Universitatea Ştefan cel Mare Suceava
Facultatea de SILVICULTURĂ

Identifying and mapping of vegetation forest disturbances on frame successions of Landsat type

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1. The starting point

- Satellite images are used for a short time compared with terrestrial and air means to investigate terestrial ecosystems.

- Developments in technology and the climate change debate have imposed a focus on research related to the status of forest structure based on modern satellite recordings and the improvement and diversification of satellite data sensors

2. Research objectives

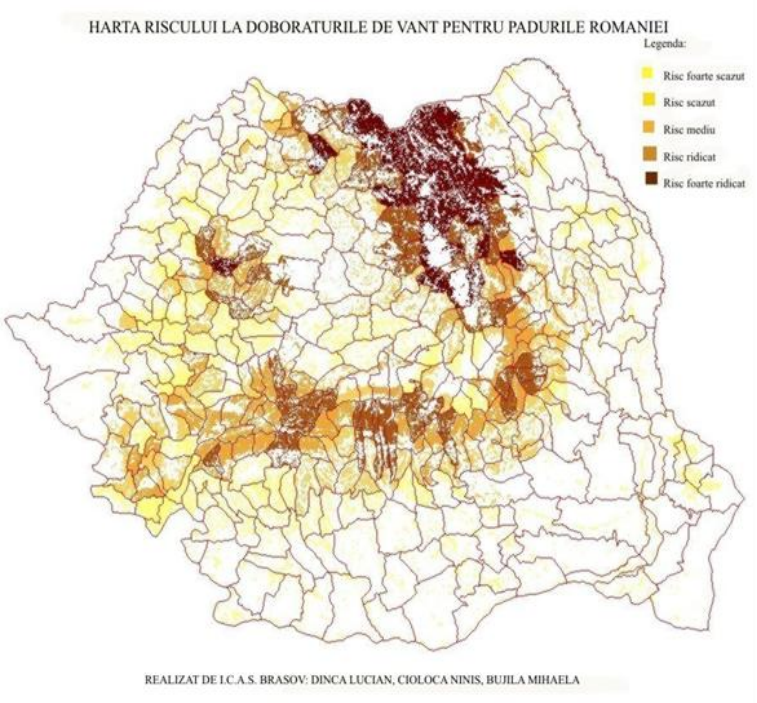
The aim of the research is to identify the usability of the LANDSAT satellite images of medium resolution in the identification and mapping of forest vegetation disturbances.

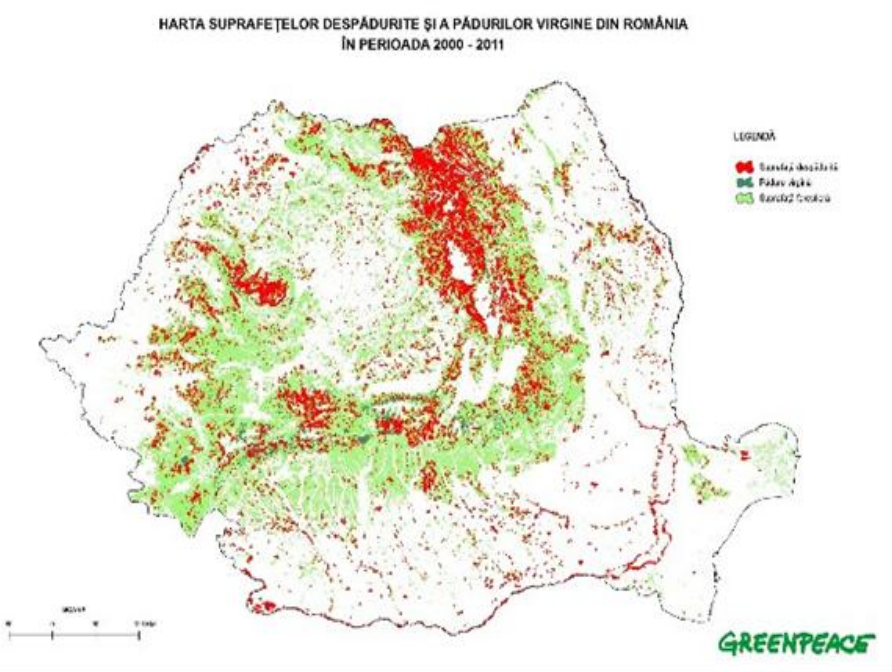
Objectives:

- O1: Highlight areas covered by forest vegetation by application of vegetation indeces and the *tasseled cap* transformation;
- O2: Vegetation mapping by the Landsat images classification;
- O3: Determination of areas disturbed by comparing forest classified images.

3. Relevance of the study

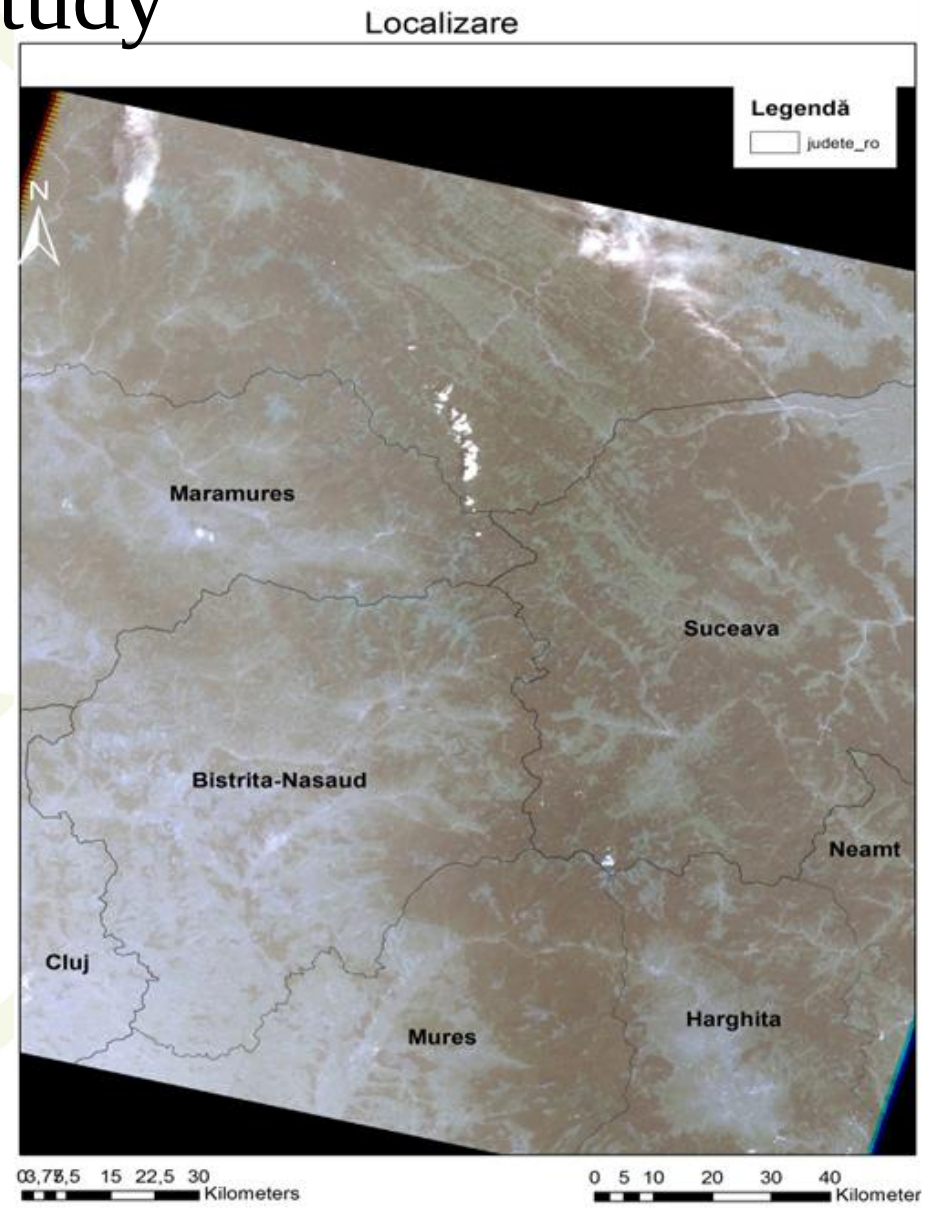
Forest disturbances may be classified into three major categories: abiotic disturbance (storms, land slides, volcanoes, droughts and floods), biota disturbance (insects, diseases, and invasive plants), and fire (a blend of abiotic disturbance and biota).





4.Geographical location of the area taken in study

The test compound is represented by the northern Carpathians and overlap on boundaries of a LANDSAT scenes taken from the internet free archive



