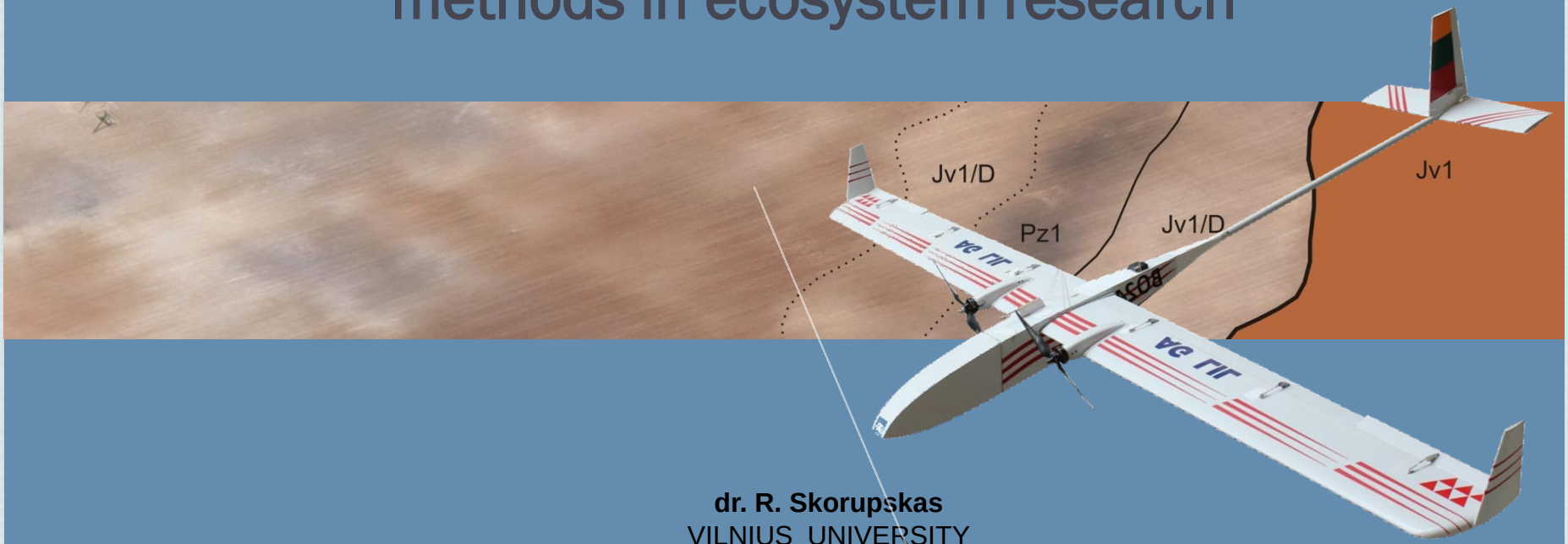
TARPTAUTINIS MOKSLINIS – PRAKTINIS SEMINARAS
„NUOTOLINIAI METODAI GAMTINIŲ EKOSISTEMŲ TYRIMUOSE: PRIVALUMAI IR IŠŠŪKIAI“
12 – Oktober 2021
Vilnius (Lithuania)

Possibilities and strengths of using remote sensing methods in ecosystem research



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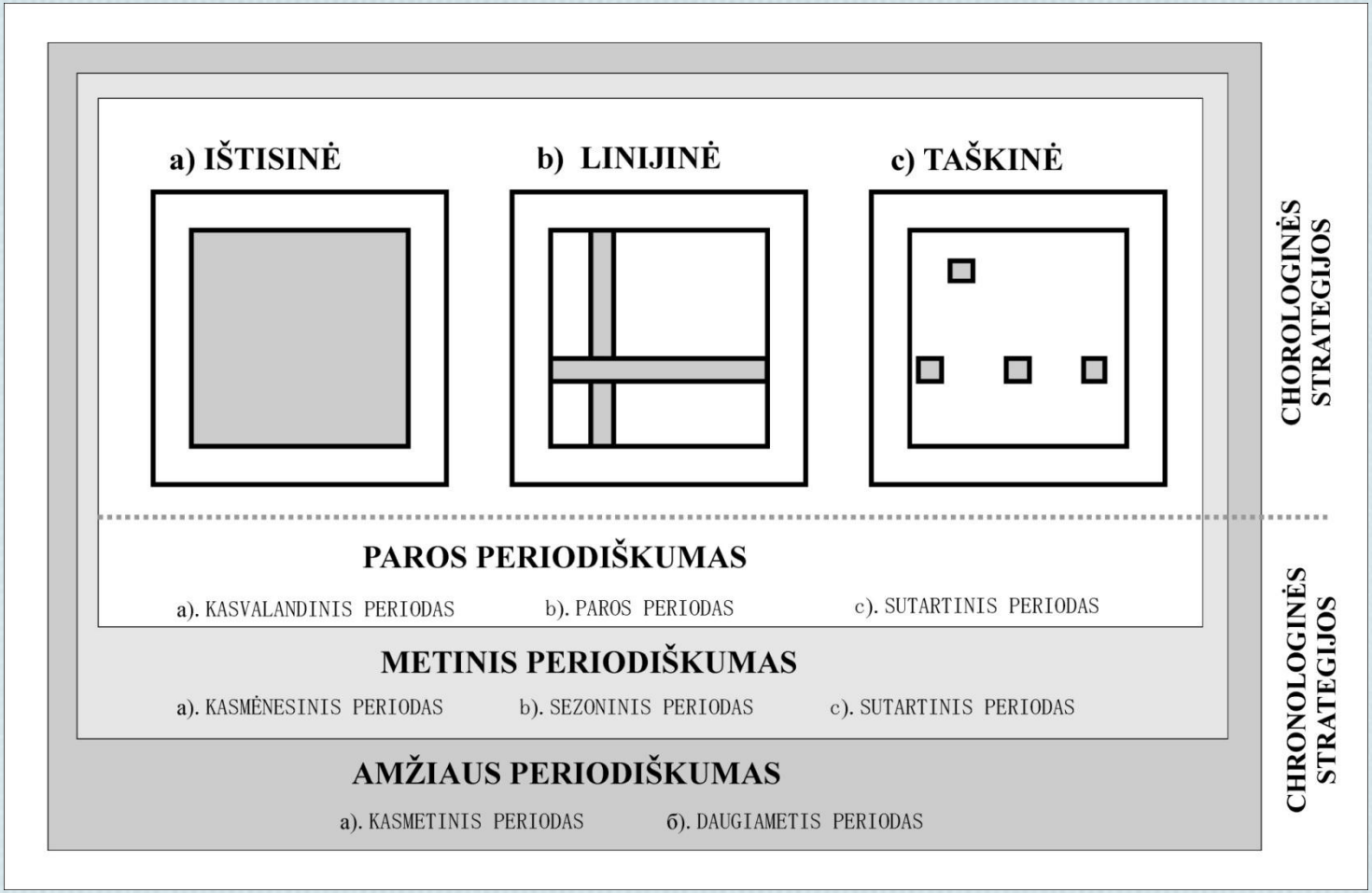
Remote sensing tools used for the research:

