USAMVB Timisoara
"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH IN APPLIED LIFE SCIENCES"
27 November 2020
"Young people and multidisciplinary research in applied life sciences"

IDENTIFICATION AND ANALYSIS BY GRADIENT OF GRASSLANDS FROM THE ALMĂJULUI MOUNTAINS

Margareta MĂGUREANU , Loredana COPĂCEAN, Luminiţa COJOCARIU

Banat University of Agricultural Sciences and Veterinary Medicine "Regele Mihai I al României" from Timişoara, 119 Calea Aradului, 300645 Timişoara
Corresponding author: lorecopacean@yahoo.com

Abstract.

In Banat Montains, the grasslands have a significant influence, on the one hand by the size of the surfaces and implicitly the weight in the structure of the land fund, and on the other hand, by the role they have in the regional economy. Through classical working methods, locating and mapping grassland areas is a complicated process, requiring very large human and time resources, but supplemented by geomatic methods, which offers the possibility of a computerized and "remote" territorial analysis using geospatial data, simplifies this process and further provides significantly superior results. In this context, the purpose of this study can be divided into two research directions: on the one hand, the identification and location of grasslands areas in the Almajului Mountains, and on the other hand, their analysis on the altitudinal gradient, with direct and indirect implications on genesis and evolution of grassland areas. To achieve the objectives of the study, techniques and methods specific to the GIS environment and implicitly geospatial data sets were used. The identification and location of the grasslands surfaces was done by processing the Corine Land Cover database, 2018 edition, and the analysis of the relief of the area, by processing the Digital Elevation Model. The analysis of the grasslands on altitudinal gradient resulted from the spatial, statistical "crossings" between the grassland surfaces and the altitude map. The researches showed that the grasslands are distributed in all subzones of the considered area, an area of great physical-geographical complexity, which also determines differentiations in the structure of the vegetal cover and implicitly in the typology of the grasslands. The gradient analysis showed a slightly higher percentage of grasslands in the hill area (approx. 43%), between 301 - 600 m. The use of geomatic techniques in the analysis of pastoral space allowed both the identification and spatial location of grassland areas, as well and their complex analysis in correlation with relief factors. Therefore, the approach of the grasslands through the GIS technique allows the analysis of discrete processes, difficult to quantify by classical methods.

Keywords: grasslands, location, quantification, analysis, geomatics.

INTRODUCTION

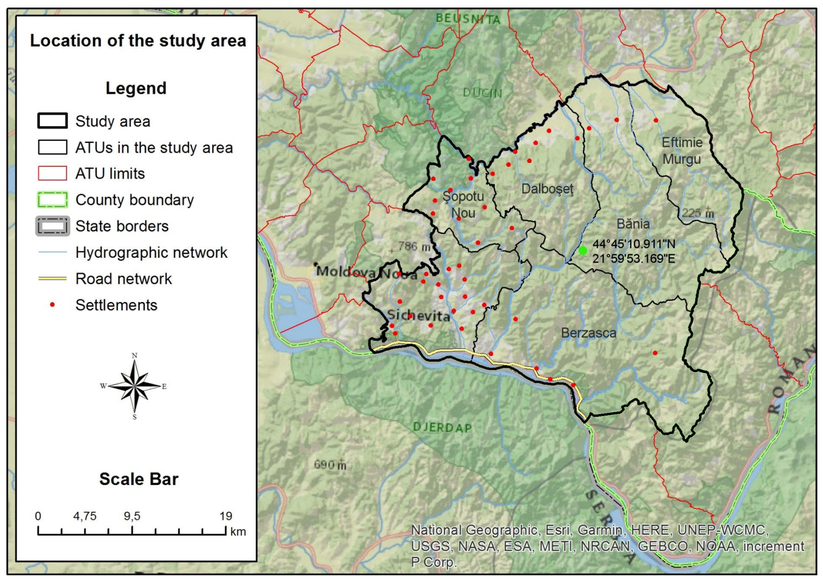
Given, on the one hand, the large territorial expansion and the low degree of accessibility of mountain areas, and on the other hand the total or partial lack of cartographic materials and cadastral documents, locating and mapping grassland areas is a difficult process that requires very large human and time resources. To remove this impediment, classical pratological and cadastral research can be supplemented by geomatic methods, which offer the possibility of a computerized and "remote" territorial analysis by using geospatial data, which means saving human resources and time but also the superiority of results, both as a way of representation and in terms of consistency of analysis, by the number of variables involved and the technique of interpretation.