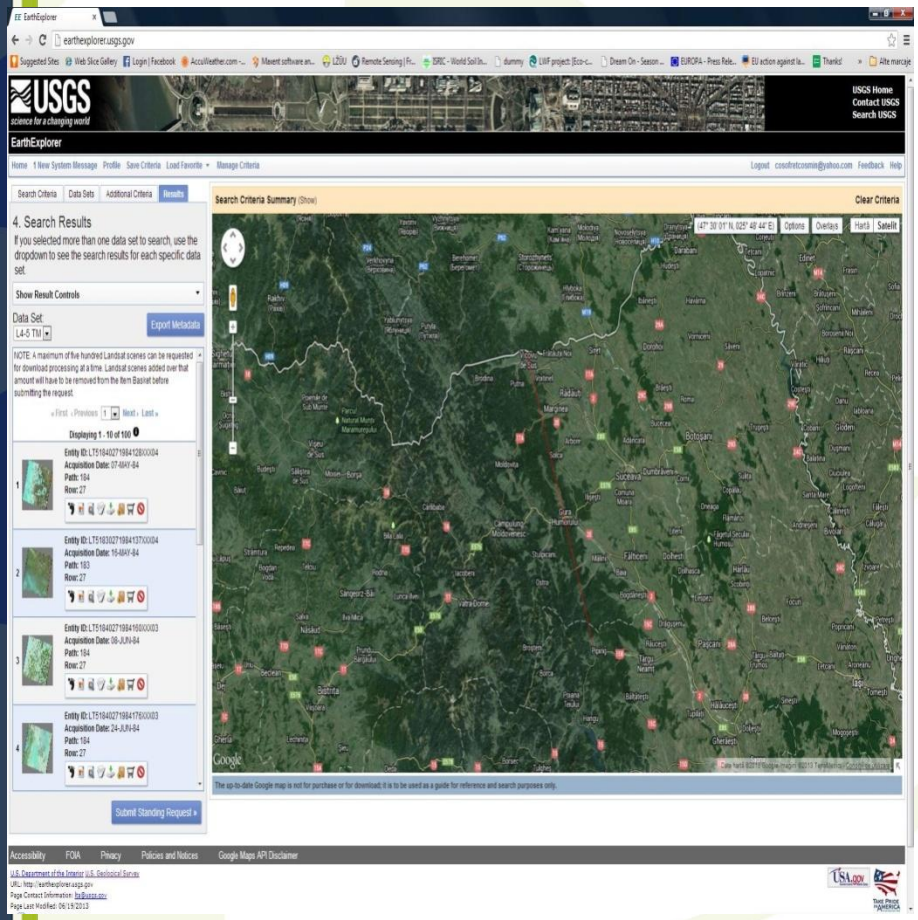
5.Equipments

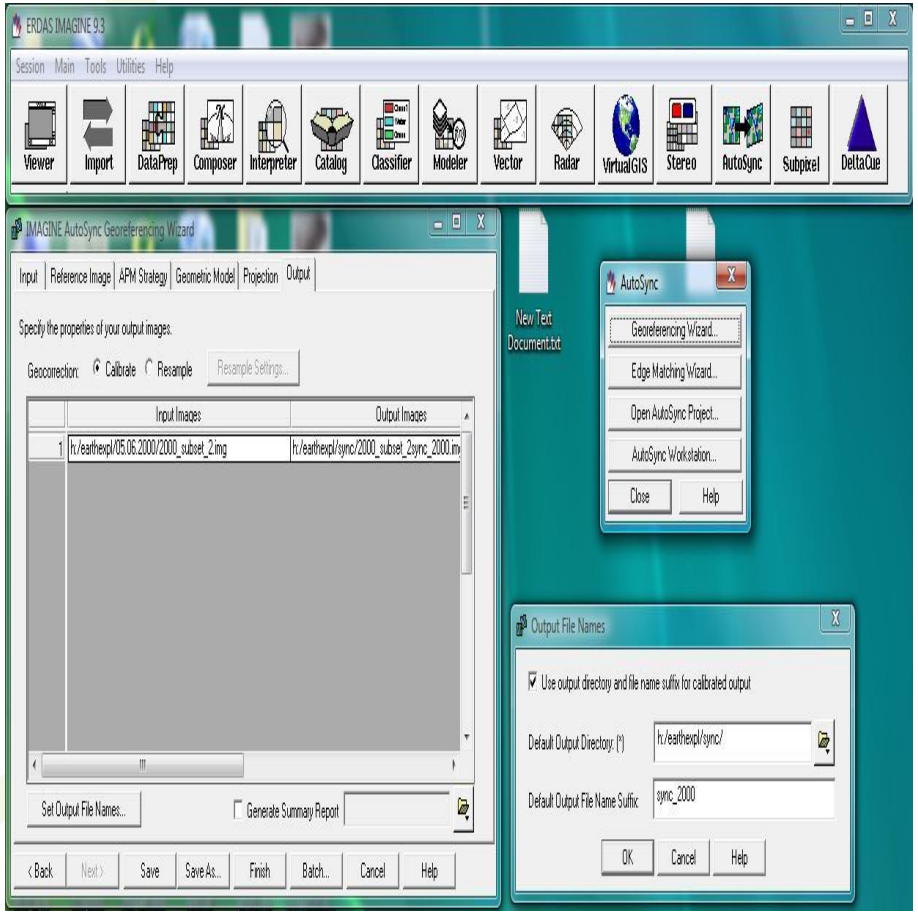
Nr. Crt.	Imagine type	Year number	Layout number	Proceeding entry	Resolution	Orbit	Stage coverage	Covered area
1	Landsat 5 TM	1977	5	multispectral	30x30	183/27	Frame	N-ul Carpatilor Orientali
2	Landsat 5 TM	23.10. 1984	7	multispectral	30x30 120x120 (T)	183/27	frame	N-ul Carpatilor Orientali
3	Landsat 5 TM	Sept 1986	7	Multispectral	30x30 120x120 (T)	183/27	Frame	N-ul Carpatilor Orientali
4	Landsat 5 TM	08.07. 1989	7	Multispectral	30x30 120x120 (T)	183/27	Frame	N-ul Carpatilor Orientali
5	Landsat 5 TM	18.08. 1989	7	multispectral	30x30	183/27	frame	N-ul Carpatilor Orientali
6	Landsat 7 ETM+	05.06. 2000	8 1	Multispectral pancromatic	30x30 15x15 60x60 (T)	183/27	frame	N-ul Carpatilor Orientali
7	Landsat 7 ETM+	17.07. 2001	8 1	Multispectral pancromatic	30x30 15x15 60x60 (T)	183/27	frame	N-ul Carpatilor Orientali
8	Landsat 7 ETM+	4th July 2002	8 1	Multispectral Pancromatic	30x30 15x15 60x60 (T)	183/27	frame	N-ul Carpatilor Orientali