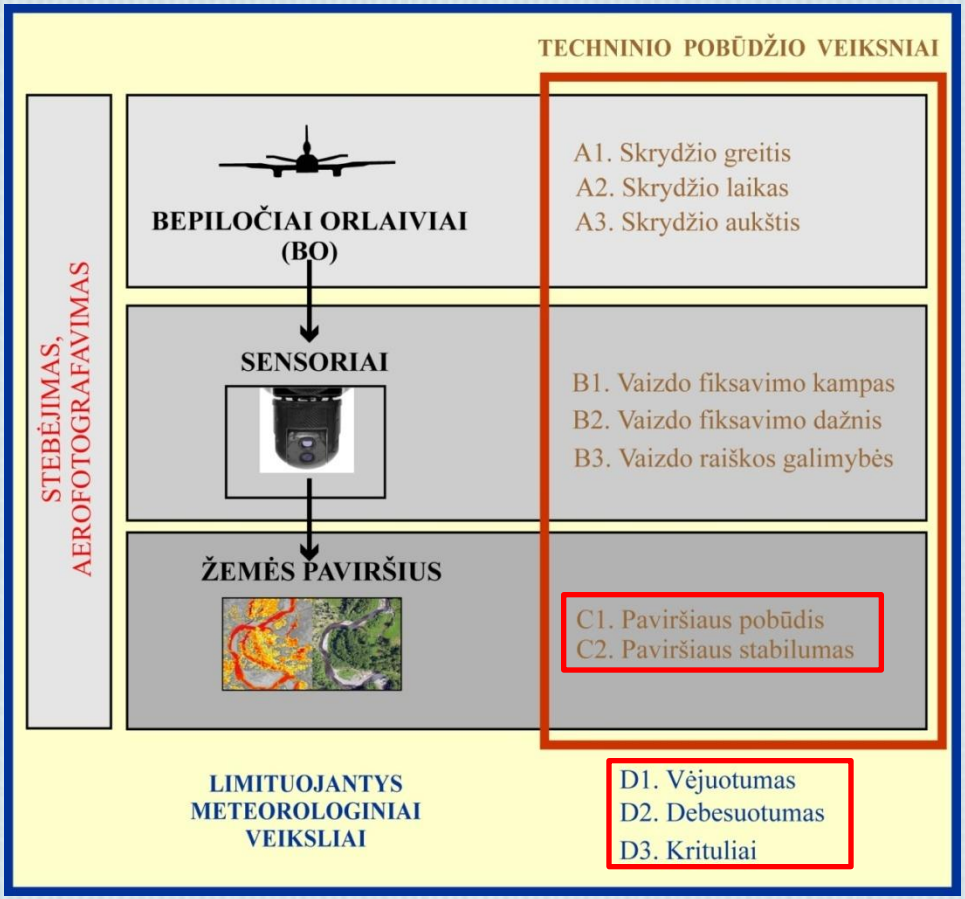
- Unmanned aerial vehicles system consisting of:
  - (A) Fixed wing unmanned aerial vehicle (BO)
  - B) Visual spectrum and IR cameras

Chronological and chorological ground surface investigation strategies using unmanned aerial vehicles



a. Continuous; b. Linear; c. Scatter;

Research implementation strategy



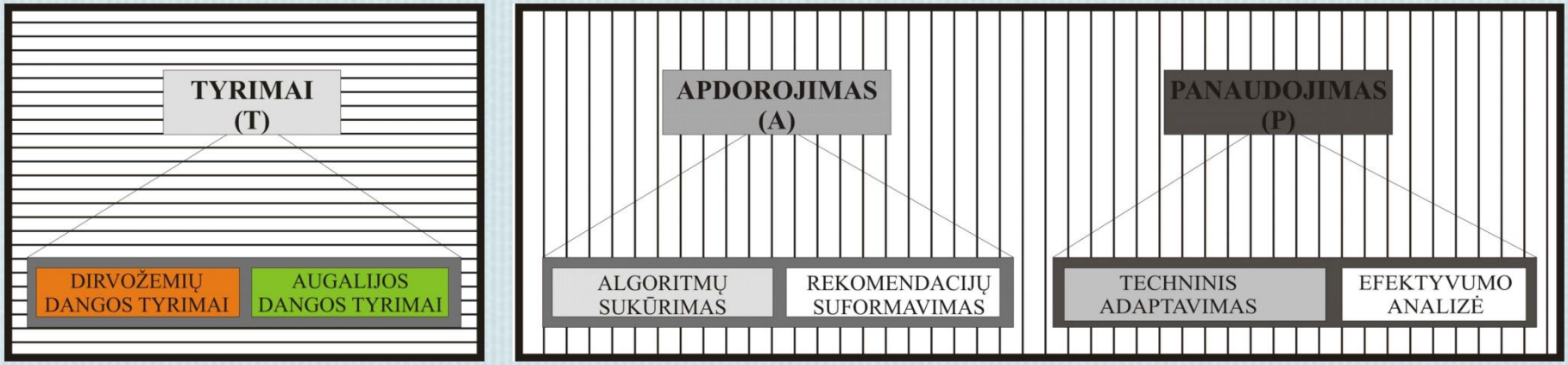
The main factors determining the research results:

Technical factors:
C1. Nature of the surface
C2. Surface stability

Meteorological factors:
D1. Windiness
D2. Cloudiness
D3. Precipitation

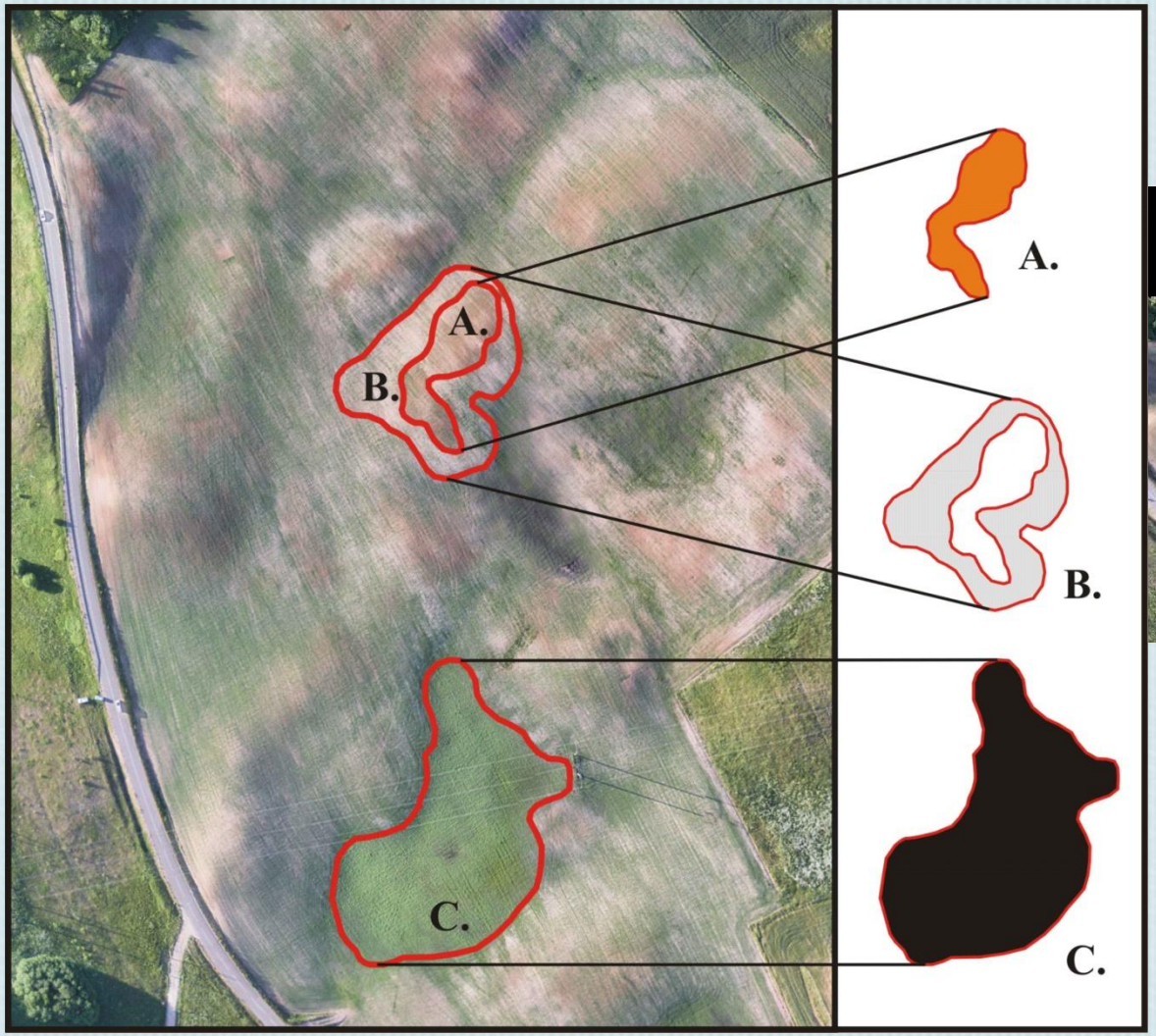
TERRESTRIAL ECOSYSTEMS

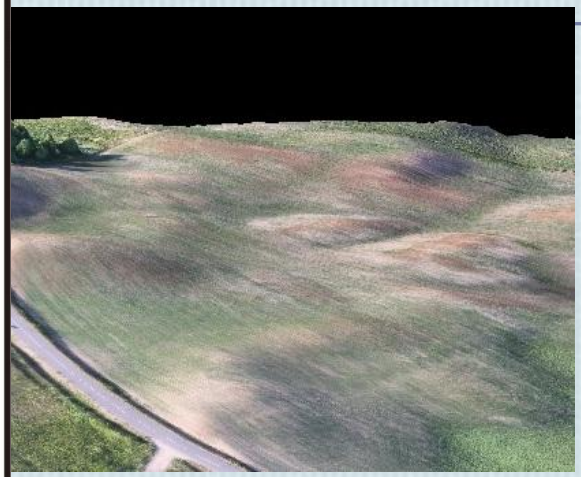
Theoretical model of the implementation of a precise agricultural system



