

CHARACTERISTICS OF PEAT PROPERTIES FROM EXTRACTED PEATLANDS

¹Reinis BITENIEKS, ¹Jānis DREIMANIS, ¹Laimdota KALNIŅA, ¹Līga PĀPARDE

¹ University of Latvia, Faculty of Geography and Earth sciences, Jelgavas street No 1, LV-1004, Riga, Latvia, e-mail: rbitenieks@inbox.lv; liga.paparde@gmail.com; janis.dreimanis85@inbox.lv; Laimdota.Kalnina@lu.lv;

INTRODUCTION

Bog vegetation covering peat deposits was removed during the process of the peatland preparation for the peat cutting in the particular area. One of the preparation steps included drainage system creation, which caused changes in the hydrological regime of the bog. As a result peat properties had changed, particularly with increase in mineralisation and natural density. Upon finishing or discontinuation of peat extraction, the remaining layer of peat had different peculiarities in comparison to its natural density, as well as other peat properties, including the amount of minerals and the degree of decomposition.

So far, the degradation degree of the extracted peat fields have been mainly identified by vegetation composition, which helps to evaluate the potential of the vegetation's renewal. No attention has been paid to the remaining peat layer properties, although it is very important for planning of the management and rehabilitation for extracted and degraded peat fields. **The aim of this study** was to investigate changes of the peat properties of remaining peat layers.

Research methods includes:

- Peat deposit coring with corer for soft deposits (Fig.6);
- Loss or ignition method (Fig.7);
- Magnetical susceptibility measurements (Figs.8; 10);
- pH measurements;
- Peat botanical composition analysis and decomposition degree determination (Fig. 11);
- Peat natural density analysis (Fig.12).



Fig.6. Field works



RESEARCH AREAS

- Lielsalas peatland (Fig.3);
- Drabiņu peatland (Fig.4);
- Kaigu peatland (Fig.6);
- Ķemeru peatland (Fig.5).