6. Methodology

www.earthexplorer.usgs.gov

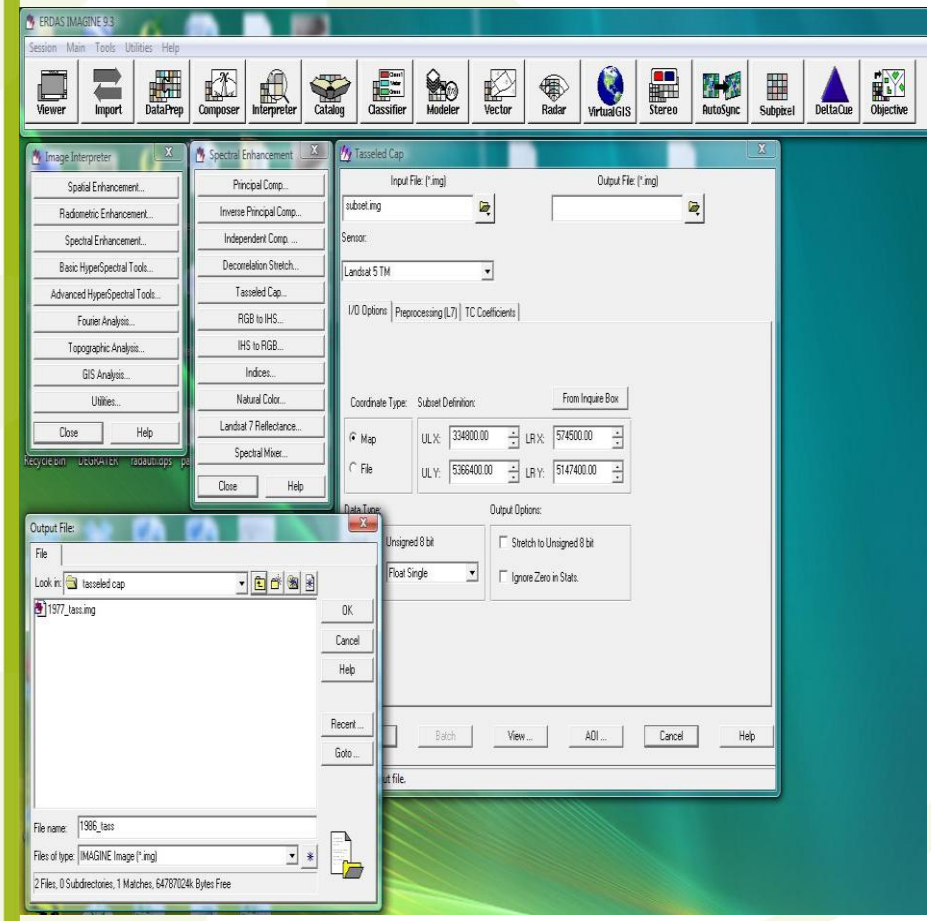
Imagine Autosync



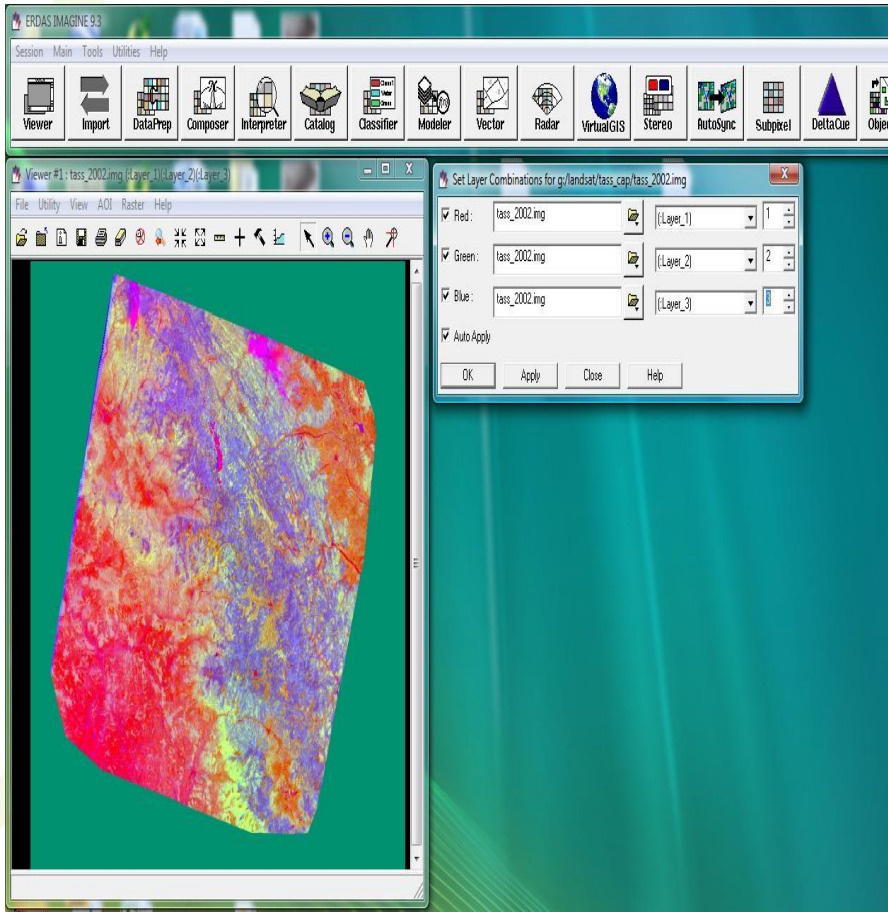


6. Methodology

„tasseled cap” change-over



RGB 123 mixture



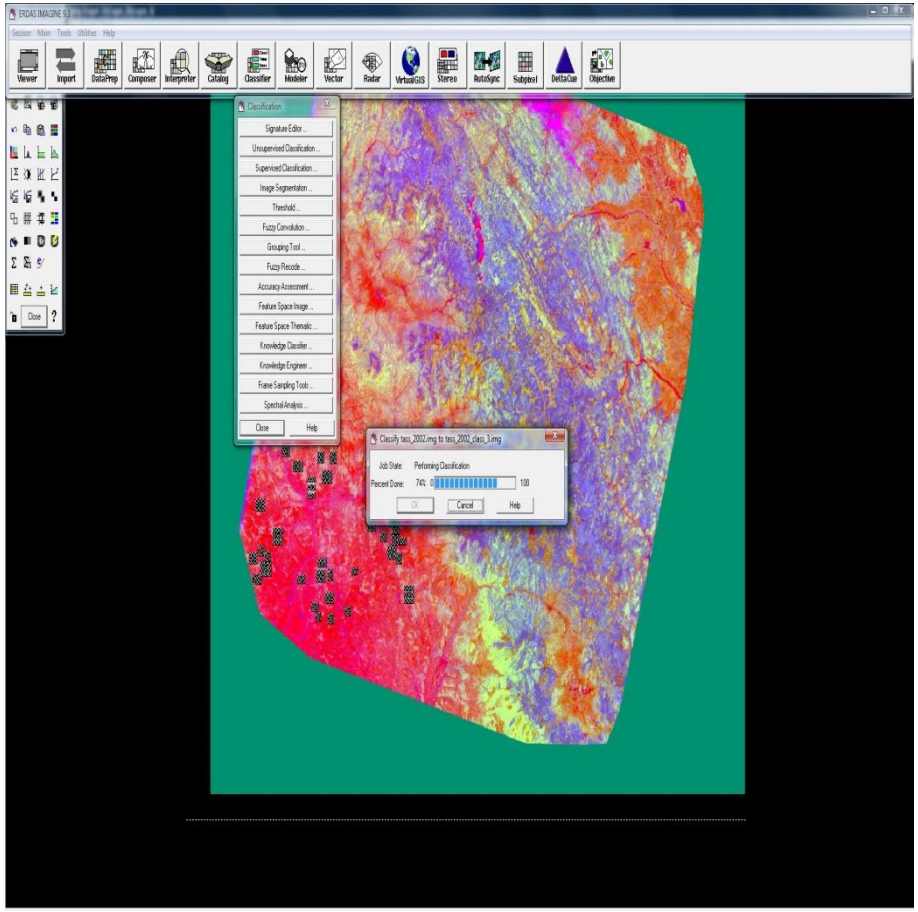
6. Methodology

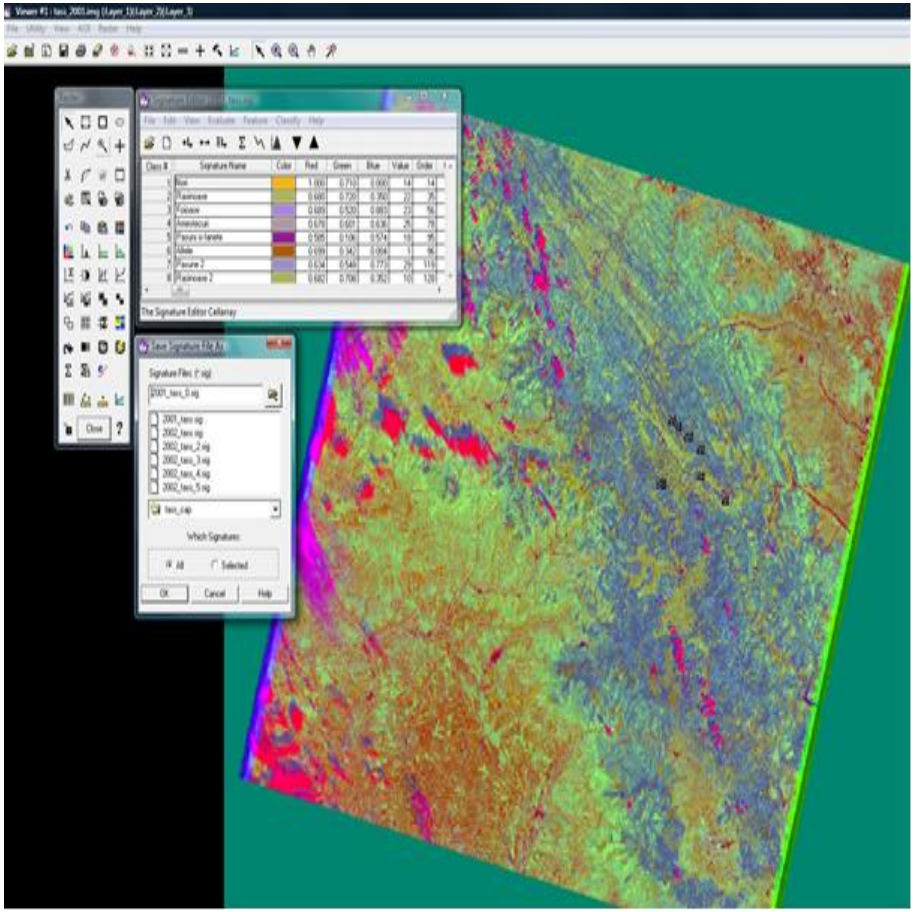
Supervised classification

1. Maximum likelihood method

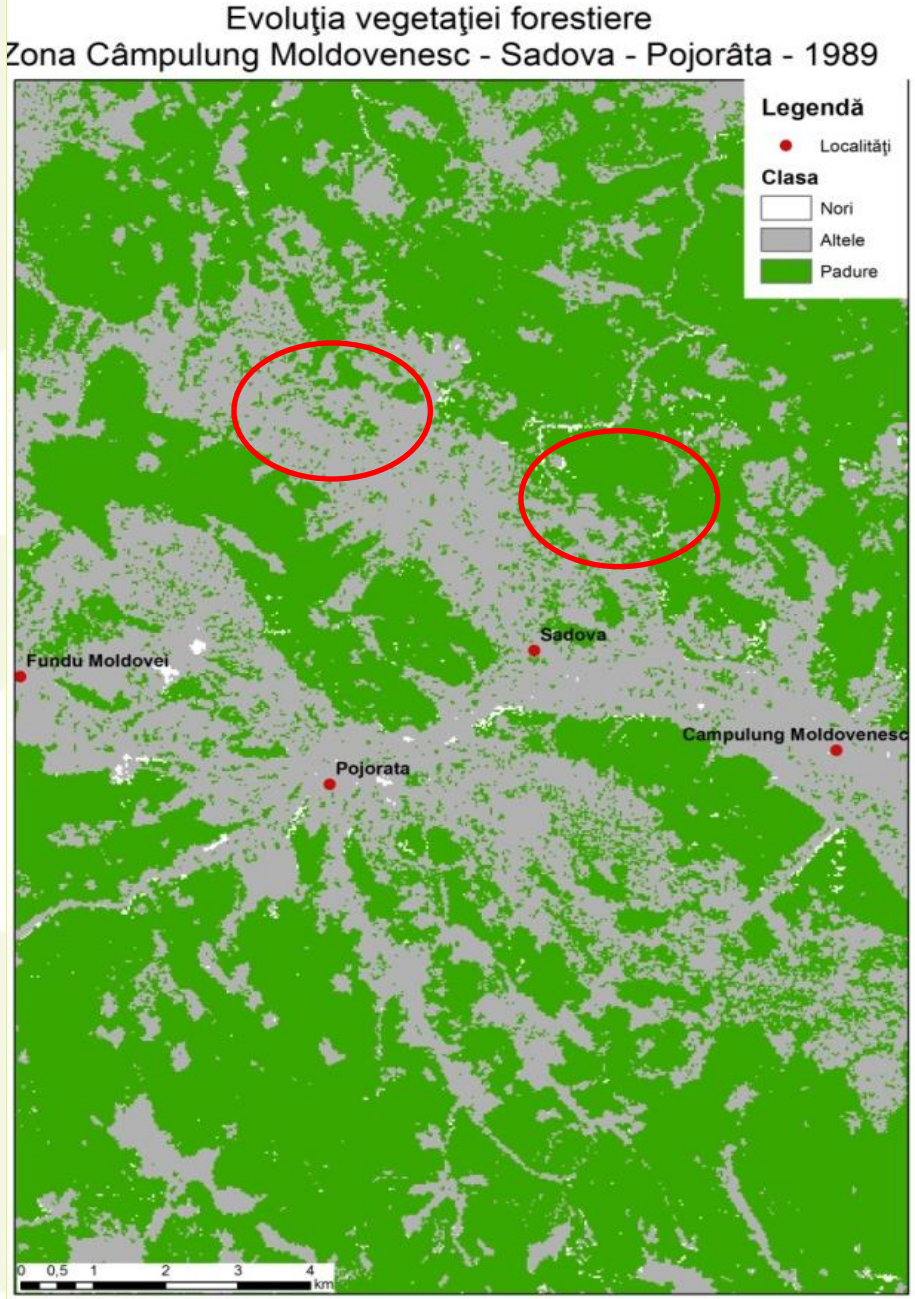
2. The minimum distance from the average

