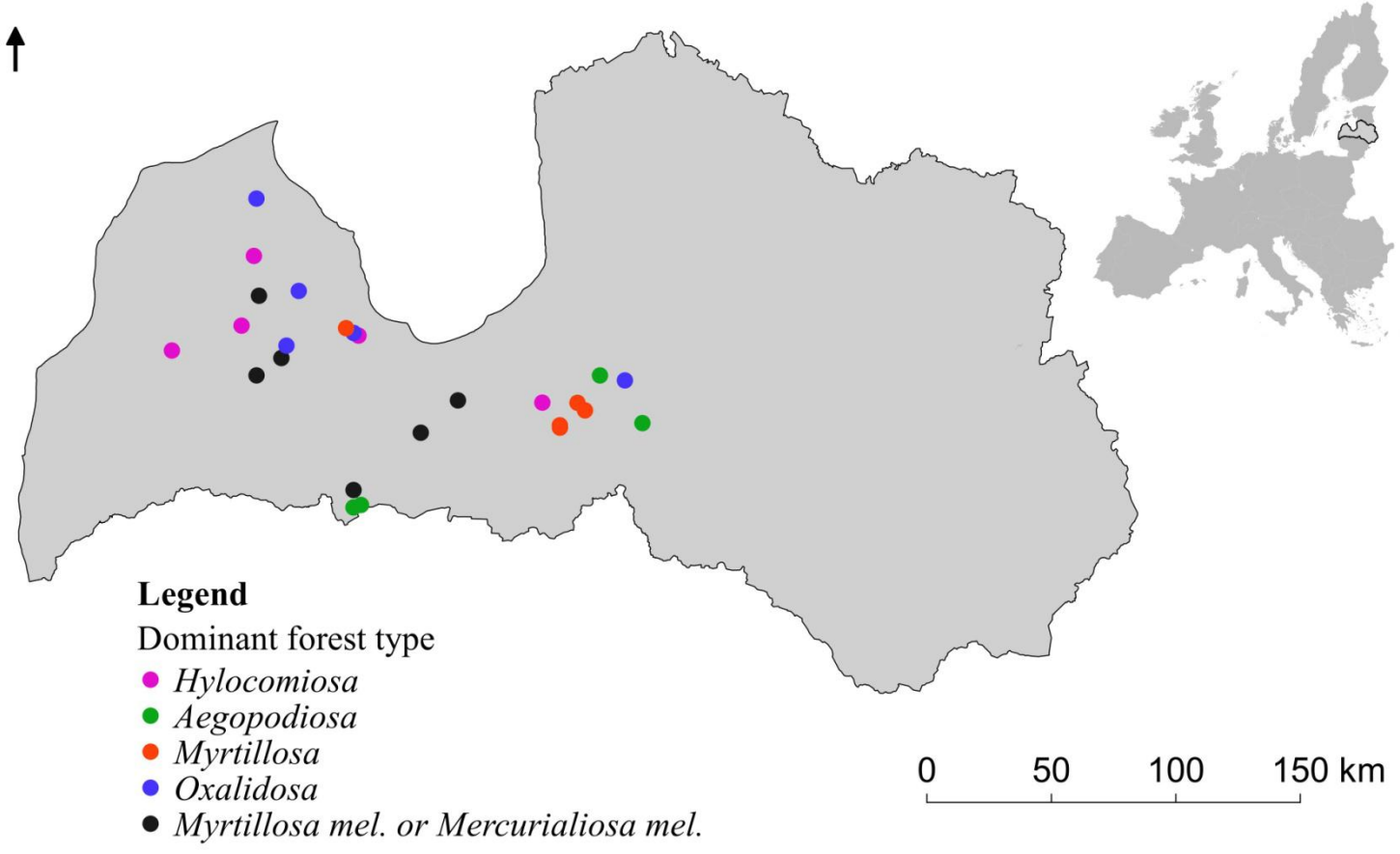
Introduction

Soil disturbance, like rutting and soil compaction is a consequence of timber harvesting operations, but its impact is variable and can be reduced through improved planning of forest management operations