Research (T)

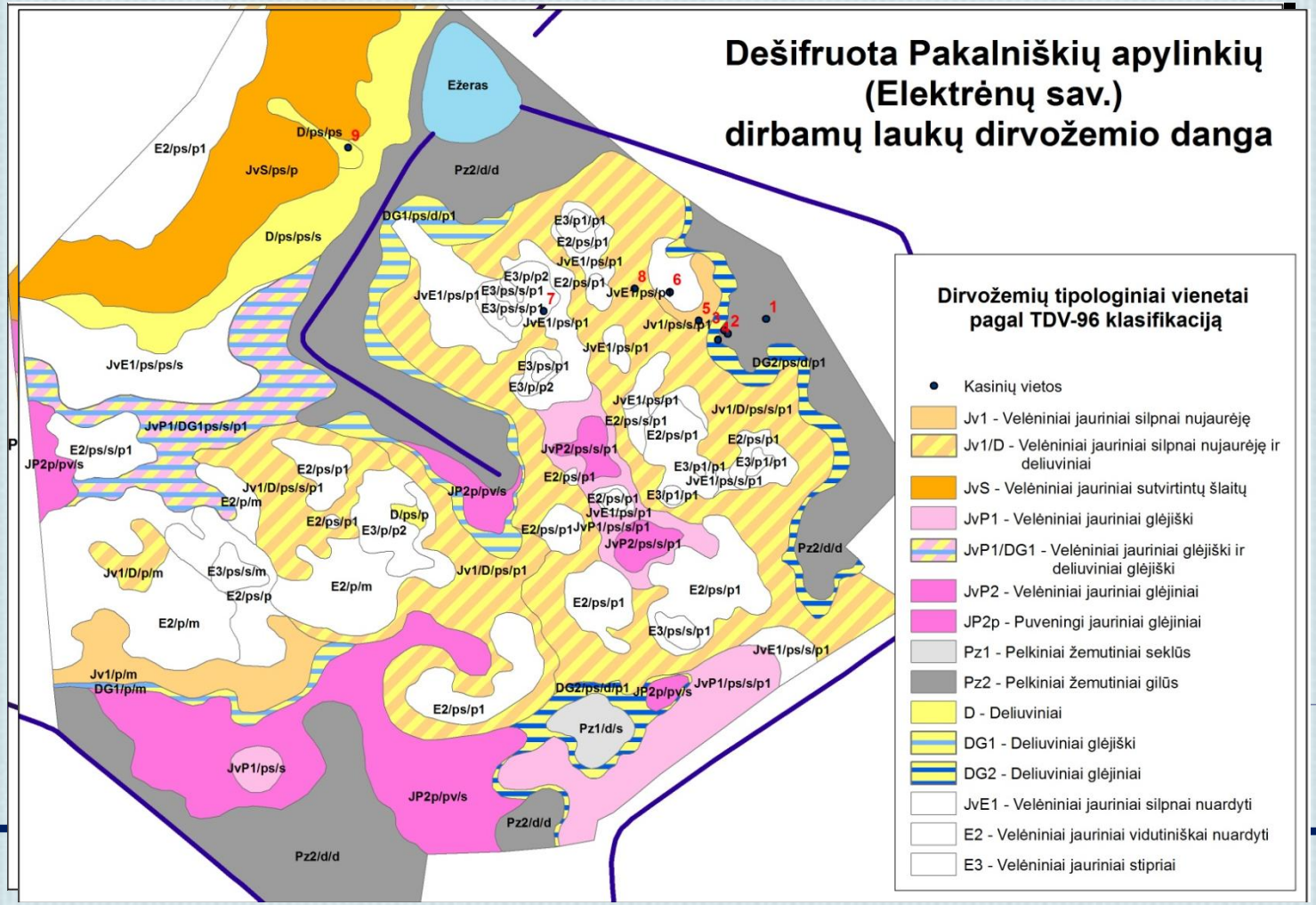
1. *Lack of accurate information on soil cover structure (lack of detailed soil mapping);*
2. *Lack of experience in remote sensing of soil physical and chemical properties;*
3. *Lack of experience in remote sensing of physical and chemical properties of crops.*





Solutions relevant to precision agriculture should be formed on the typological basis of soils, by analogy with forestry.

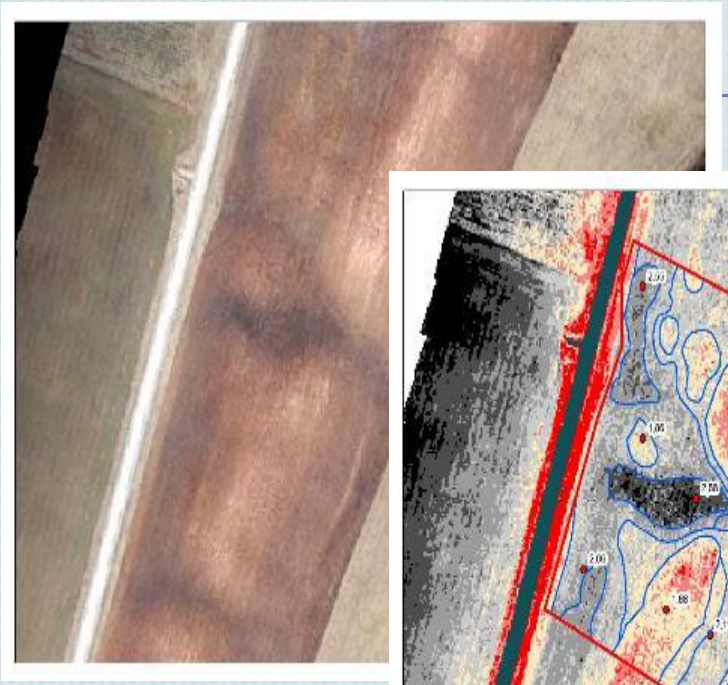
It is appropriate to consider as a territorial unit for the implementation of precision agricultural measures a soil facia (or landscape faction) with the same subsoil composition, physical and chemical conditions of soils, and whose reaction to the impact and tendencies of changes in properties are the same.



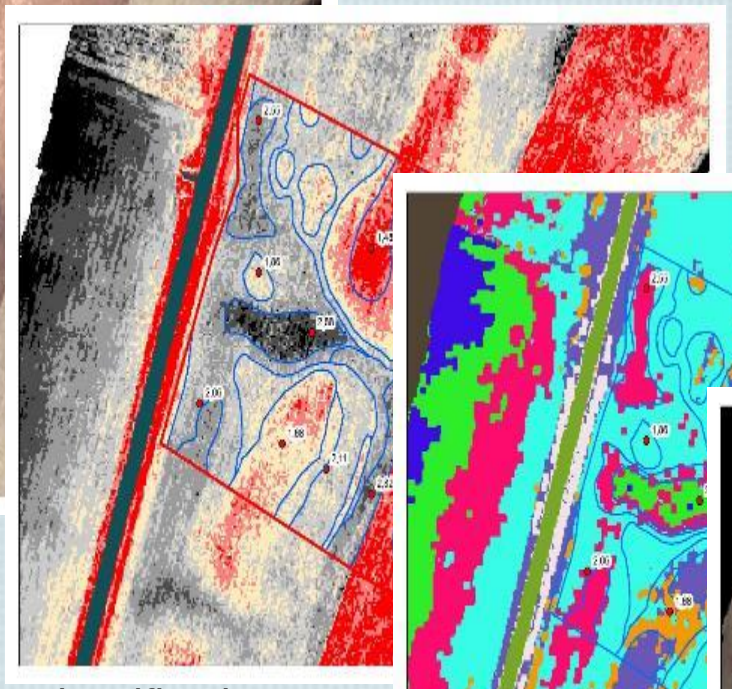
Volungevičius, Skorupskas, 2014

Example of detailed mounding of hilly terrain soils and its comparison with available data of state soil mapping.