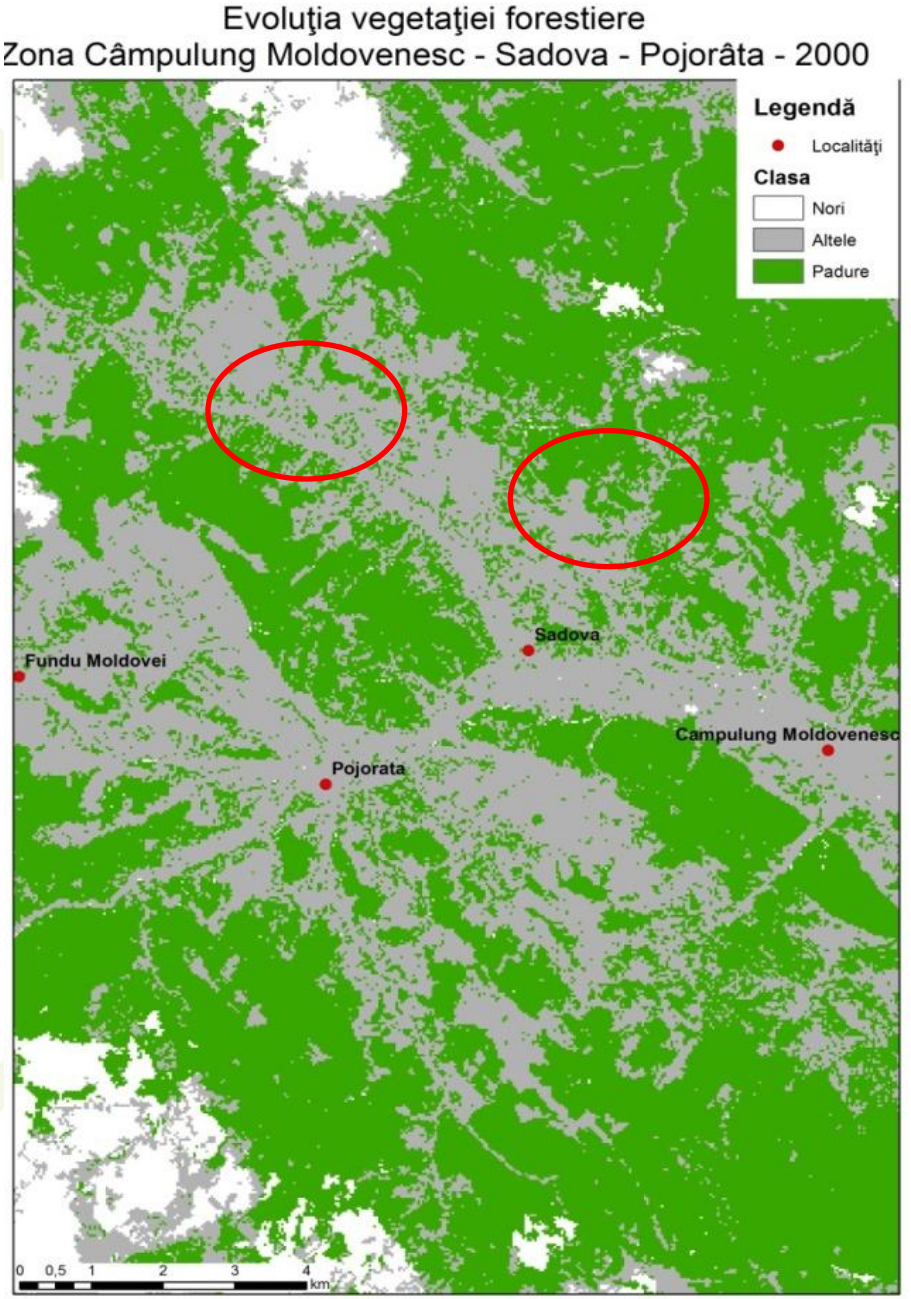
Spectral signatures



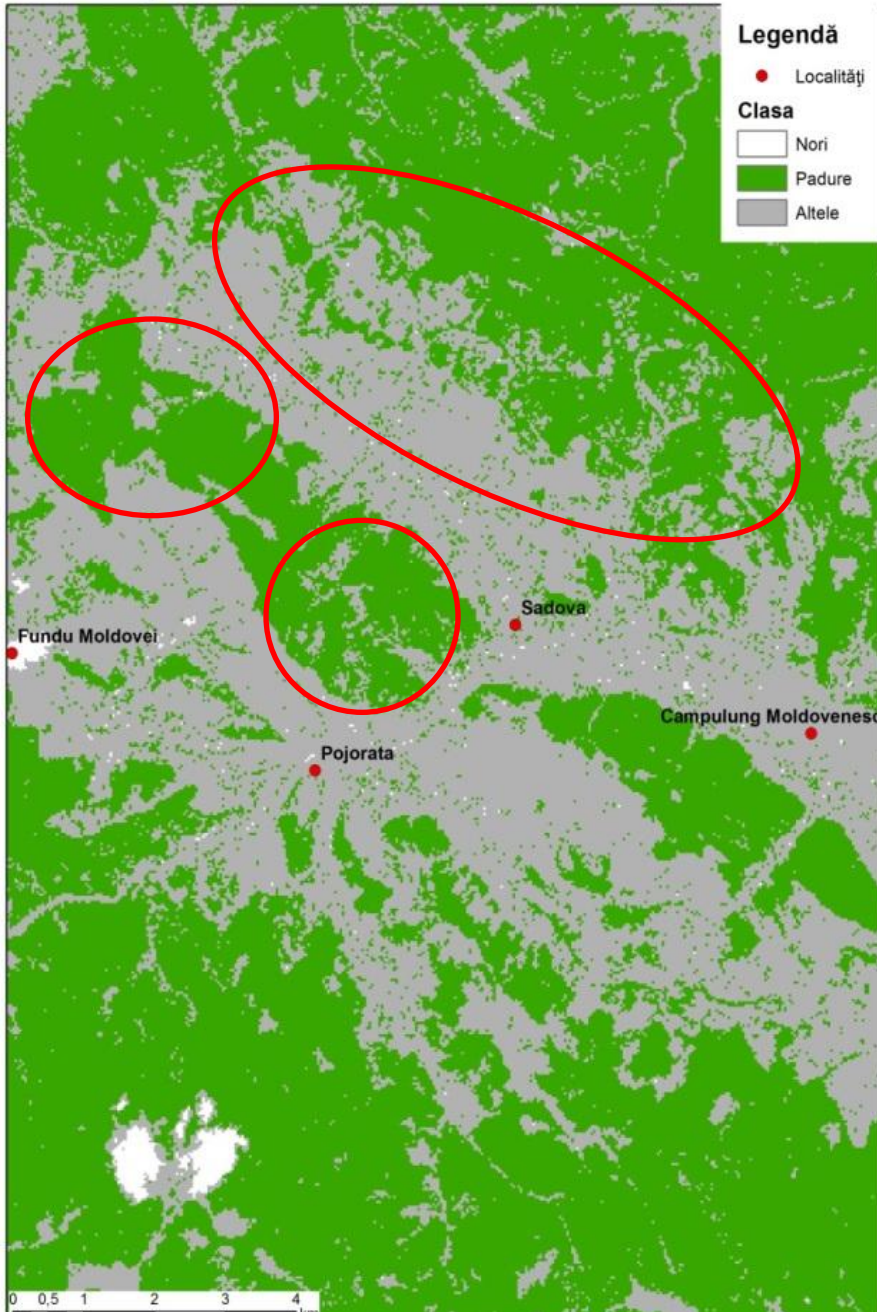


7. Results

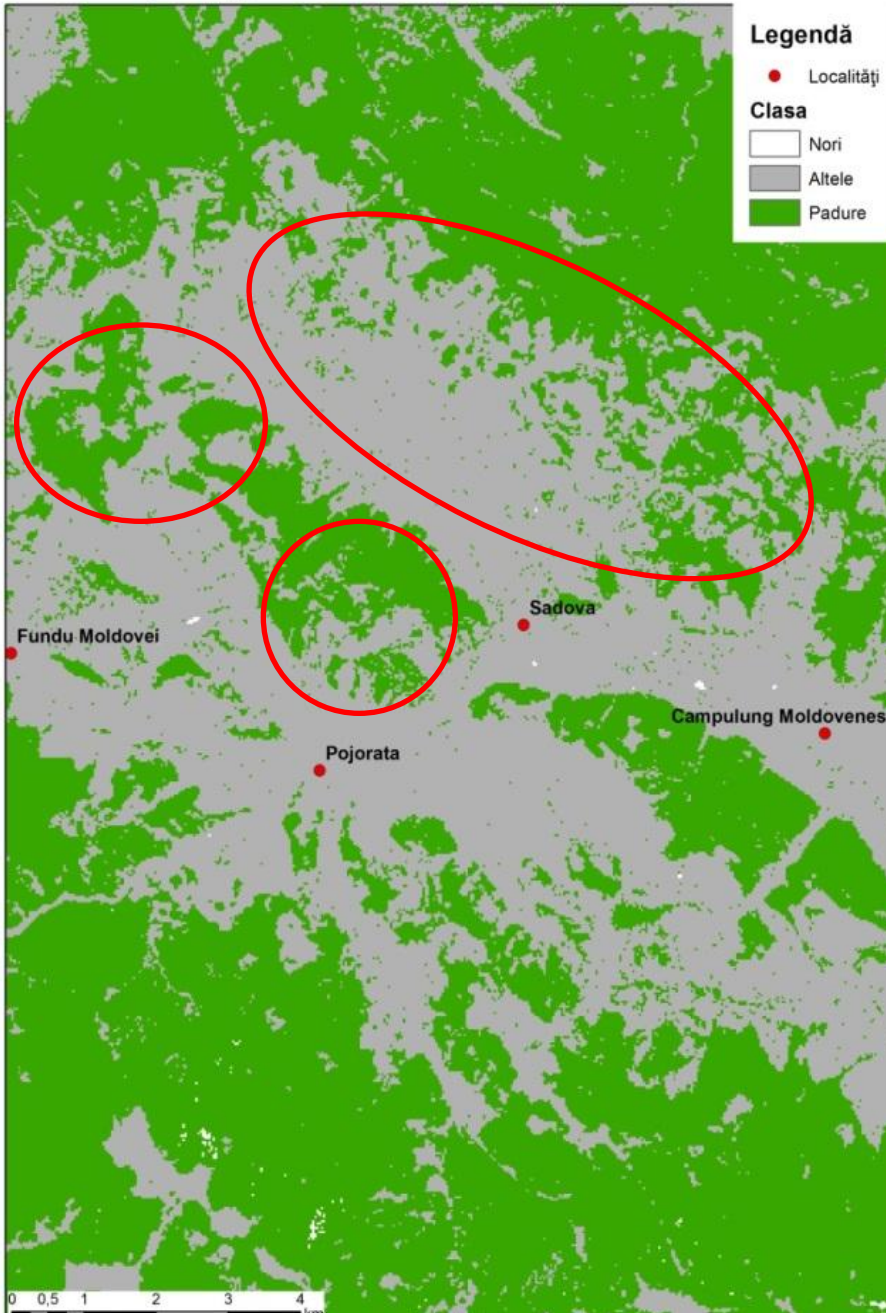

Evoluţia vegetaţiei forestiere
Zona Câmpulung Moldovenesc - Sadova - Pojorâta - 1989
Legendă
Localităţi
Clasa
Nori
Altele
Padure
Fundu Moldovei
Sadova
Campulung Moldovenesc
Pojorata
0 0,5 1 2 3 4
km


Evoluţia vegetaţiei forestiere
Zona Câmpulung Moldovenesc - Sadova - Pojorâta - 2000
Legendă
Localităţi
Clasa
Nori
Altele
Padure
Fundu Moldovei
Sadova
Campulung Moldovenesc
Pojorata
0 0,5 1 2 3 4
km

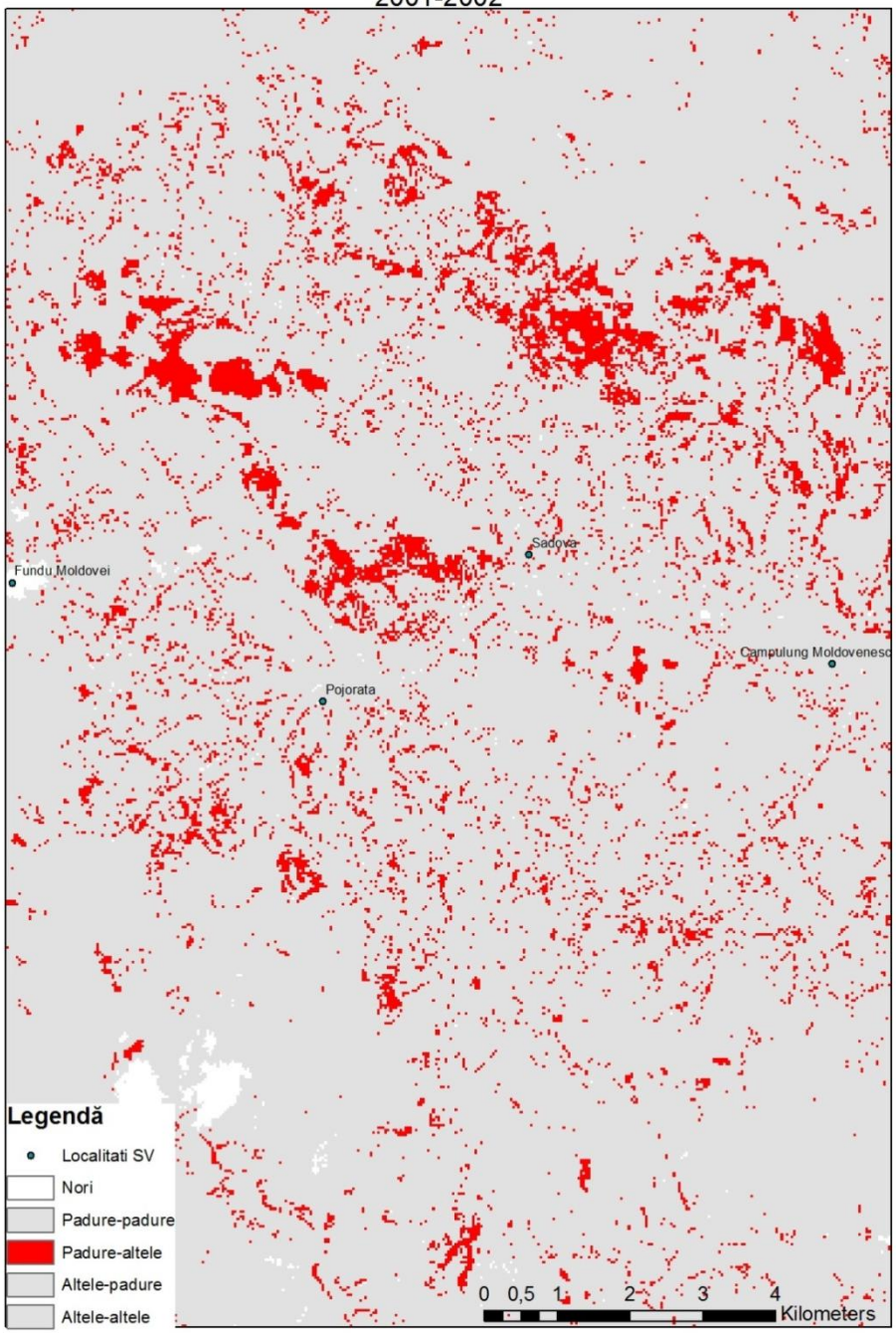
Evoluţia vegetaţiei forestiere
Zona Câmpulung Moldovenesc - Sadova - Pojorâta - 2001