Fig.5. "Lielā Ķemeru tīreļa" degraded peatland landscape



Fig.7. Loss on ignition method



Fig.1. Drabiņu peatland

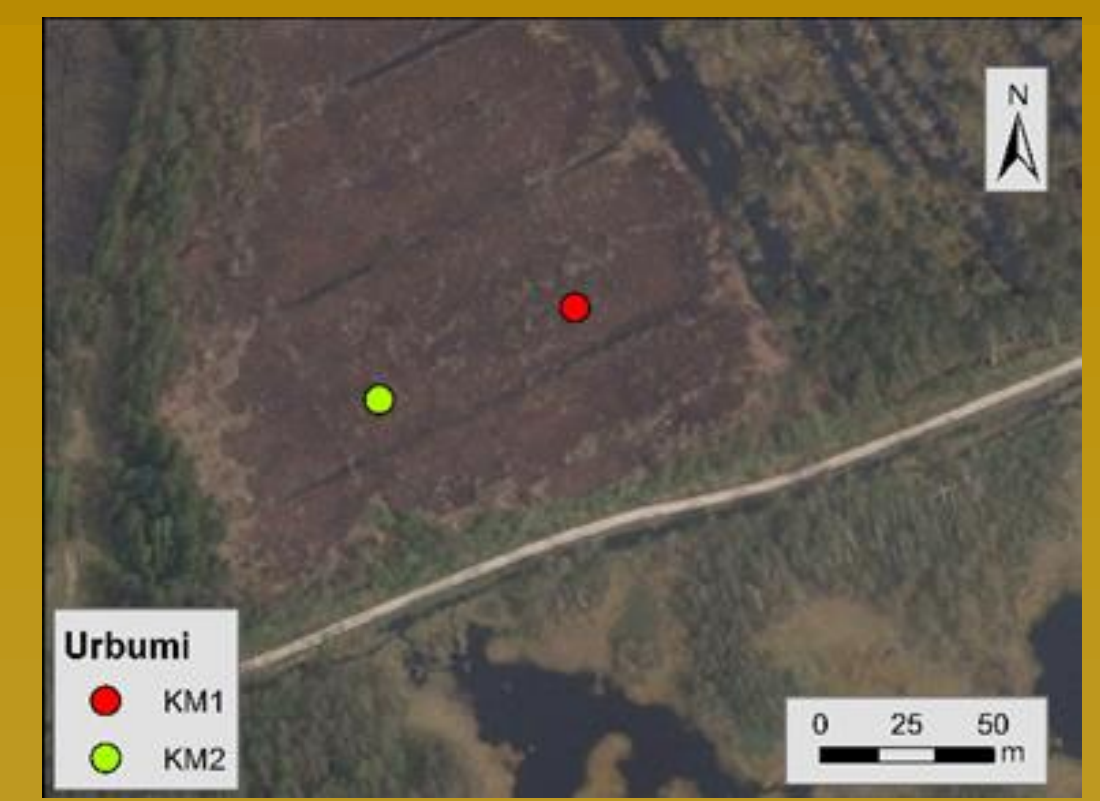


Fig.2. Ķemeru peatland



Fig.3. Lielsalas peatland



Fig.4. Kaigu peatland



Fig.8. Magnetic susceptibility measurements



Fig.9. Peat monolith sample

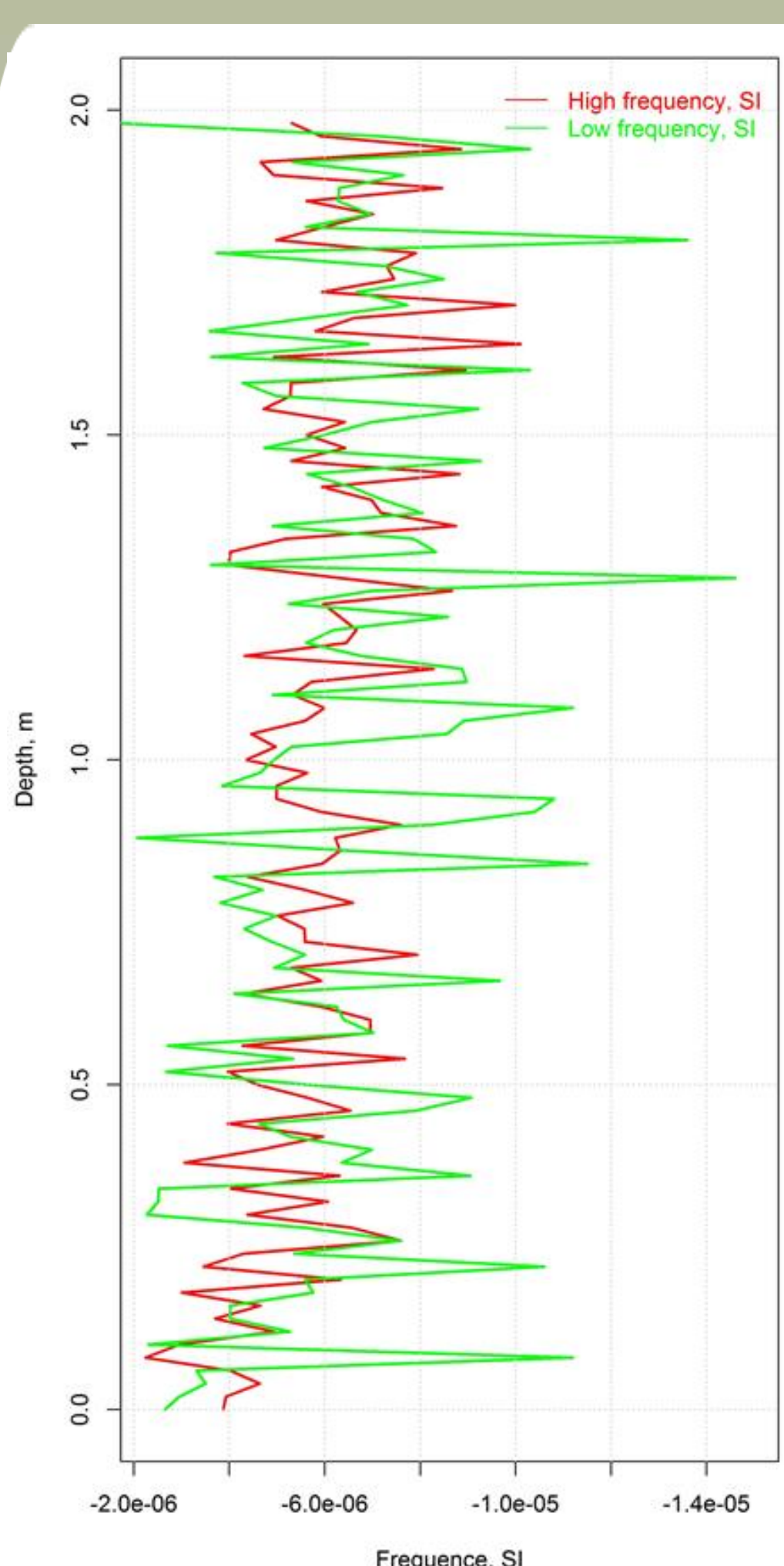


Fig.10. Results of magnetic susceptibility measurements (Drabiņu peatland)

The results of the magnetic sensitivity analysis show the absence of magnetically sensitive substances in peat. All organic substances are mostly diamagnetic.