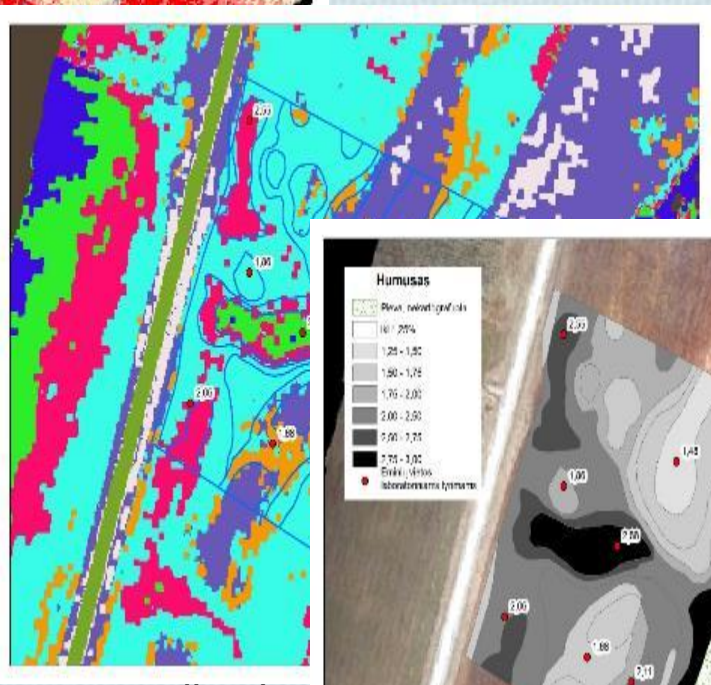
Isolation of qualitatively different soil areas



Raster



Classification

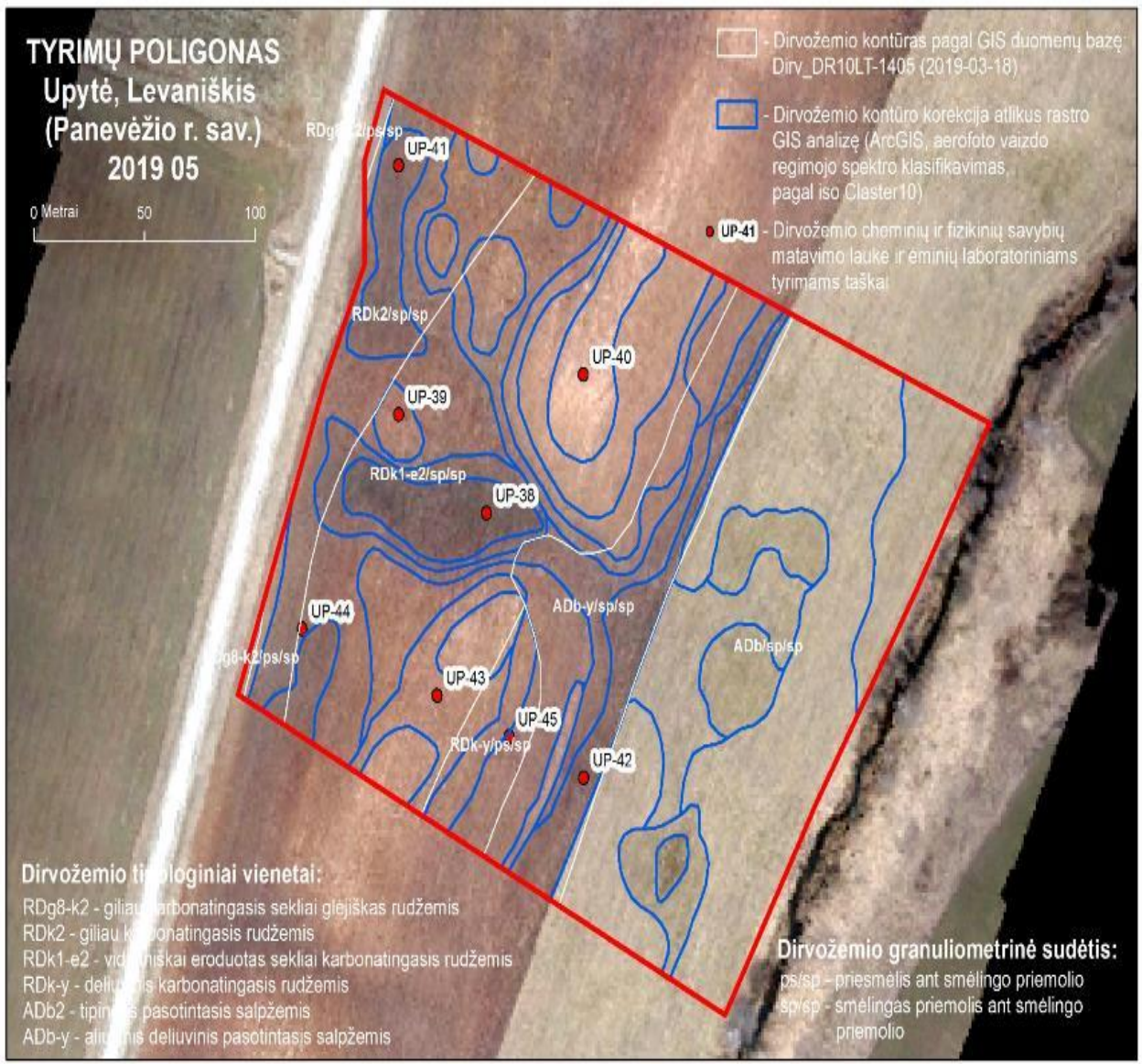


Generalization

Typing according to available data

The result is presented in the example of the humus content of the soil.

Volungevičius, Skorupskas, 2019



Volungevičius, Skorupskas, 2019

- Creation of a soil typological map:

- makes it possible to estimate soil productivity as accurately as possible;

- calculate humus stocks;

- to identify problem areas of eroded soils;

- Basis for more accurate calculations and more efficient business planning;

- draw up a plan for continuous and objective research / monitoring of soil conditions.