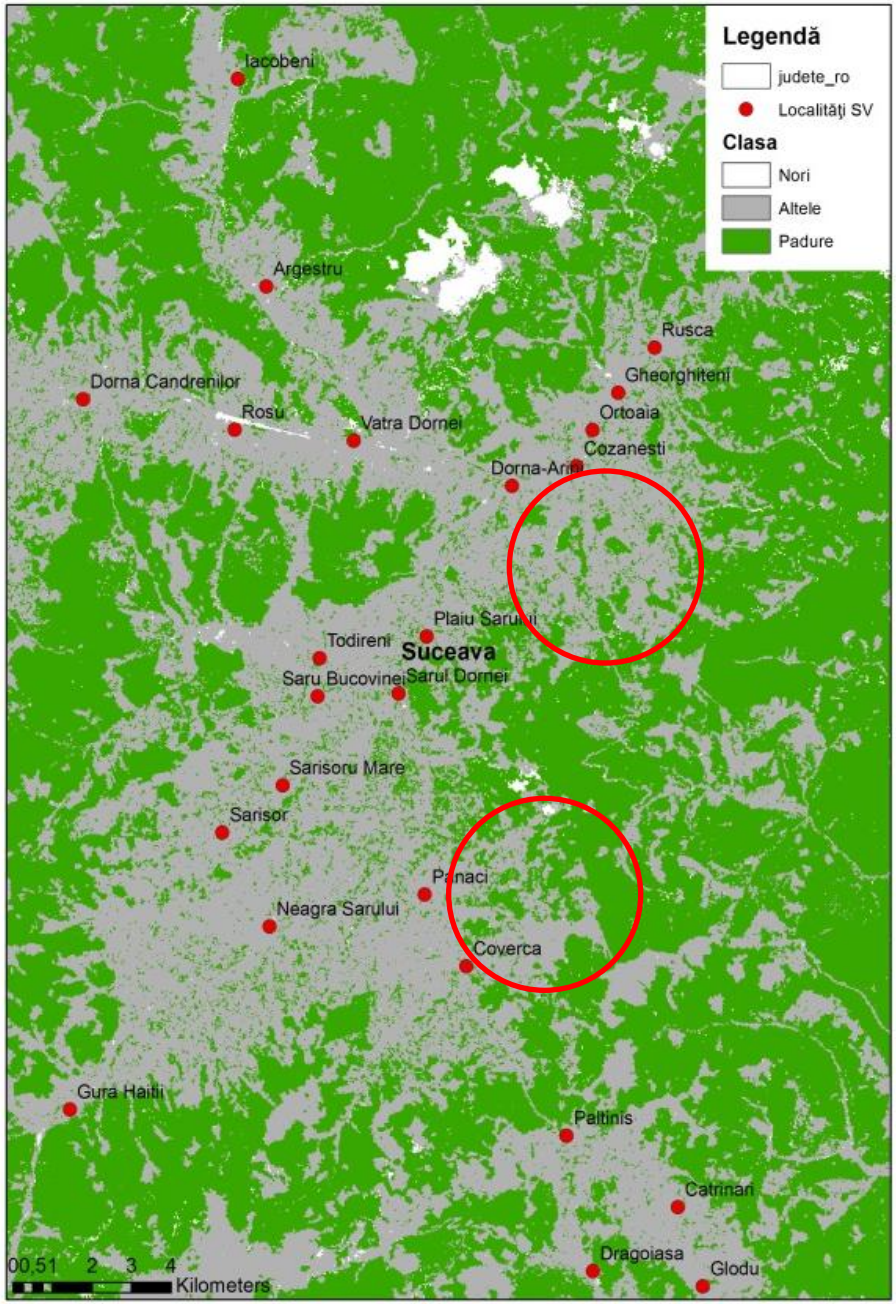
Evoluţia vegetaţiei forestiere
Zona Câmpulung Moldovenesc - Sadova - Pojorâta - 2002



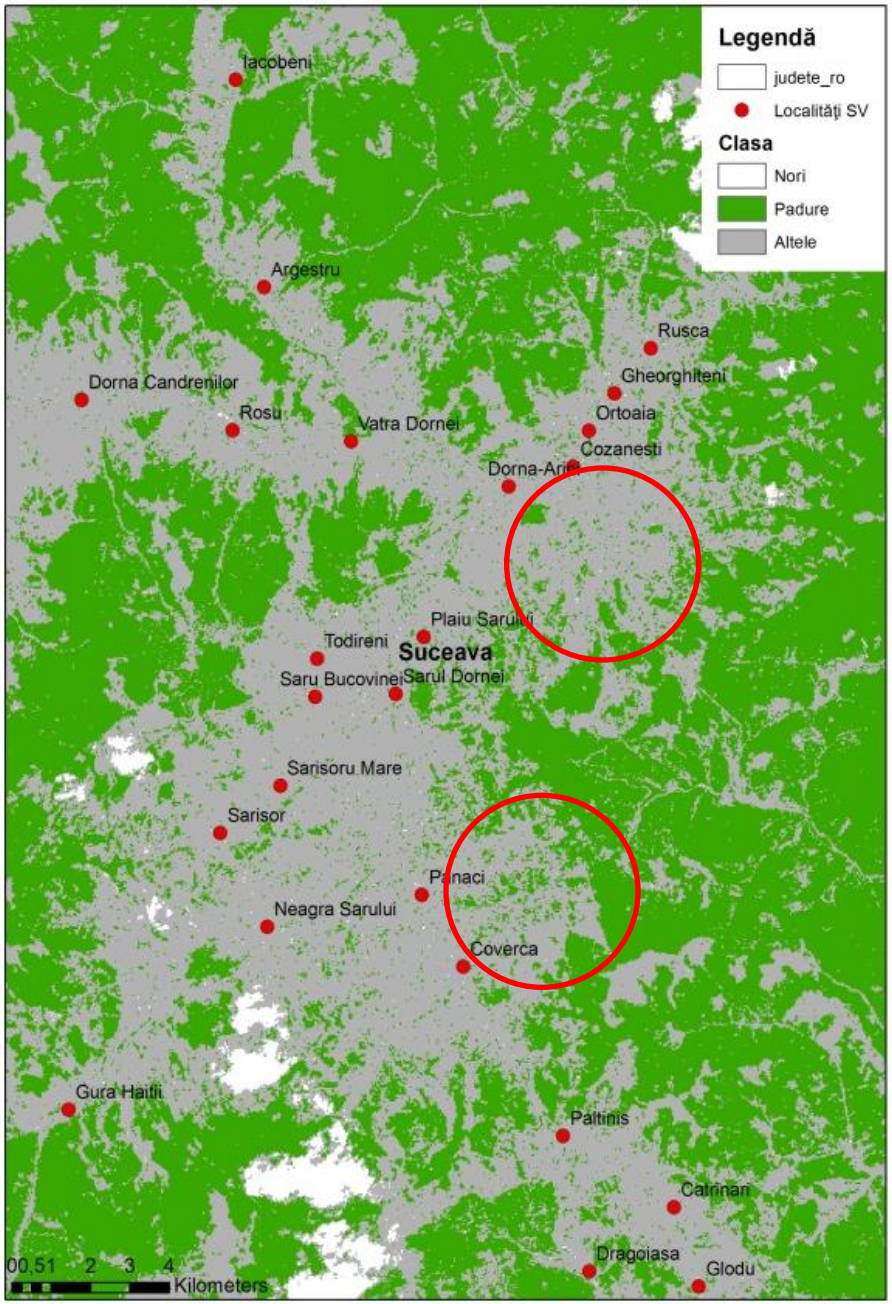
Perturbări Campulung - Pojorata - Sadova
2001-2002



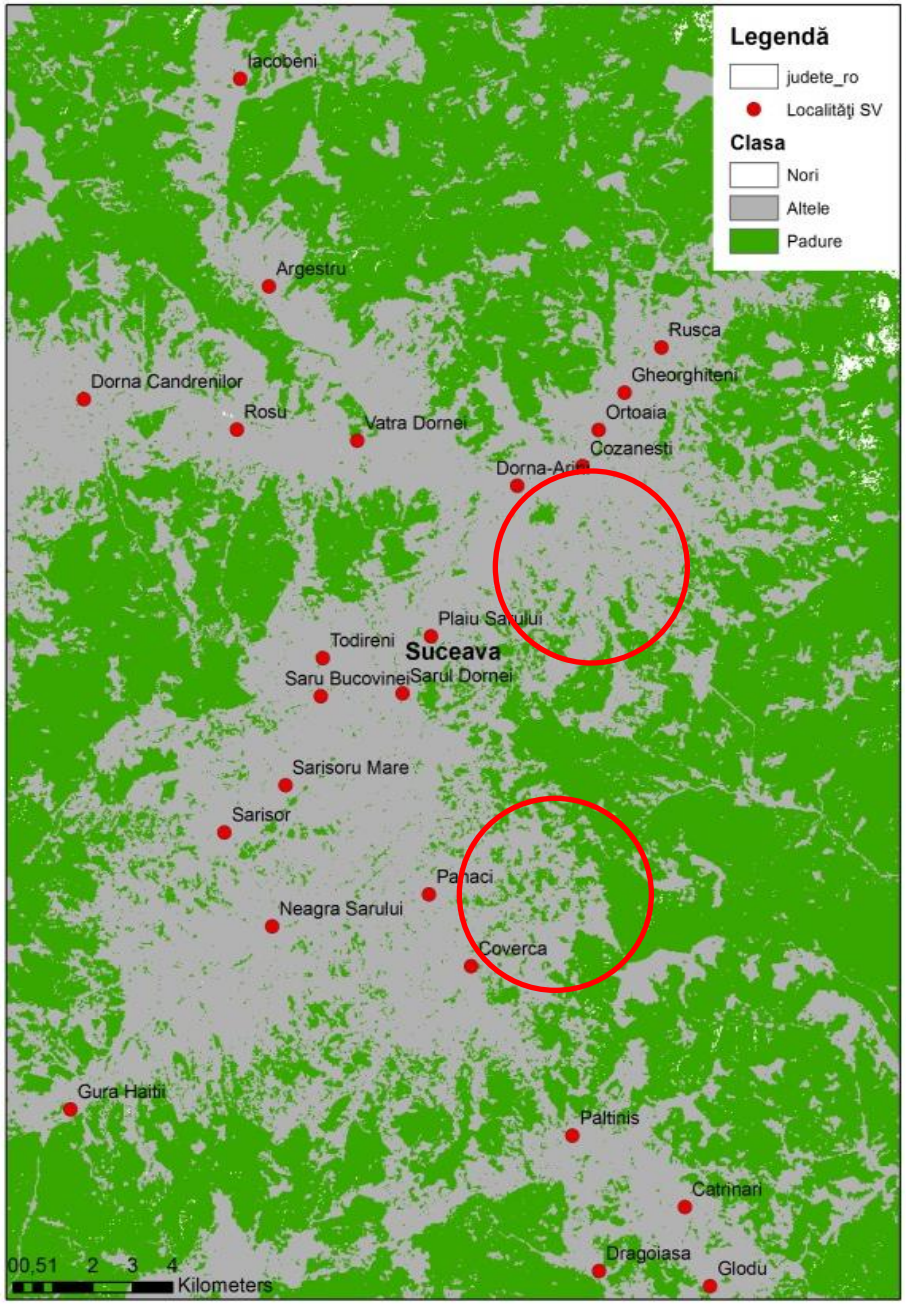
Evoluţia vegetaţiei forestiere
Zona Vatra Dornei 1989