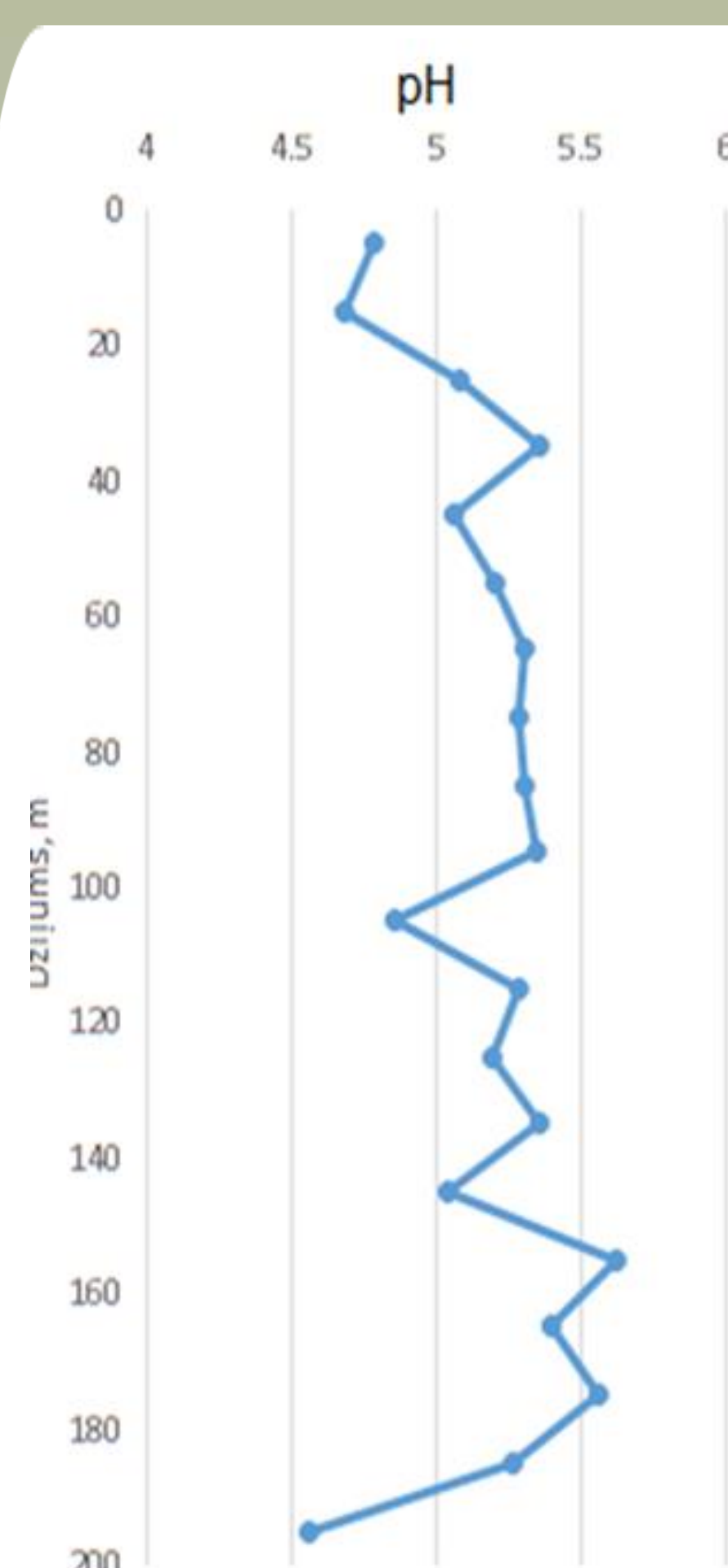


Fig.11. Results of pH measurements (Kaigu peatland)

The diagram shows fluctuations in pH values, which relate to the effects of precipitation on the top of the diagram and groundwater level changes.