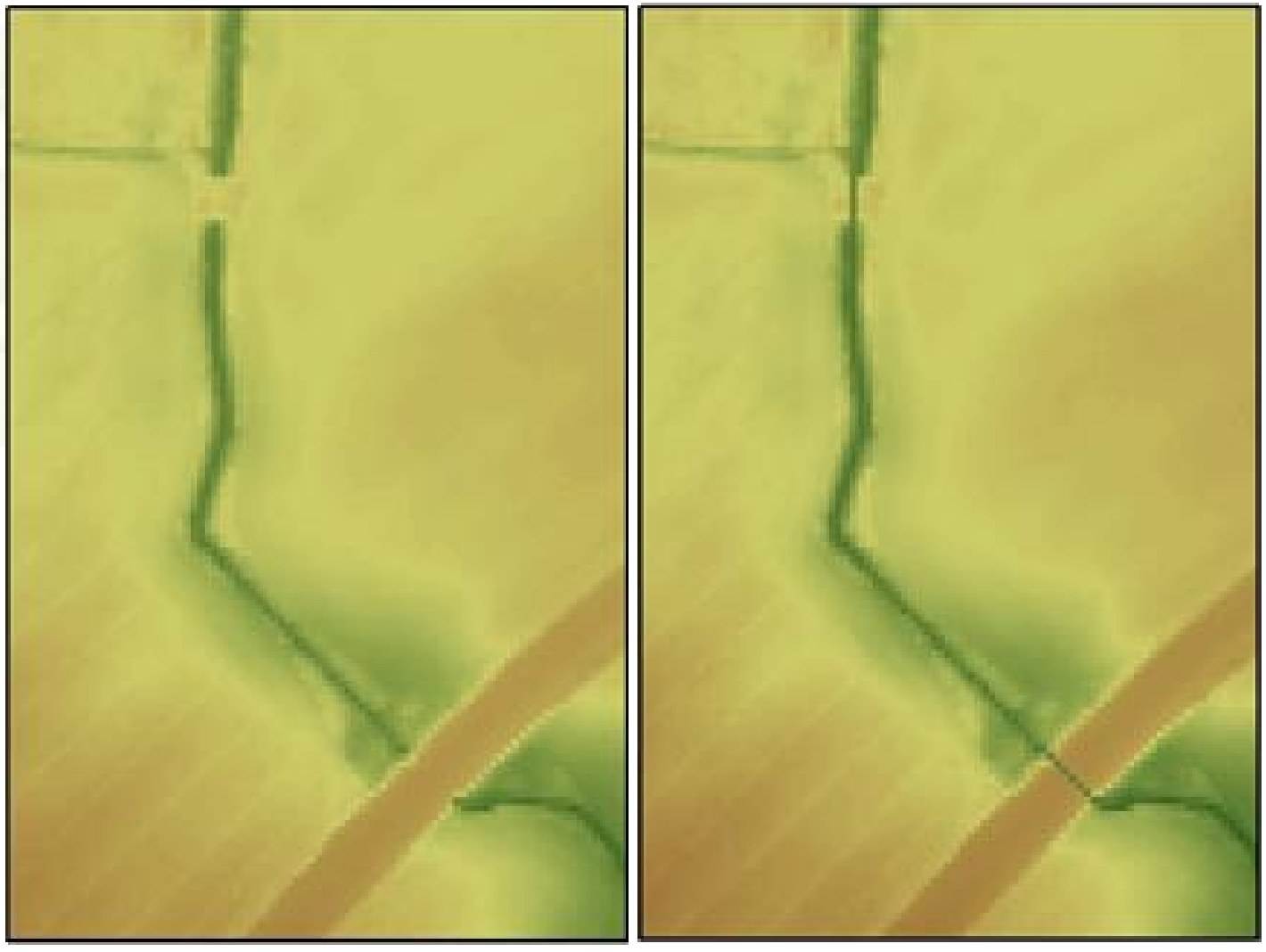
Study area

228 study plots are made to represent various forest types on different quaternary sediments;

Data about basal area of forest stand, forest type, soil penetration resistance, soil texture, depth of peat layer and thickness and severity of reductimorphic horizon are collected.