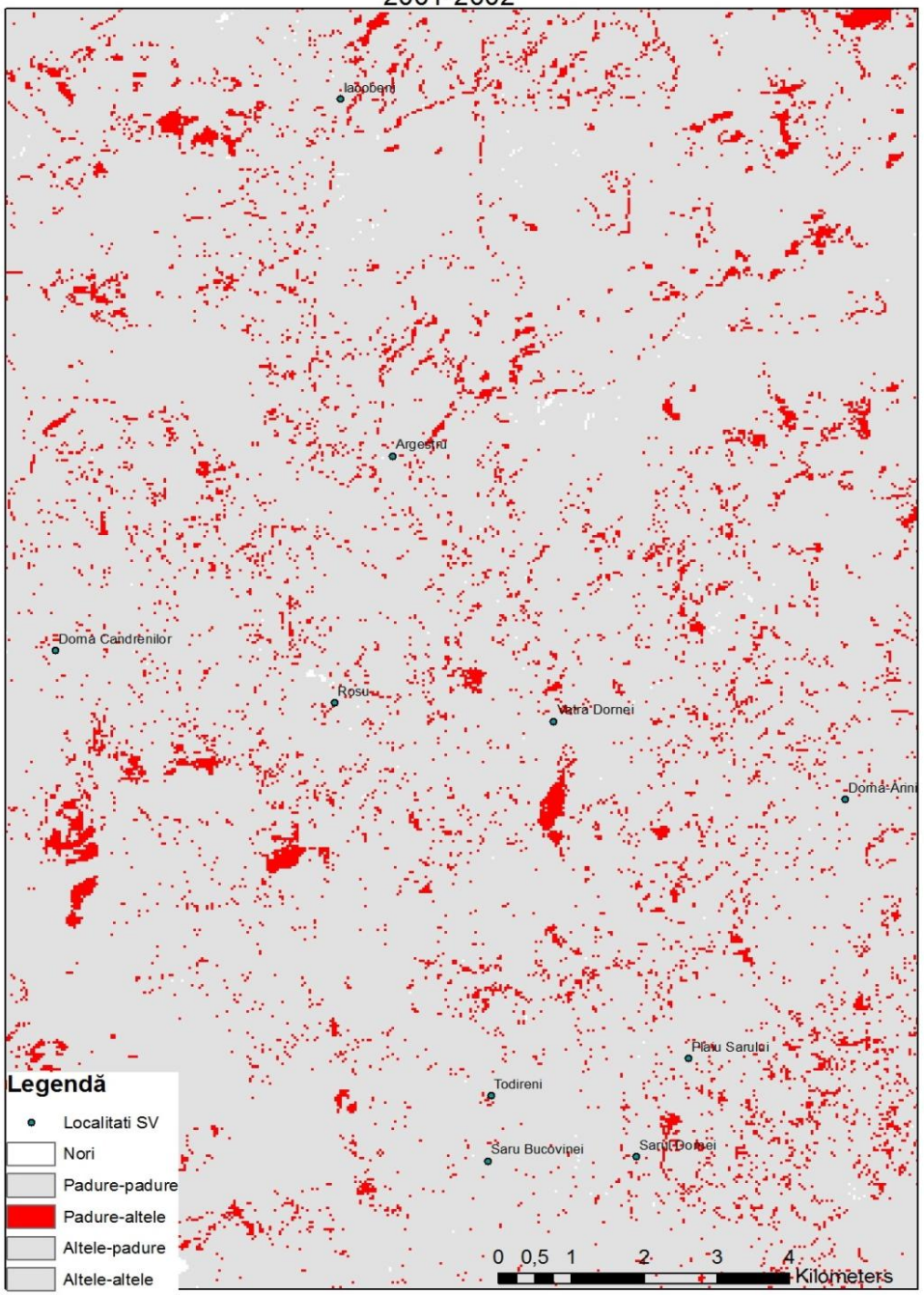
Evoluţia vegetaţiei forestiere
Zona Vatra Dornei 2001



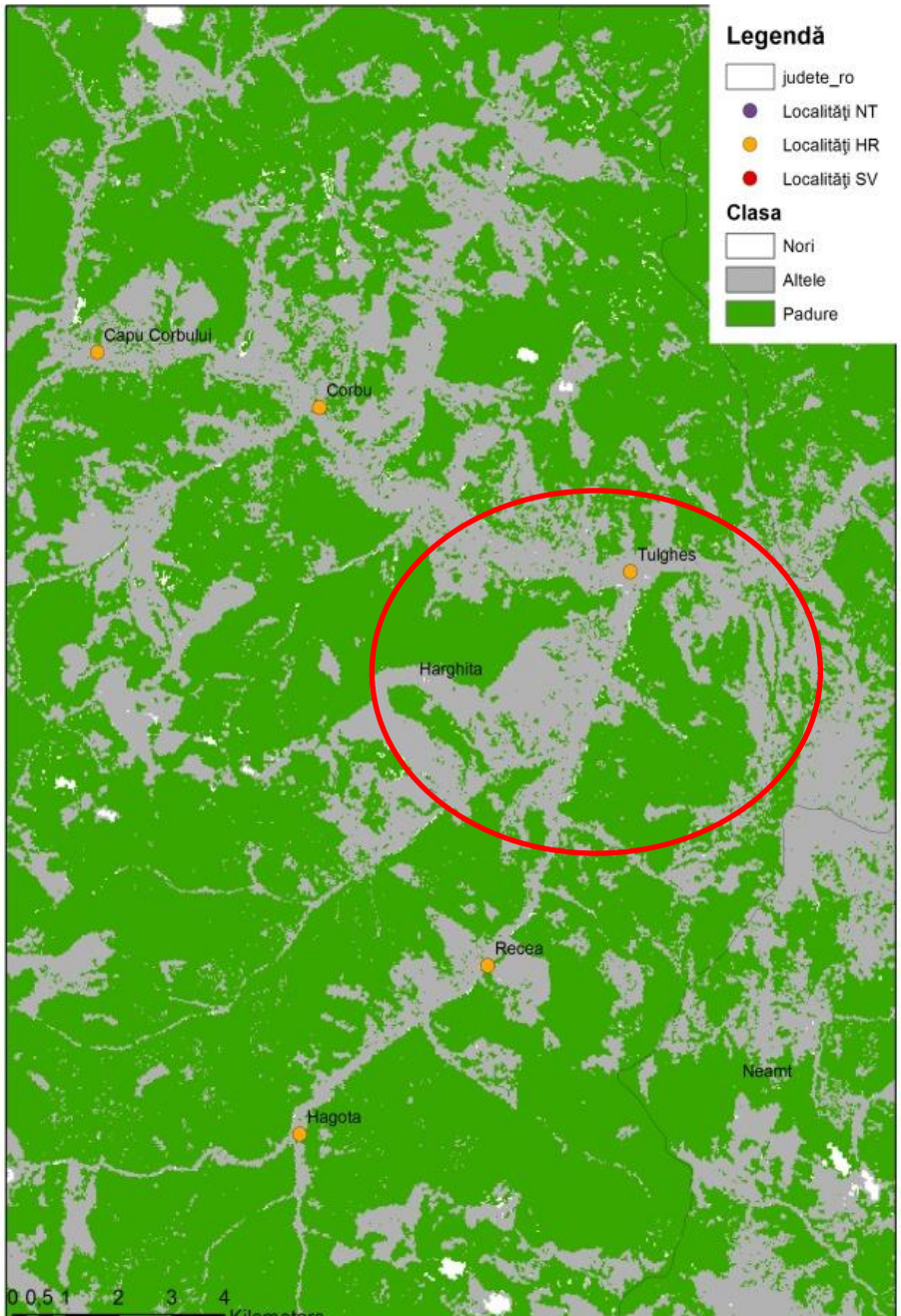
Evoluţia vegetaţiei forestiere
Zona Vatra Dornei 2002