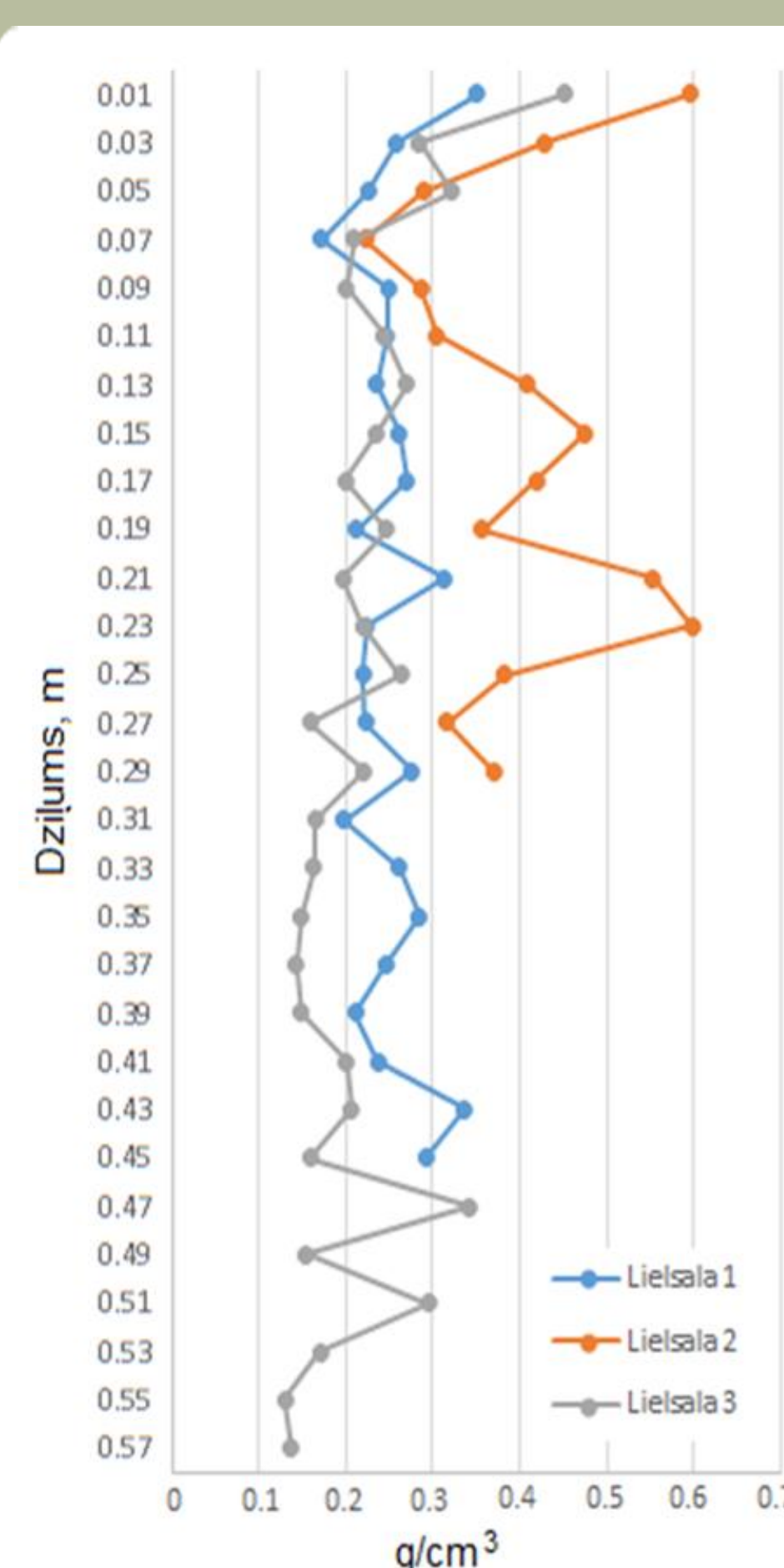


Fig.12. Results of peat natural density measurements (Lielsalas peatland)

The density of remaining peat layers differs from the natural bog's peat density. Normally, the density increases at the bottom of the peat layer due the weight of the peat, but in extracted peatlands density values are higher, due to drainage.