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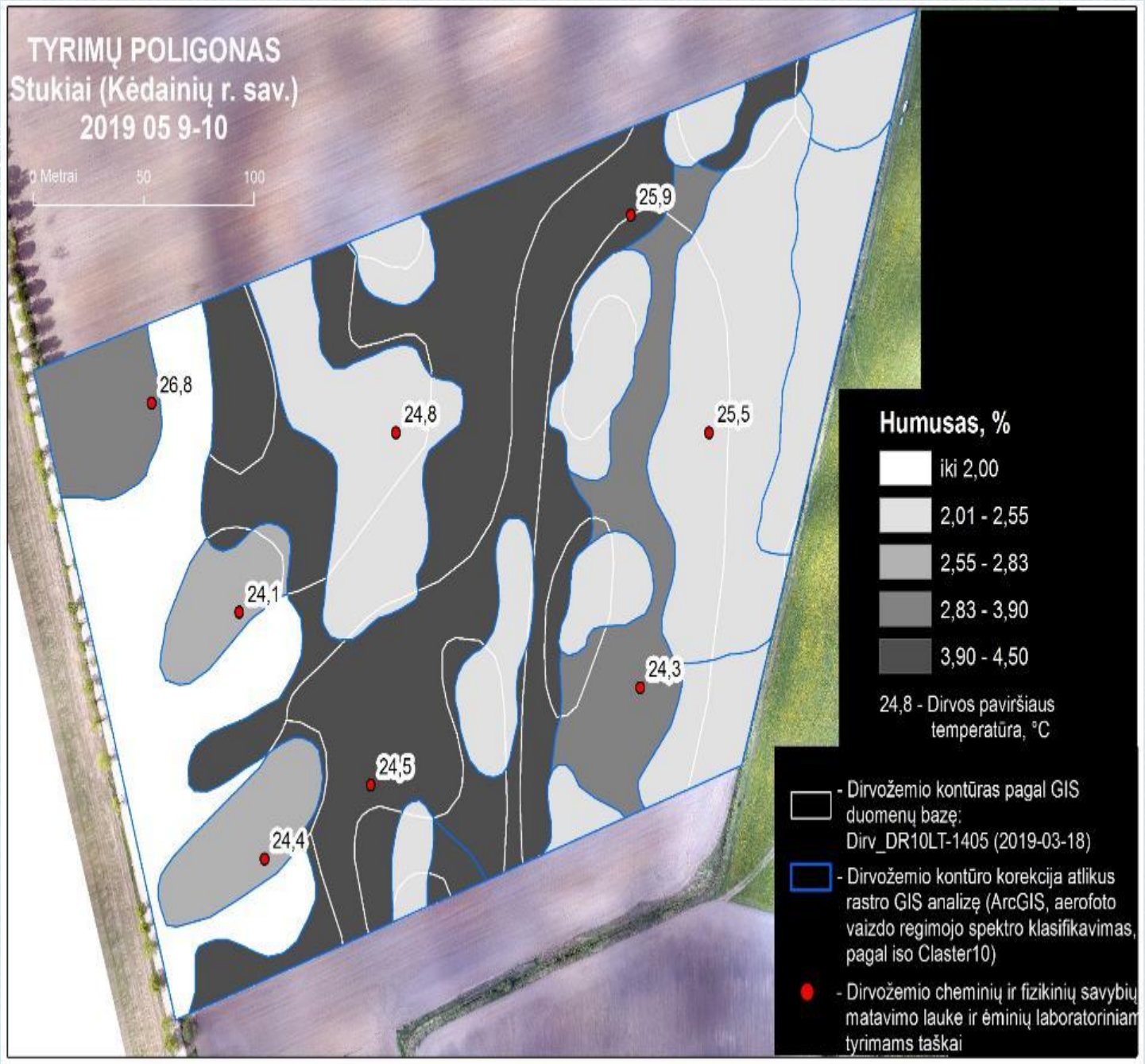
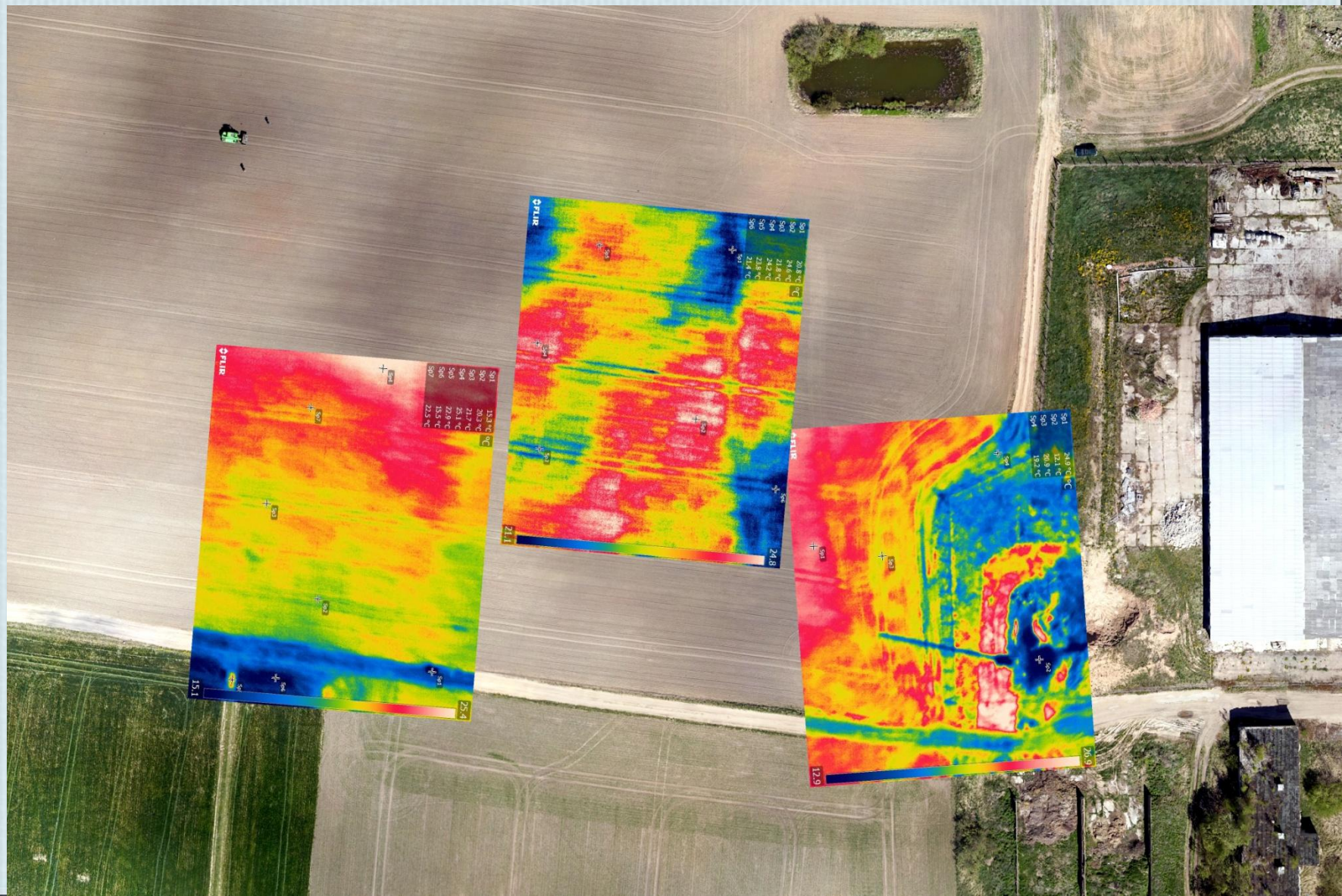
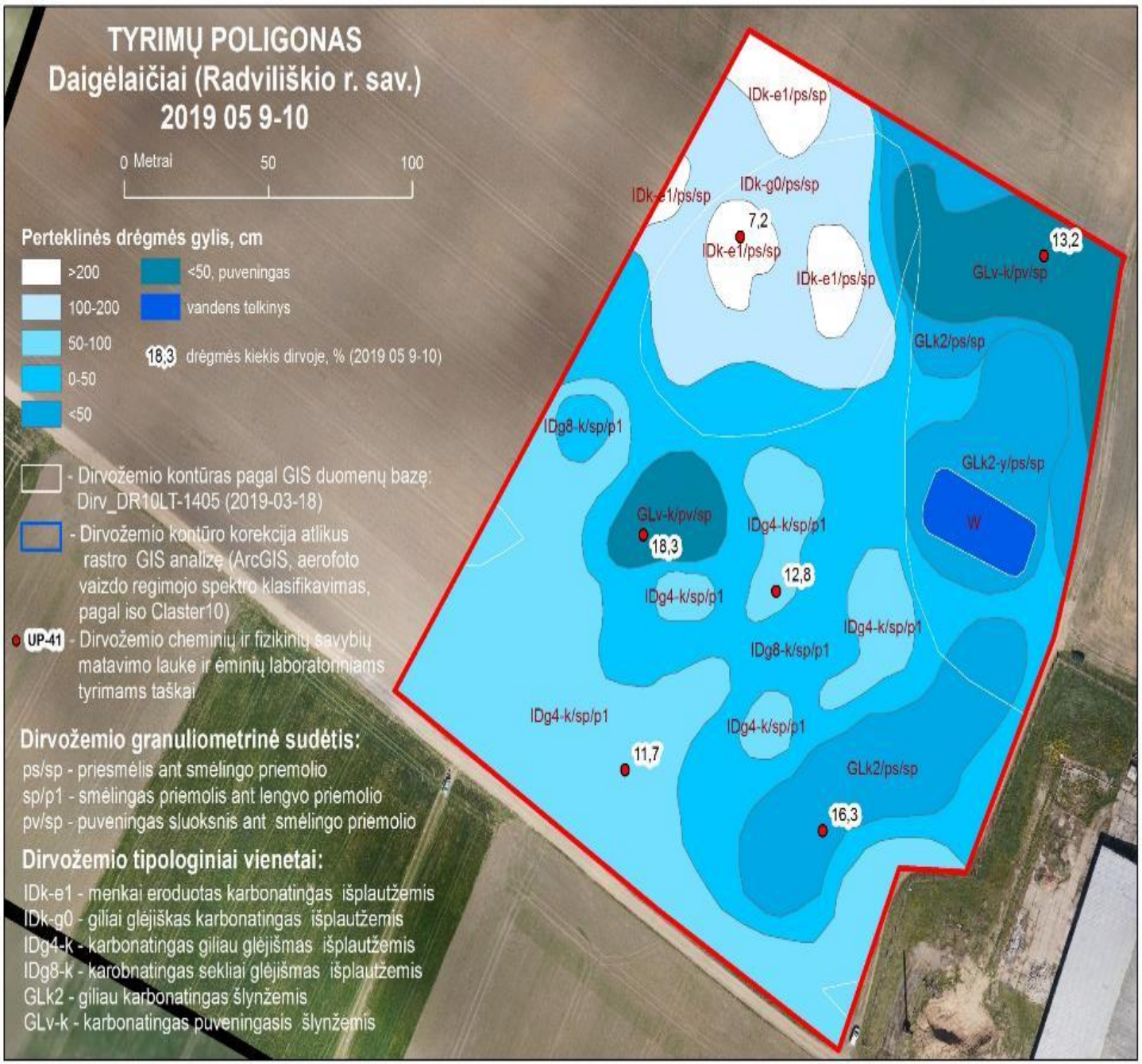