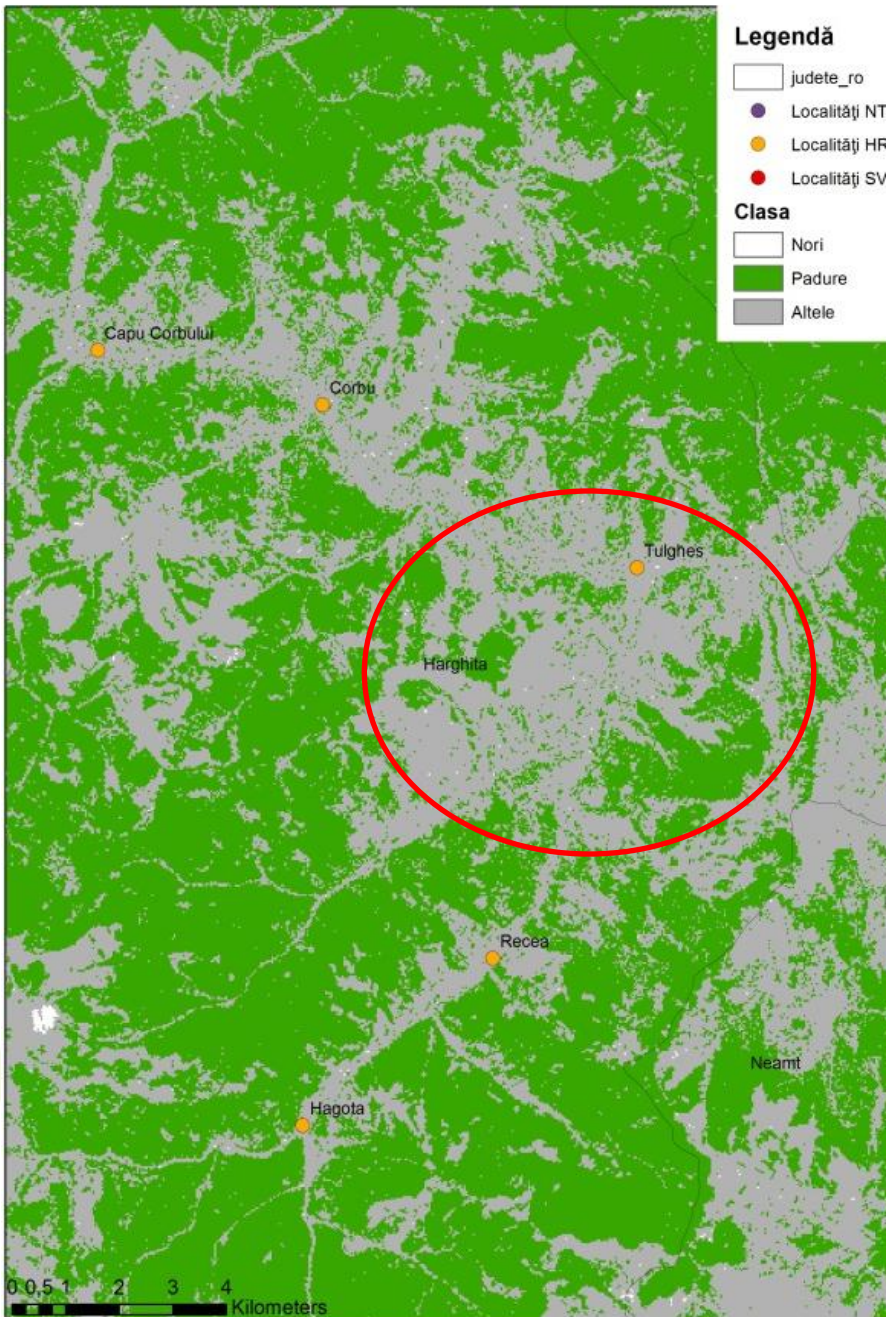
Perturbări Vatra Dornei
2001-2002



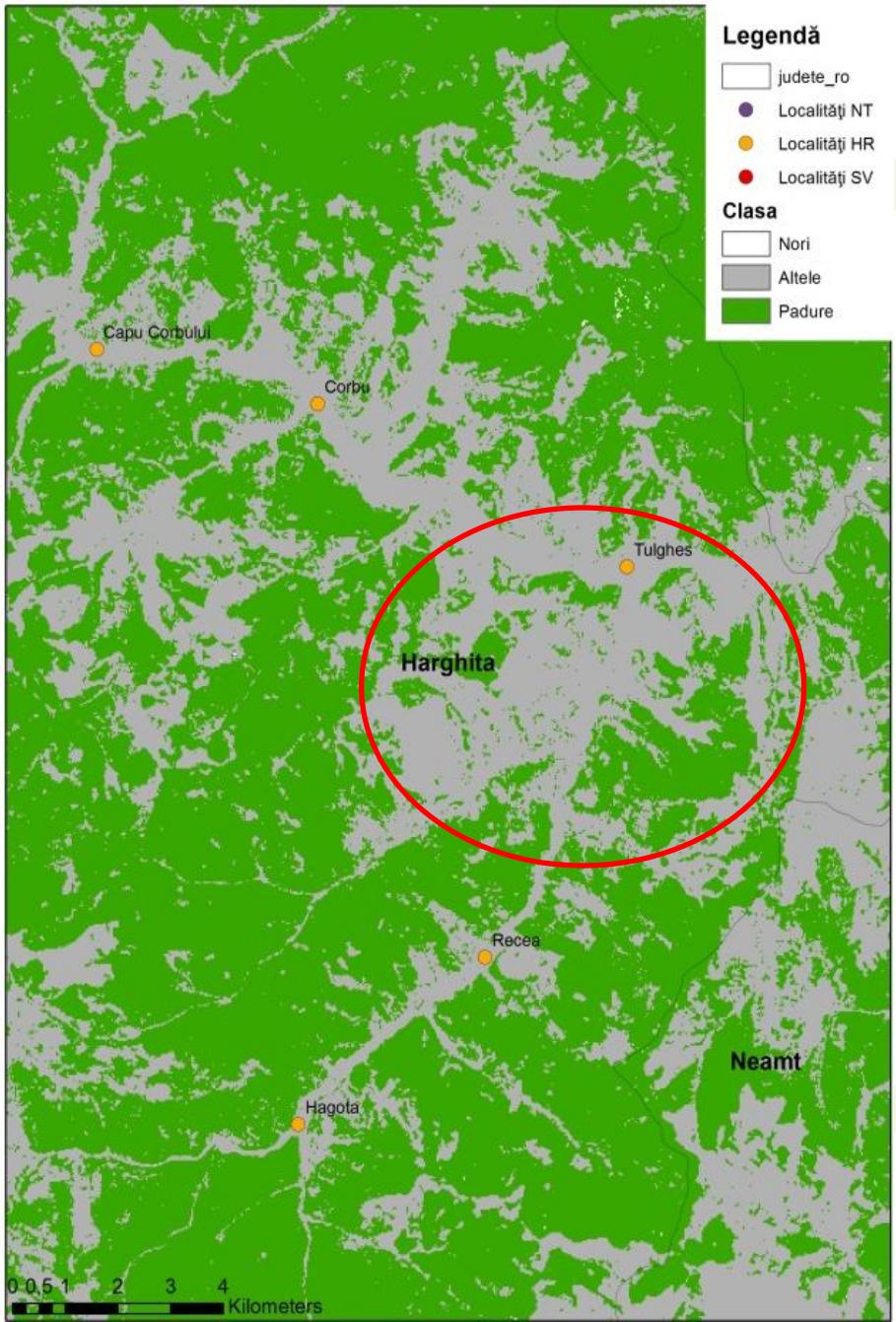
Evoluţia vegetaţiei forestiere
Zona Harghita 1989



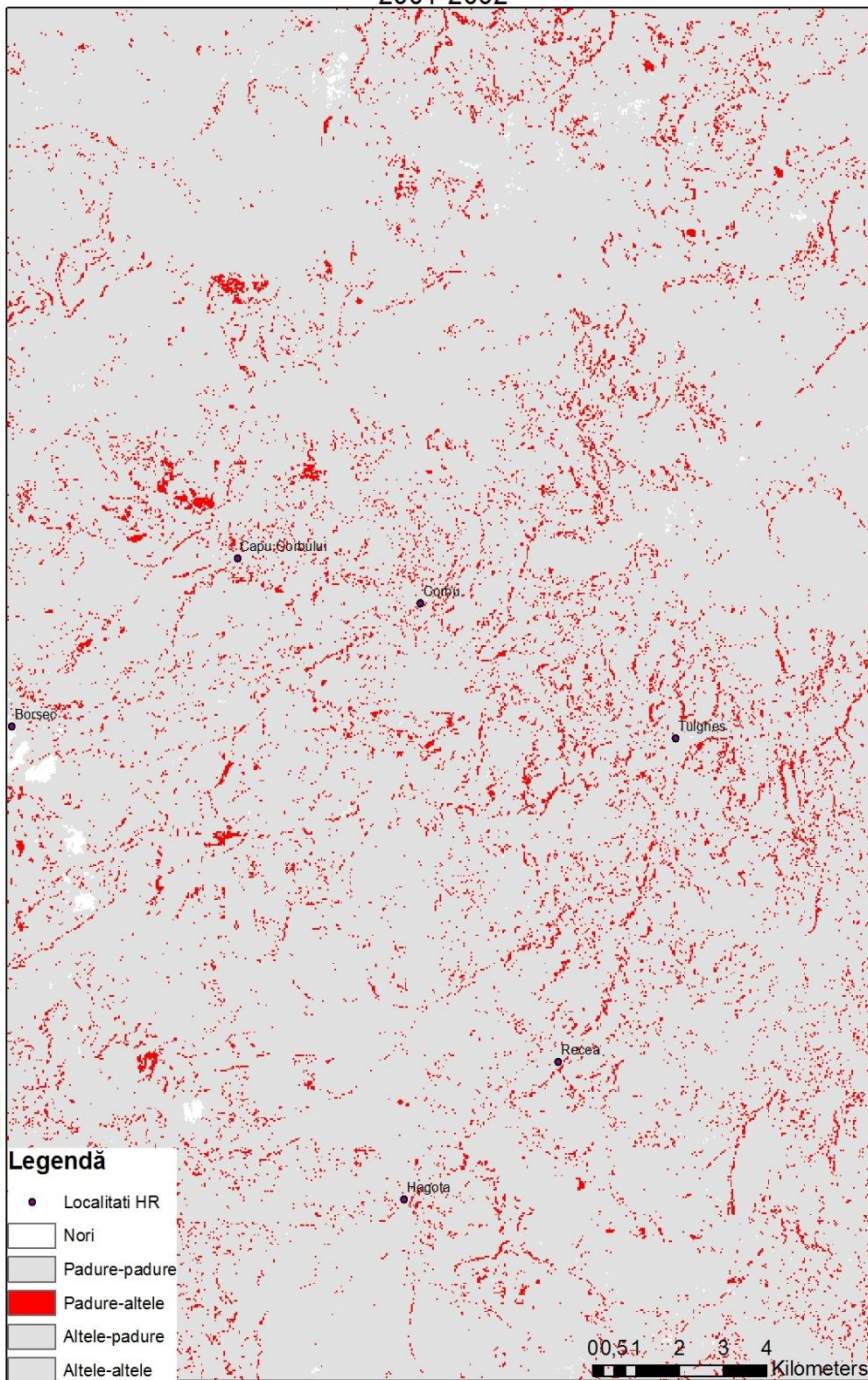
Evoluţia vegetaţiei forestiere
Zona Harghita 2001



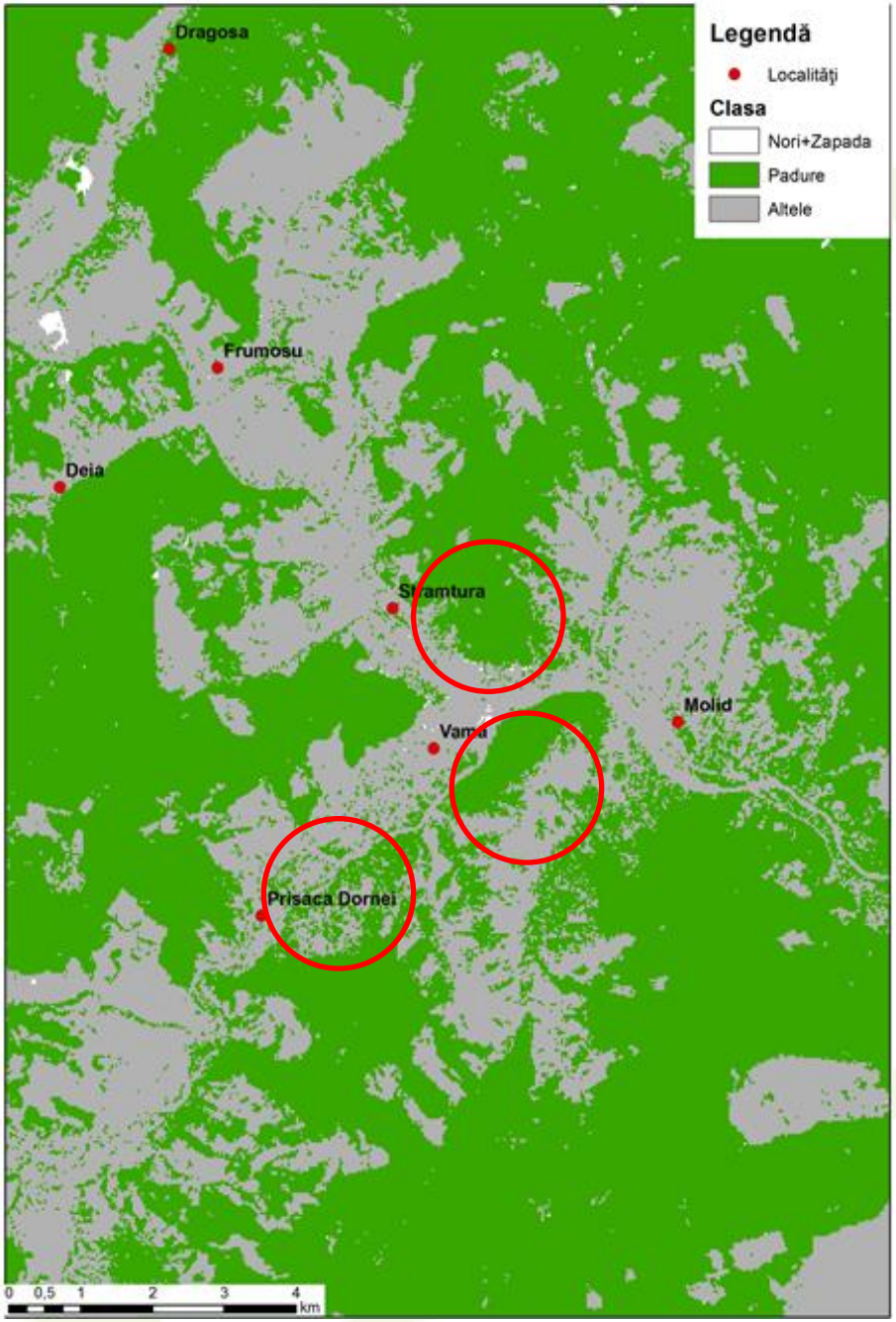
Evoluţia vegetaţiei forestiere
Zona Harghita 2002