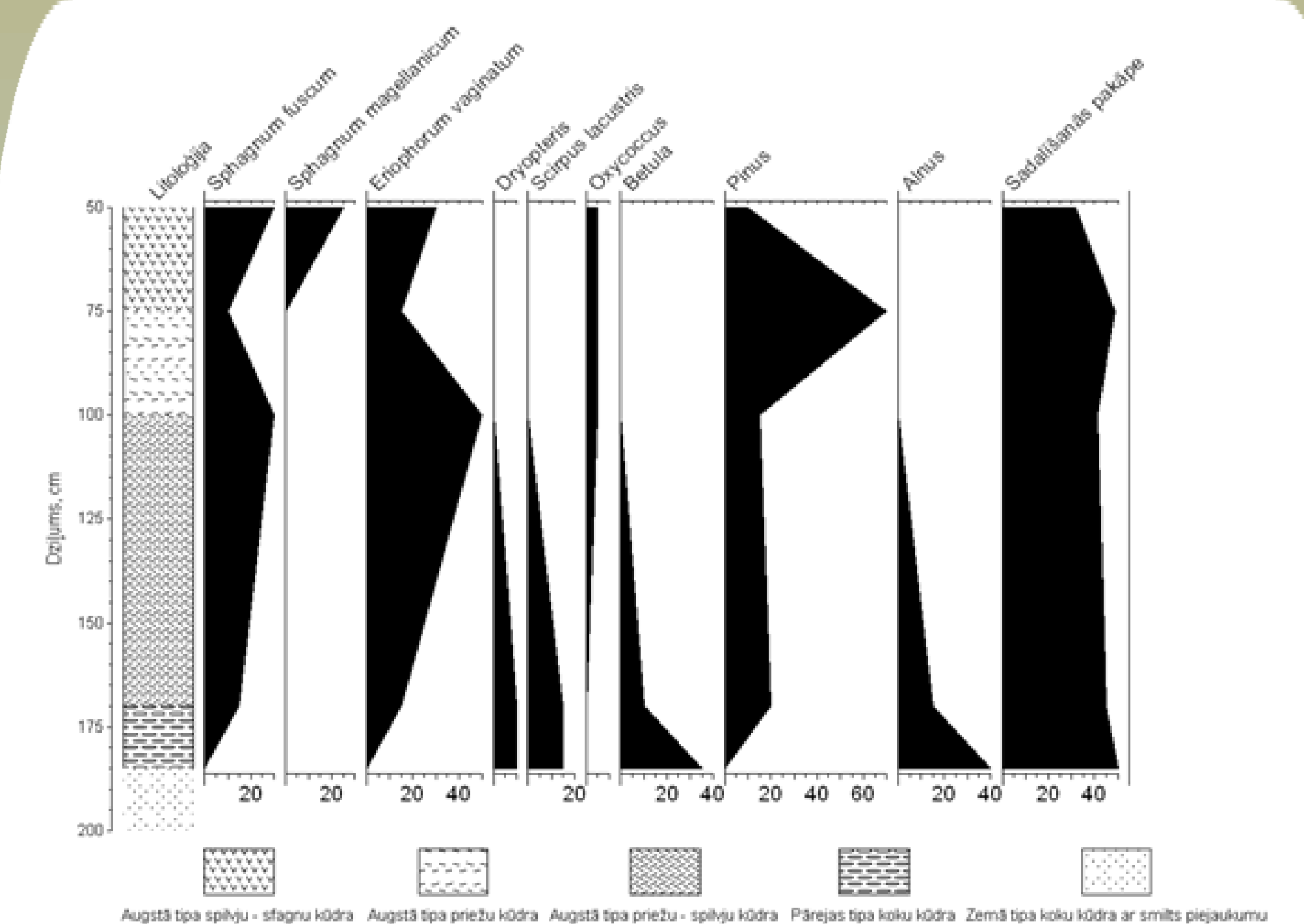


Fig.13. Results of botanical composition and degree of decomposition analysis (Kaigu peatland)

The obtained results of study allow to conclude that the remaining peat layer in the excavated fields of the Kaigu peatland consists of all three consecutive types of peat: fen, transitional and raised bog type. All of them are well distributed more than 40% apart from the upper layer of the sphagnum, whose degree of decomposition decreases to 32%.