Soil typological mapping data are related to soil humus data

Volungevičius, Skorupskas, 2019

Assumptions of soil moisture research using thermal imaging cameras



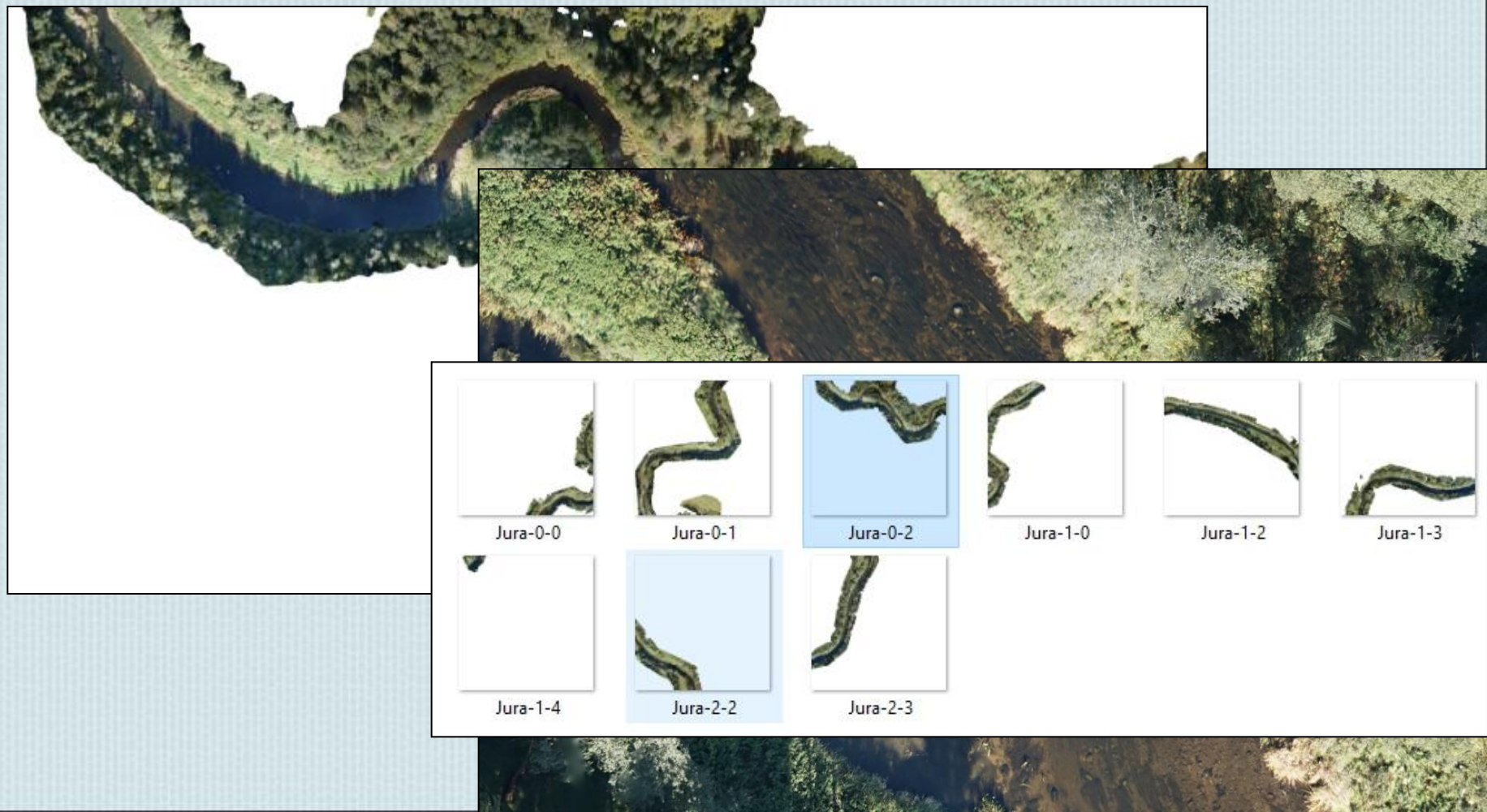


Soil typological mapping data are correlated with soil moisture data

Volungevičius, Skorupskas, 2019

AQUATIC ECOSYSTEMS

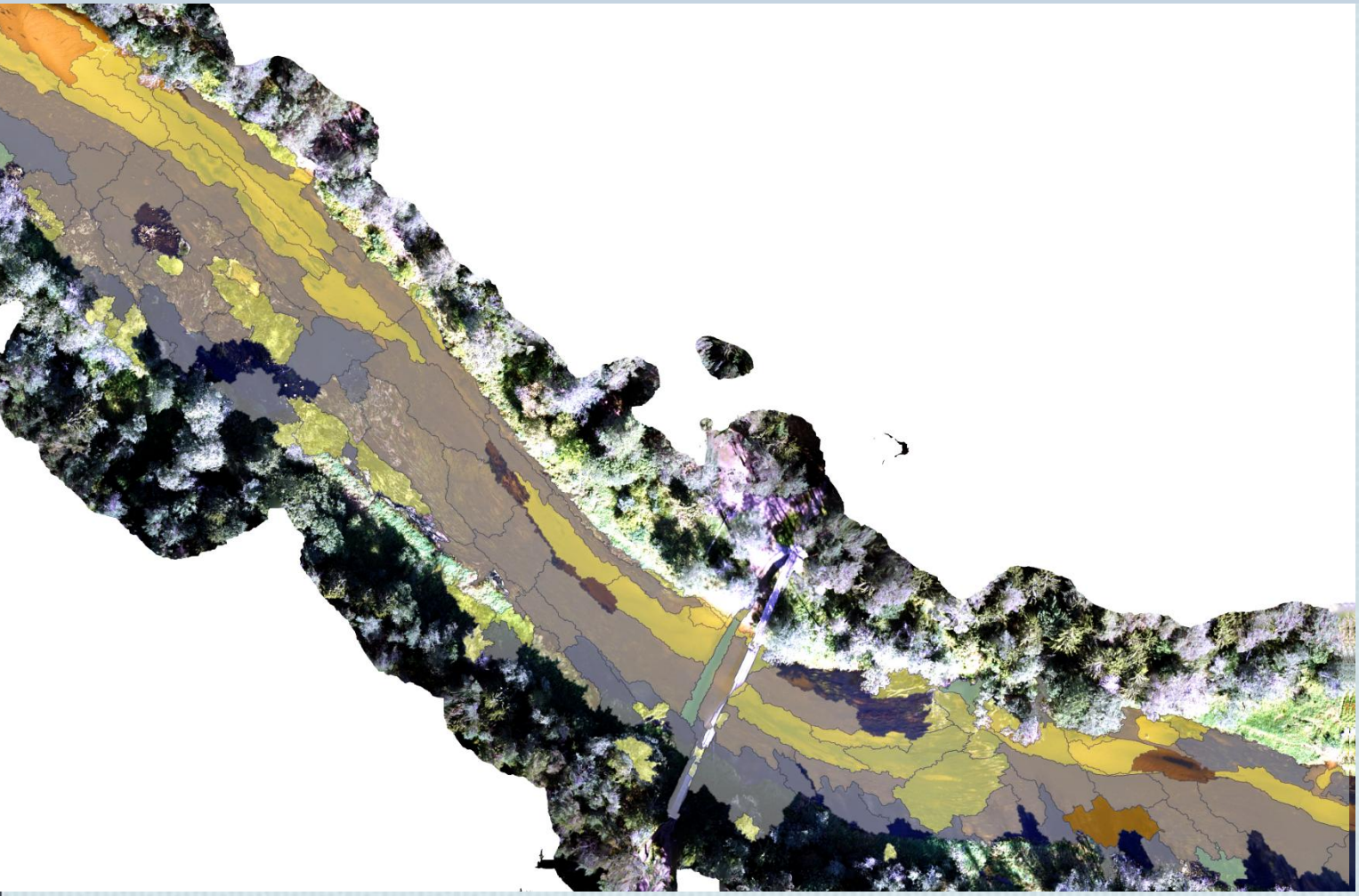
I Stage Preparation of aerial photograph material