By combining pratological research with geospatial methods and data, the present study pursues two major objectives: on the one hand, the identification and location of grassland areas in the Almajului Mountains, and on the other hand, their analysis on the altitudinal gradient, in correlation with the conditions of relief, this being the determining factor, directly and/or indirectly, regarding the composition and structure of the vegetal cover of the meadows

MATERIAL AND METHODS

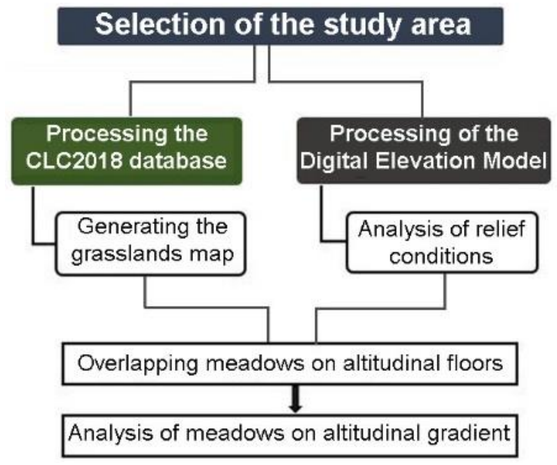
Study area

From an administrative point of view, the grasslands that are the object of this study are located within six administrative-territorial units (ATU): Eftimie Murgu, Bănia, Dalboşeţ, Şopotu Nou, Sicheviţa and Berzasca. The total area of the study area is 85837.70 ha.



Research methodology

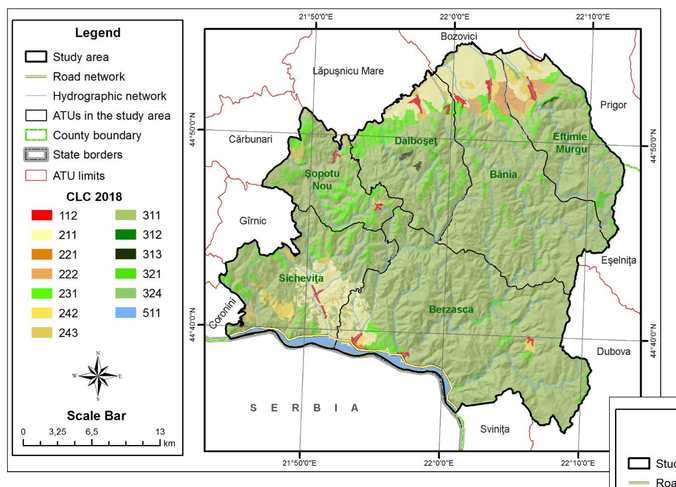
The research presented in this study was performed in two main stages, according to the general objectives, divided into several sub-stages.



To identify the land used as grasslands, the 2018 Corine Land Cover geospatial database was used, in vectorial format. By overlapping with the area of interest, in the GIS environment, the map of the land use/coverage was obtained, as well as the map of the distribution of the grassland surfaces. For the grouping and characterization of the grasslands according to the altitudinal gradient, statistical analysis and multilayer analysis were applied.