Processing of Remote sensing data



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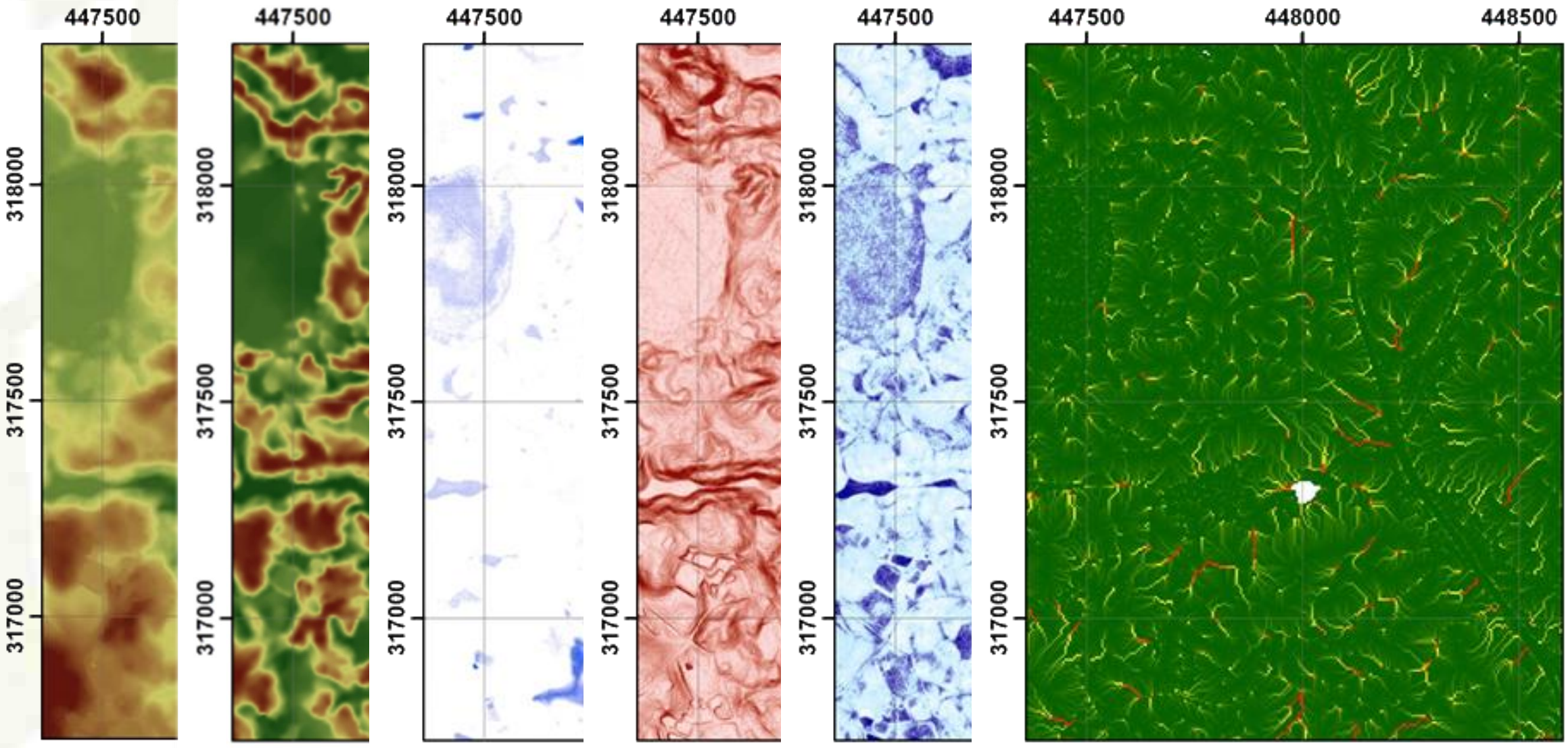
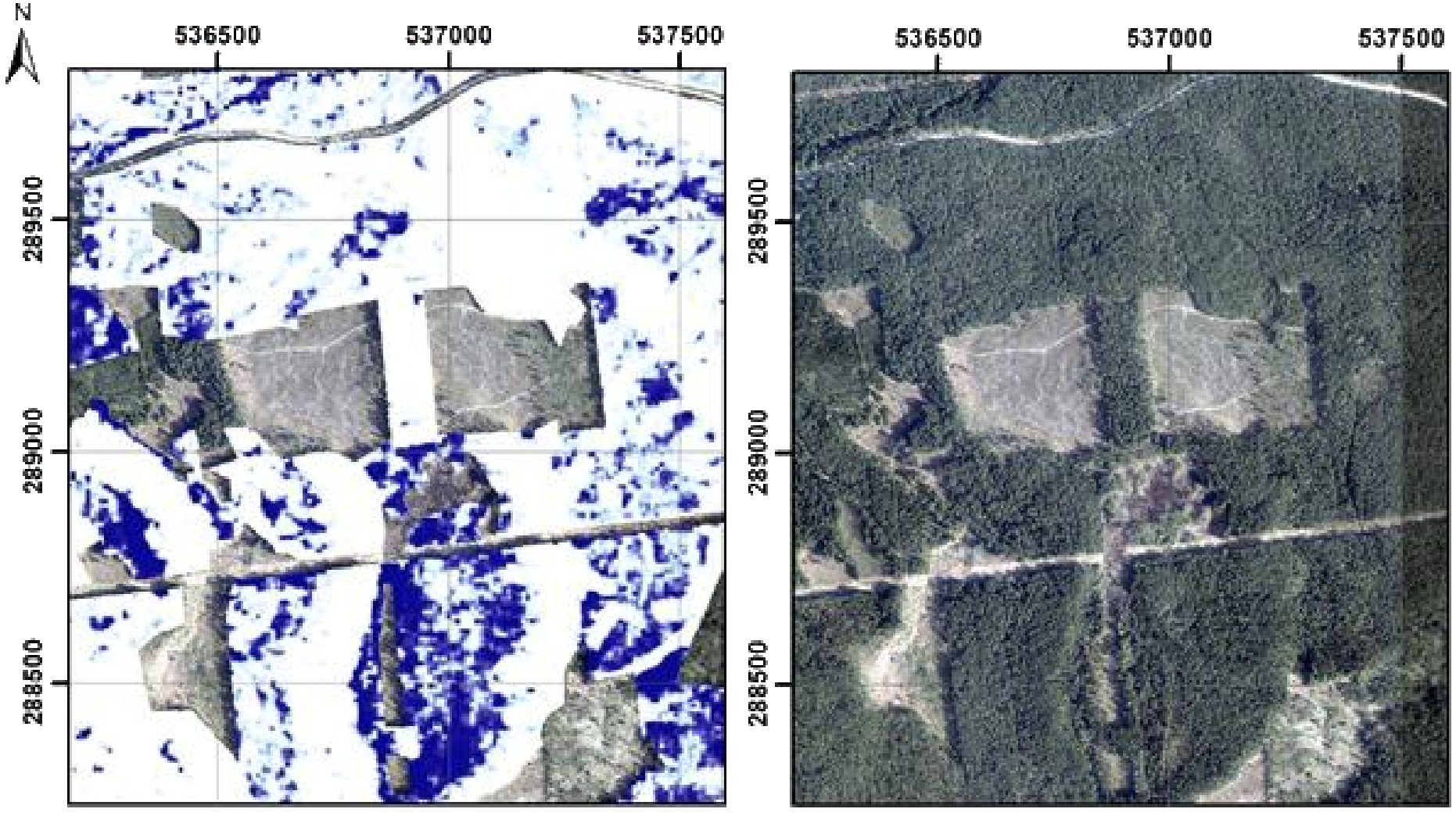


Data analysis

ANOVA test for comparing means of different soil wetness classes are used and various spatial indices are compared to determine significance in predicting soil wetness.

Binary logistic regression analysis are used to predict spatial distribution of soil wetness using various spatial indices.

Results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Conclusions

Applyed methodology is perspective in doil wetness predicting and can be used in practice for planning of forestry operations.

The accuracy of soil wetness classification of soils on moraine, fluvial and eolian sediments exceeds 94%, whereas on the clayey sediments it is close to 80%.

Different geological deposits have various effect on the spatial distribution of soil wetness.

Ongoing and future work

Ditch network generation and culvert extraction from LiDAR data;

Analysis on seasonal streams and catchment area;

Soil wetness map generation for regional scale;

Machine learning application for soil wetness predictions.

Thank You!

Ivanovs, J., & Lupikis, A. (2018). Identification of wet areas in forest using remote sensing data. *Agronomy Research*, *16*. https://doi.org/10.15159/AR.18.192

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