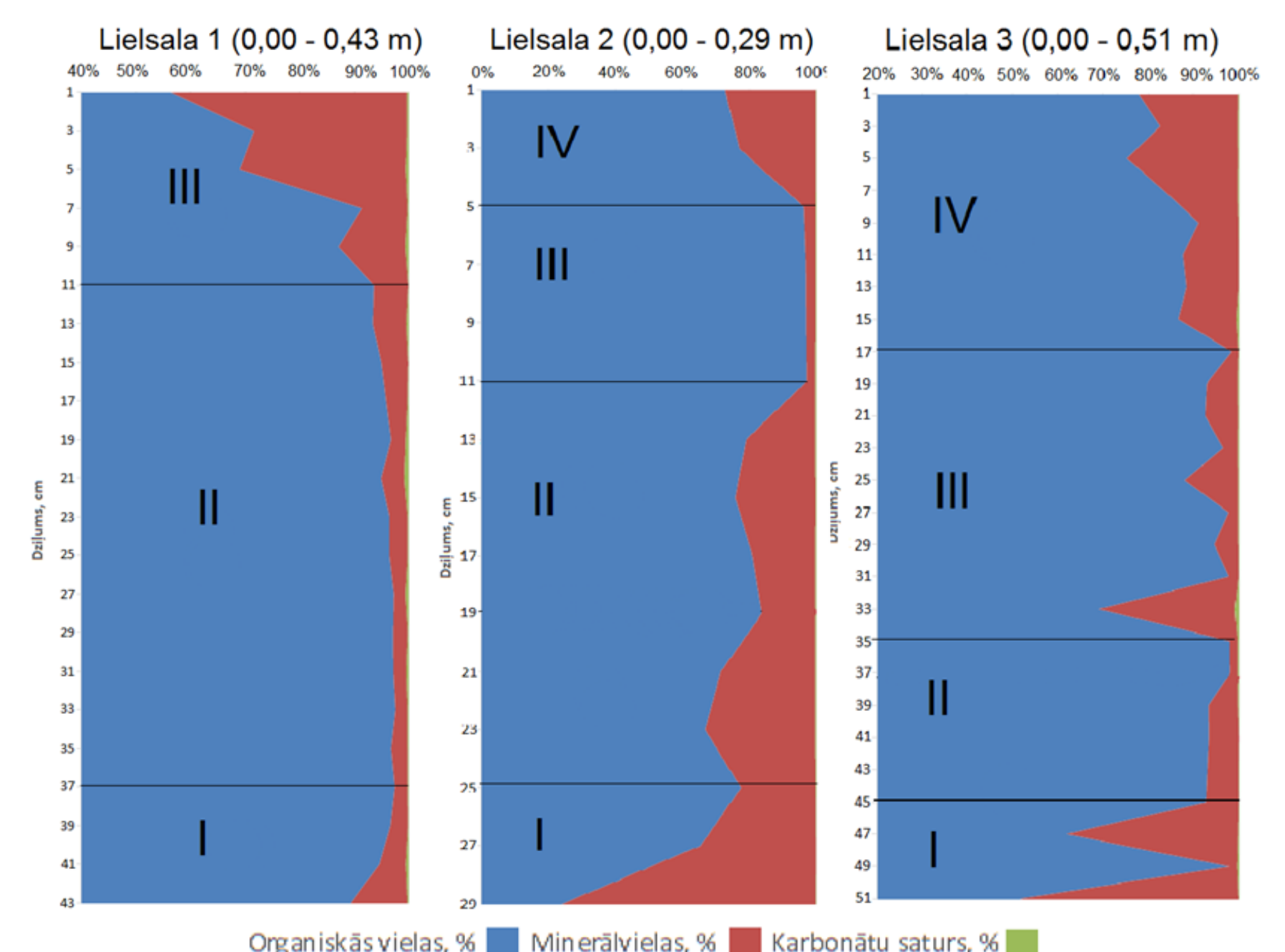


Fig.14. Results of "Loss on ignition analysis (Lielsalas peatland)

Substantial changes in the composition of all studied peat sections are associated with a significant increase in the percentage of mineral matter in the lower and upper parts of the cut.

CONCLUSIONS

Comparing the results of Lielsala, Drabiņu, Kaigu and Lielais Ķemeru peatland deposit studies, the main differences are observed in deposit composition, natural density and peat decomposition degree.

The results of Lielsala peatland reveal that the peat natural density in the upper part of the cross-section is larger than in other degraded peatlands.

The main factors affecting the natural density indicators are the degree of decomposition, the amount of mineral particles and the use of hydrological regime.