II Stage Decoding and analysis of aerial material

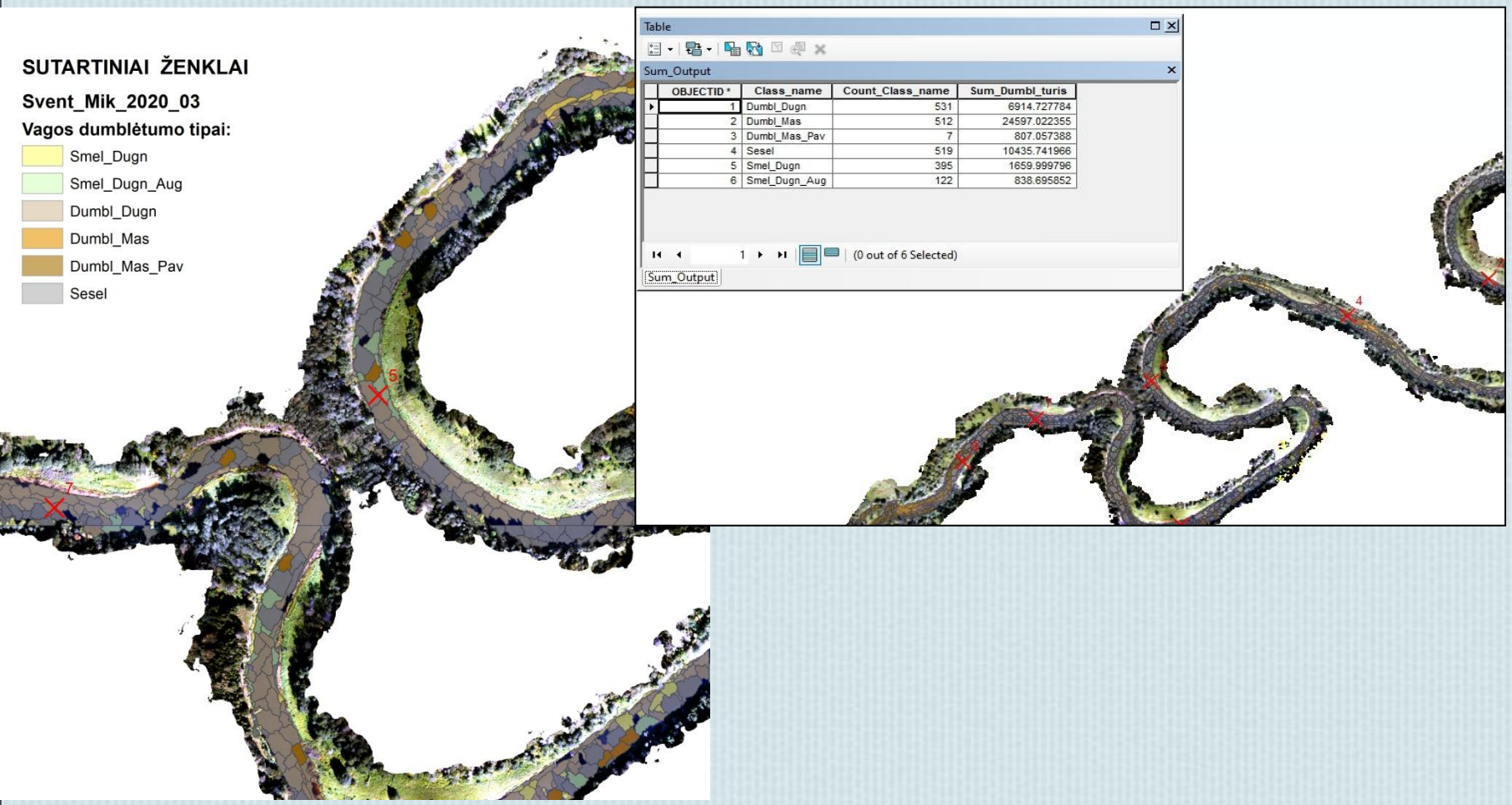
Segmentation and classification of riverbed according to bottom and surface properties:

A. Algae in water mass and surface;
B. Algae in the bottom and in the water mass;
C. Algae at the bottom;
D. Sandy bottom with single plants;
E. Sandy bottom.



Segmentation and classification of the Šventoji river bed (in the section Mikieriai - Andrioniškis) according to the nature of the bed bottom and surface.