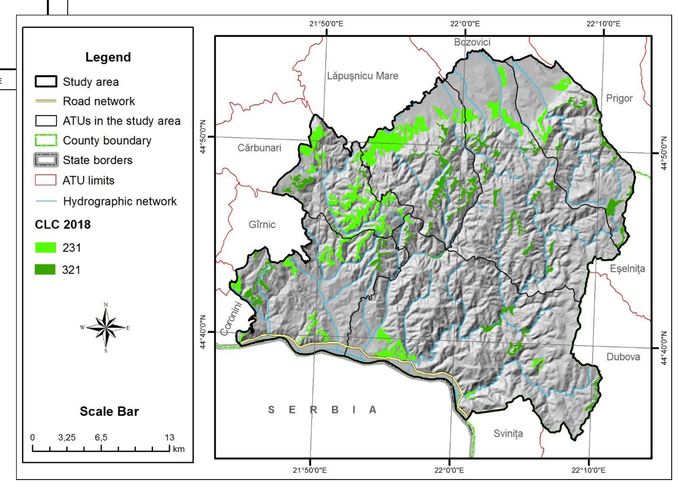
RESULTS AND DISCUSSIONS

Identification and location of grassland areas

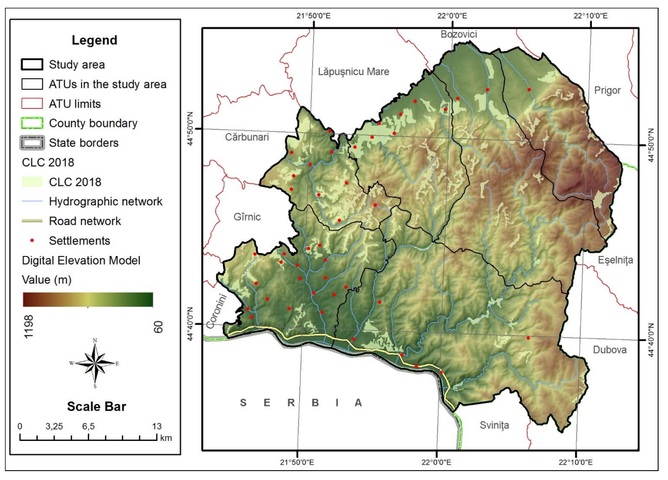


CLC 2018 Code	Legend code*	Land use/land coverage	Surface (ha)
112		Discontinuous urban fabric	622,64
211		Non-irrigated arable land	7365,28
221		Vineyards	50,01
222		Fruit trees and berry plantations	858,74
231		**Pastures**	**4587,22**
242		Complex cultivation patterns	1368,26
243		Land by agriculture, with natural vegetation	1575,51
311		Broad-leaved forest	64529,86
312		Coniferous forest	40,85
313		Mixed forest	96,51
321		**Natural grasslands**	**2861,09**
324		Transitional woodland-shrub	486,82

As a share in the structure of the land fund of the study area, the grasslands (pastures and natural grasslands) represent approx. 9%, the largest areas being located in areas with low altitudes in depressions.



Physical-geographical context and analysis on altitudinal gradient

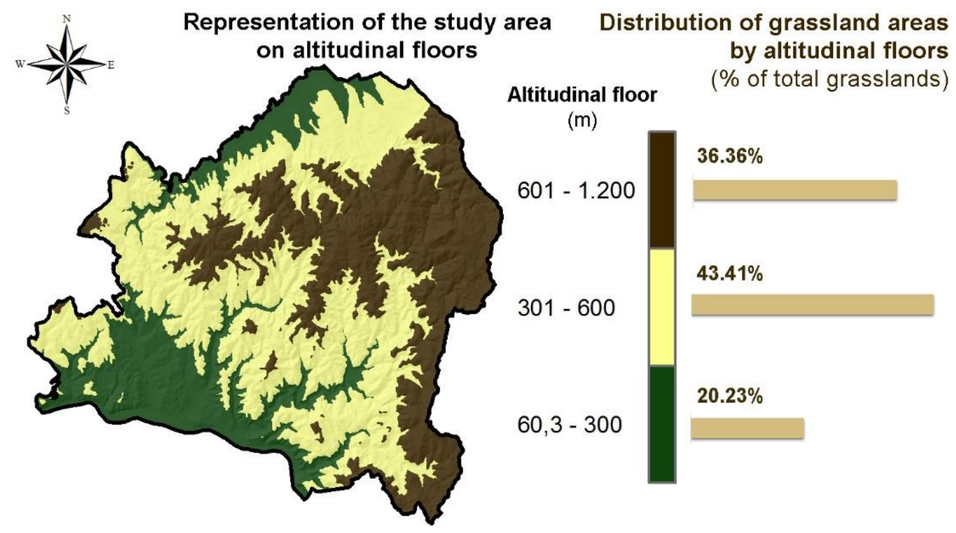


The study area extends over an altitudinal range between 60 - 1198 m (so with the amplitude of the relief of 1138 m), which suggests the complexity of environmental conditions (relief, temperatures, precipitation, soils), which it is also reflected on the vegetal cover and implicitly on the typology of the grasslands.

For a detailed analysis of the relationship between grassland and altitude, we proceeded to the spatial "crossing" of the data (*Tabulate Area* function), through which the grassland entities were "fixed" on predetermined altitude levels.

The grasslands have a differentiated distribution:

- in the low areas, under 300 m from the south and northwest of the territory (Danube Gorge and Nera's meadow), are located approx. 20% of the grassland areas, with specific characteristics of these areas;
- in the altitudinal interval 301 - 600 m, corresponding to the hill areas (the slopes of the depressions and the peaks that make the transition to the mountain area), are located approx. 43% of the grasslands of the study area; at the specified altitudes, they constitute one of the most important categories of land use;
- in the submountain and mountain floor, at altitudes over 600 m, are approx. 36% of the grasslands of the study area, generally as small areas, insular, inside the forests.



CONCLUSIONS

Due to the physical-geographical complexity of the area, the grasslands have distinct spatial characteristics and "behaviors" from one subregion to another, both in terms of occupied areas and typology.

The grassland surfaces, regardless of the exploitation mode, are located in all the subzones of the researched territory, a slightly higher percentage returning to the hill areas, with altitudes between 301-600 m.

The use of geomatic techniques in the analysis of the pastoral space allowed both the identification and spatial location of the grassland surfaces, as well as their complex analysis in correlation with the relief factors. Therefore, the approach of the grasslands through the GIS technique allows the analysis of discrete processes, difficult to quantify by classical methods.