III Stage Algae accounting and resource estimation

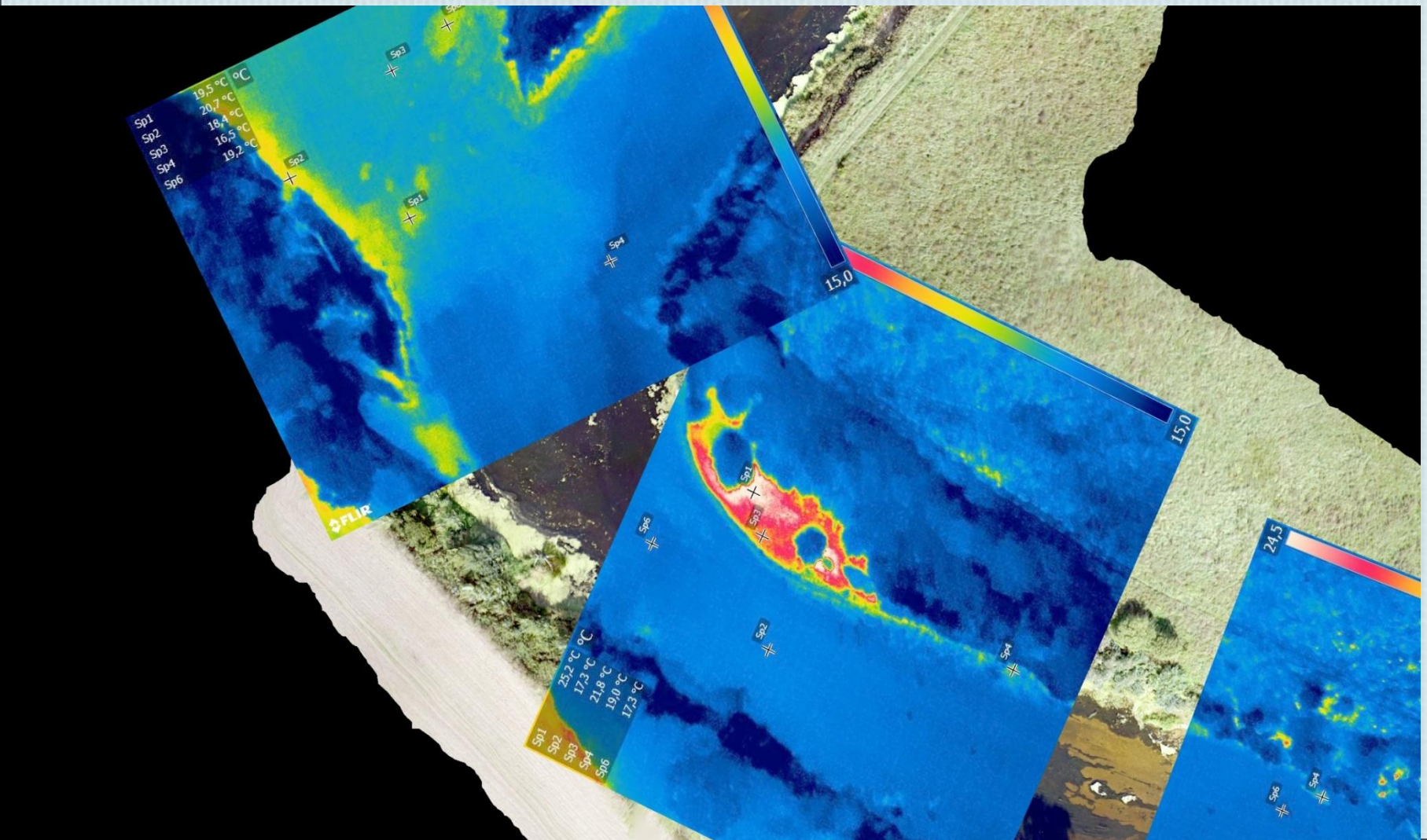


III Stage Algae accounting and resource estimation

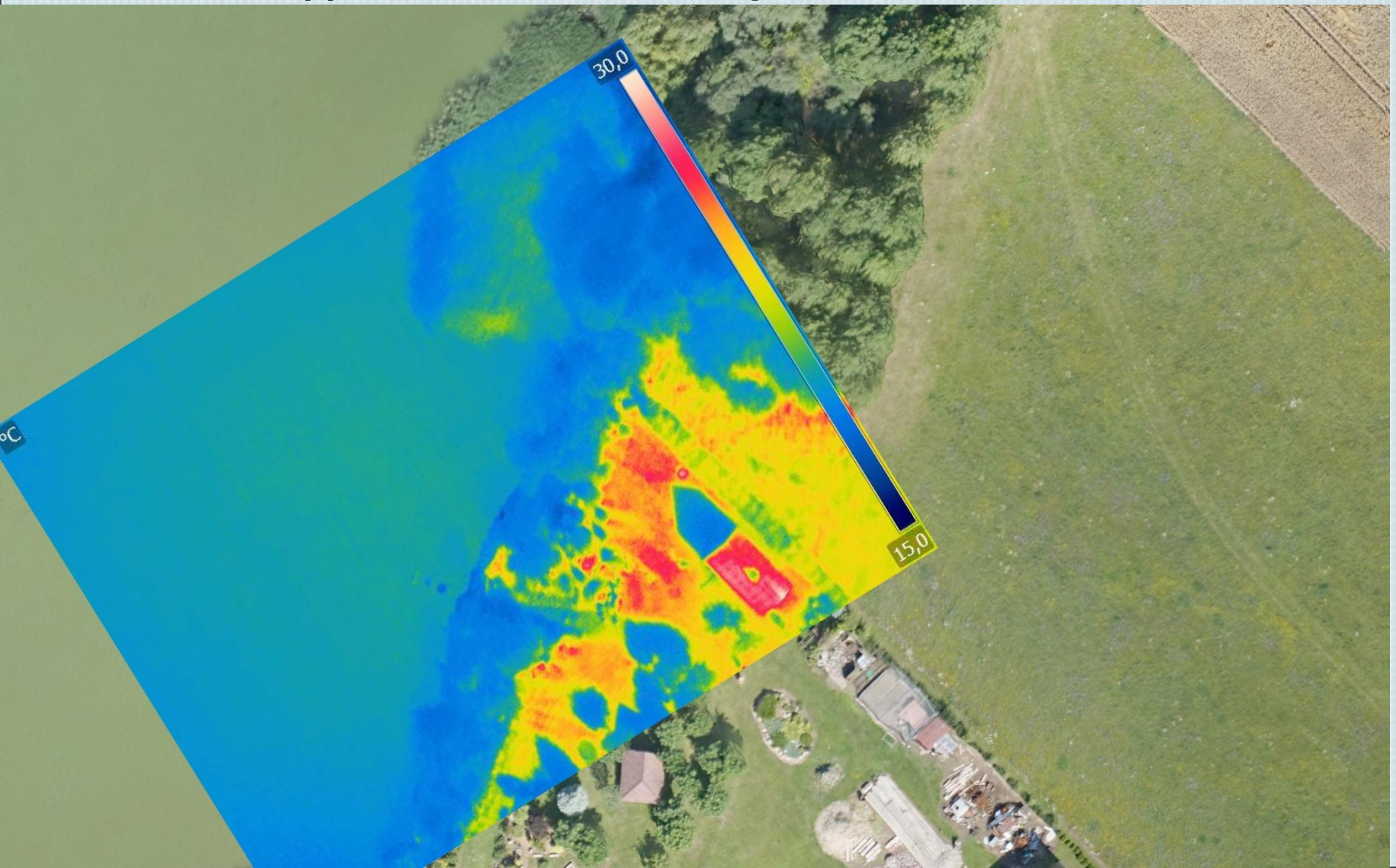
Distribution of areas and volumes of filamentous algae in the section of the Šventoji river (between Mikieriai and Andrioniškis) according to the nature of the river bed.

Vagos dugno tipai	Bendras tipui priskiriamų arealų plotas (ha)	Dugno tipo ploto dalis nuo viso tiriamo ploto (%)	Bendras tipui priskiriamų arealų dumblių tūris m^3	Tipo dalies tūris nuo viso tūrio
Dumbliai dugne	69,147	35,36	6914	16,17
Dumbliai vandens masėje	49,149	25,13	24597	57,53
Dumbliai vandens masėje ir paviršiuje	1,008	0,52	807	1,89
Smėlėtas dugnas	15,699	8,03	0	0
Smėlėtas dugnas su augalų intarpais	8,386	4,29	0	0
Šešeliuoti plotai	52,178	26,68	10435	24,41
VISO	**195,567**	**100**	**42753**	**100**

Possibilities of application of additional algal resource identification methods



Possibilities of application of additional algal resource identification methods



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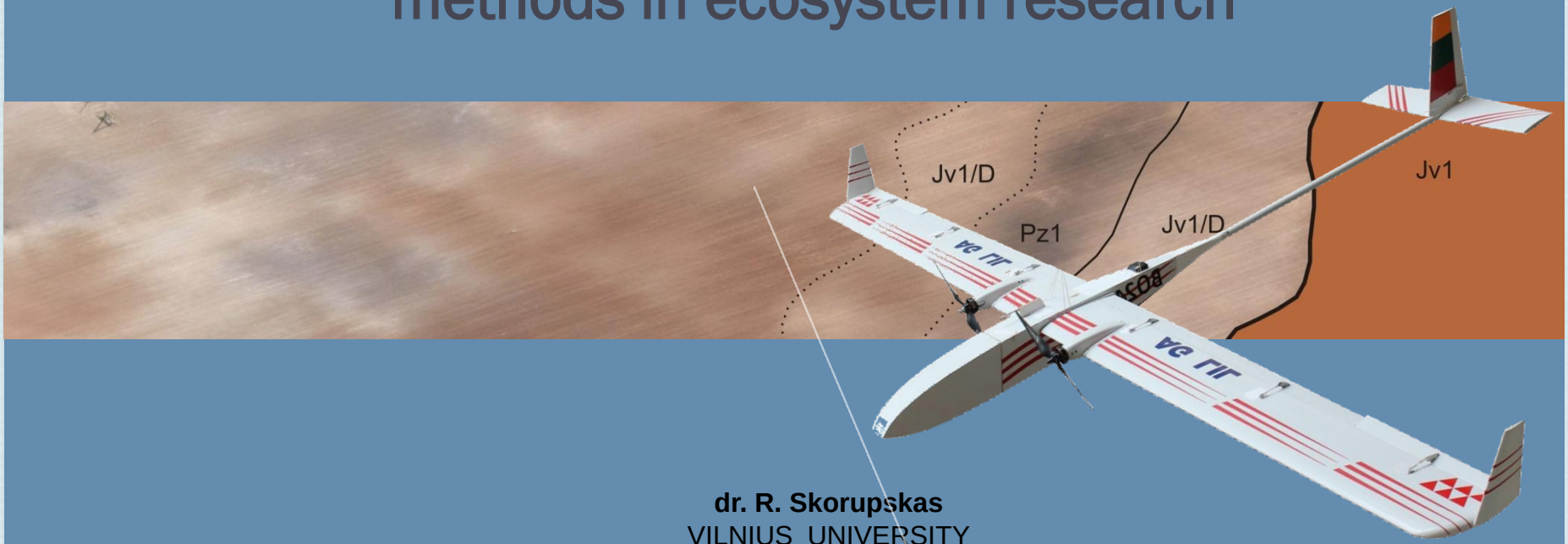

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