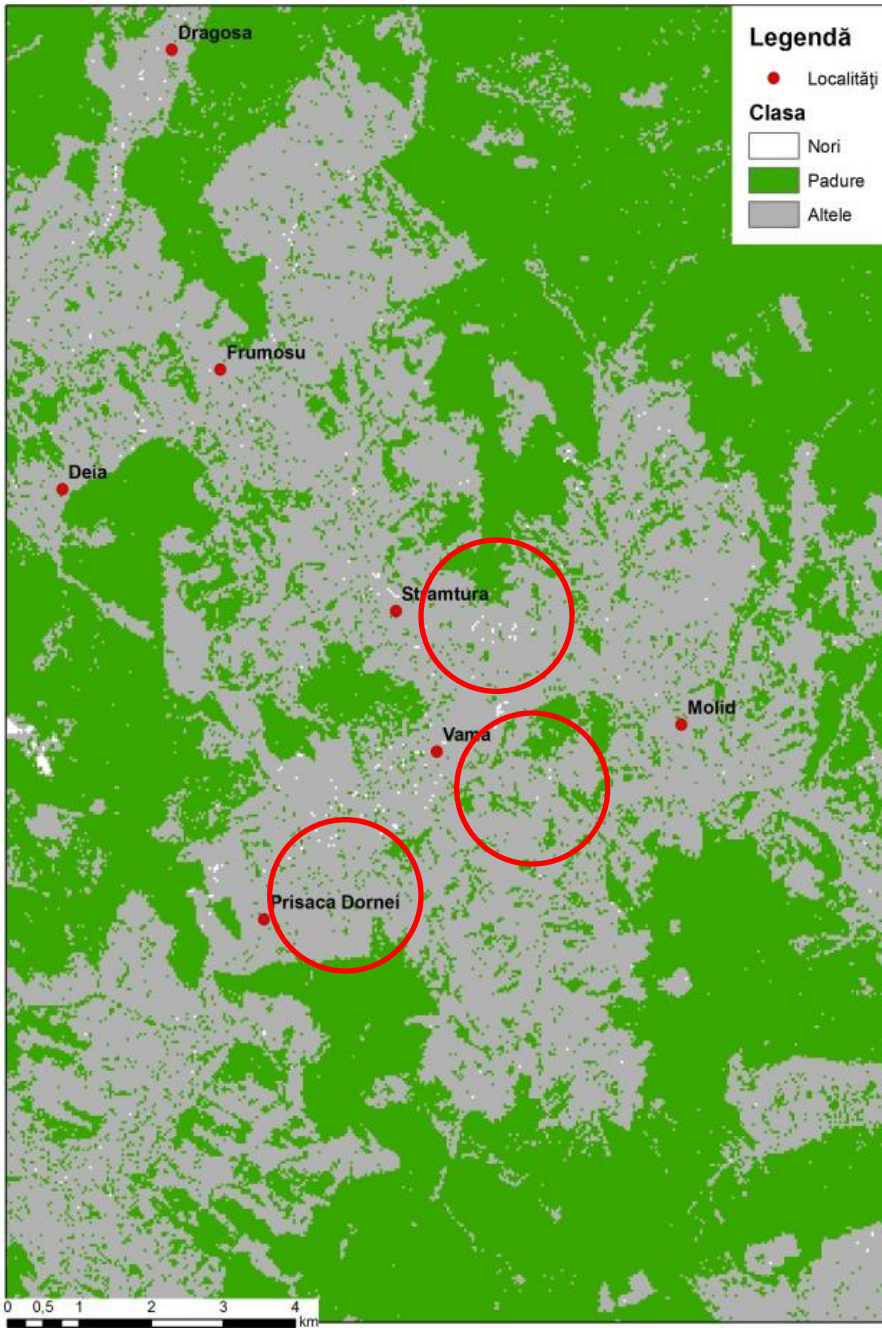
Perturbări Harghita
2001-2002



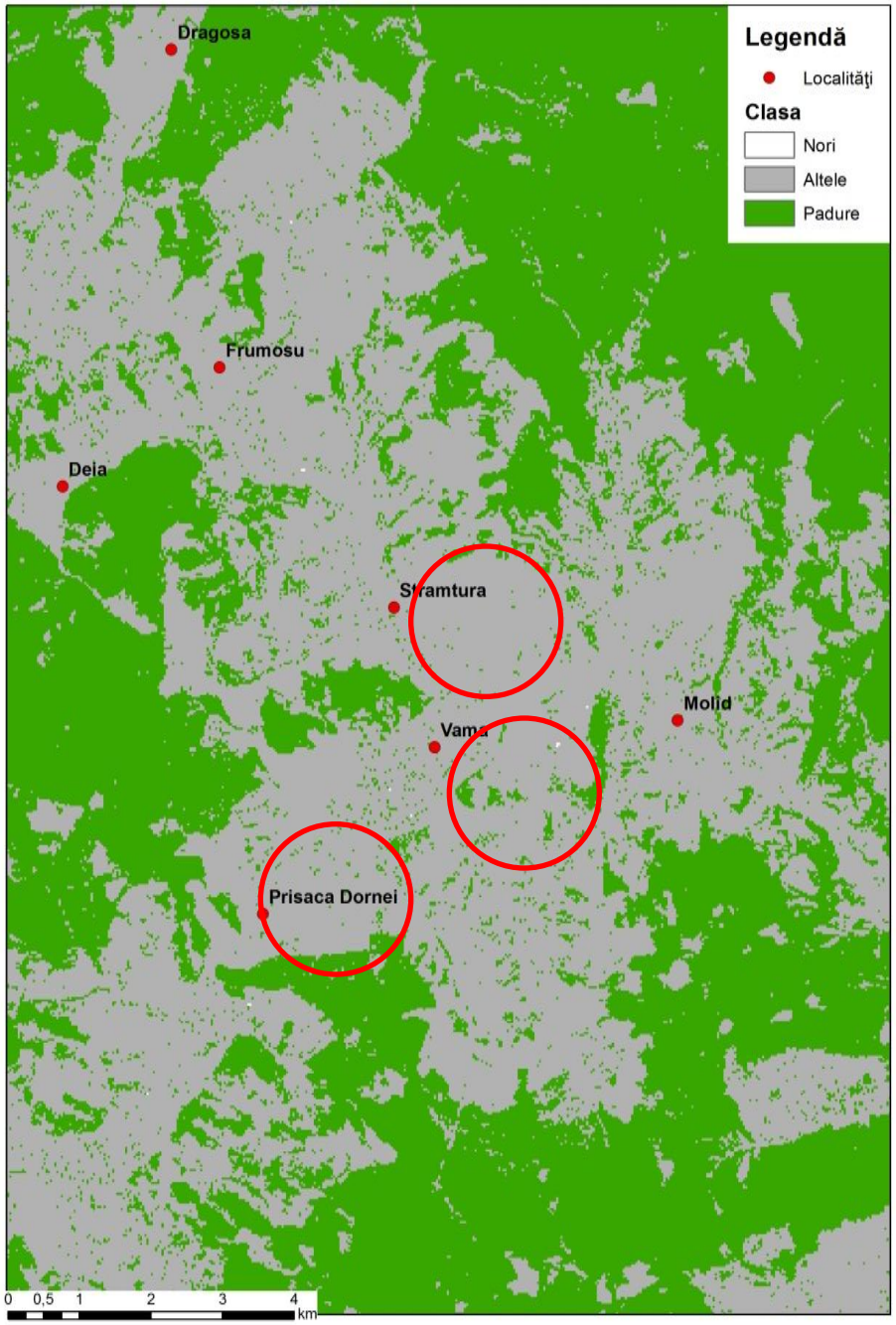
Evoluţia vegetaţiei forestiere
Zona Vama - 1986



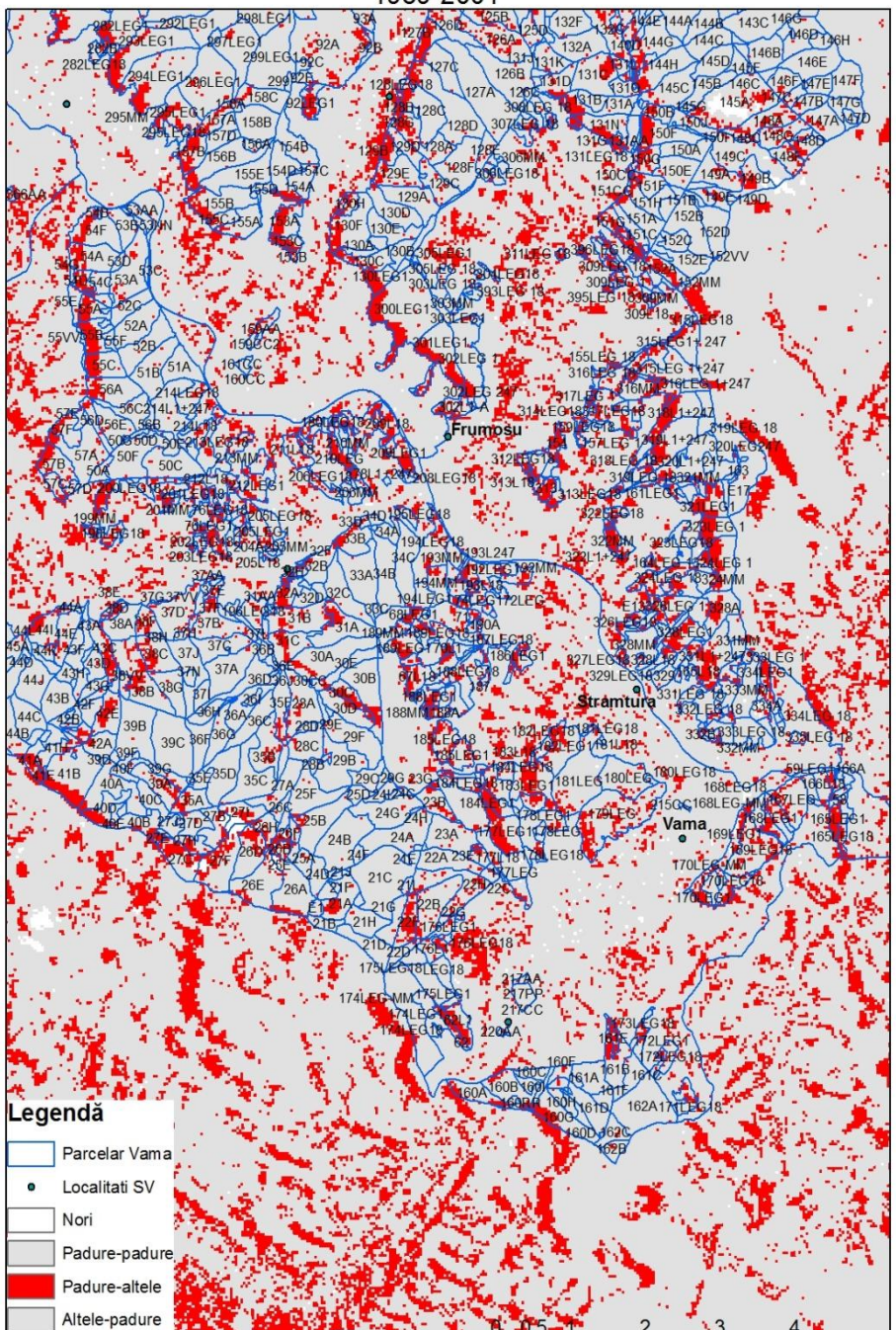
Evoluţia vegetaţiei forestiere
Zona Vama - 2001



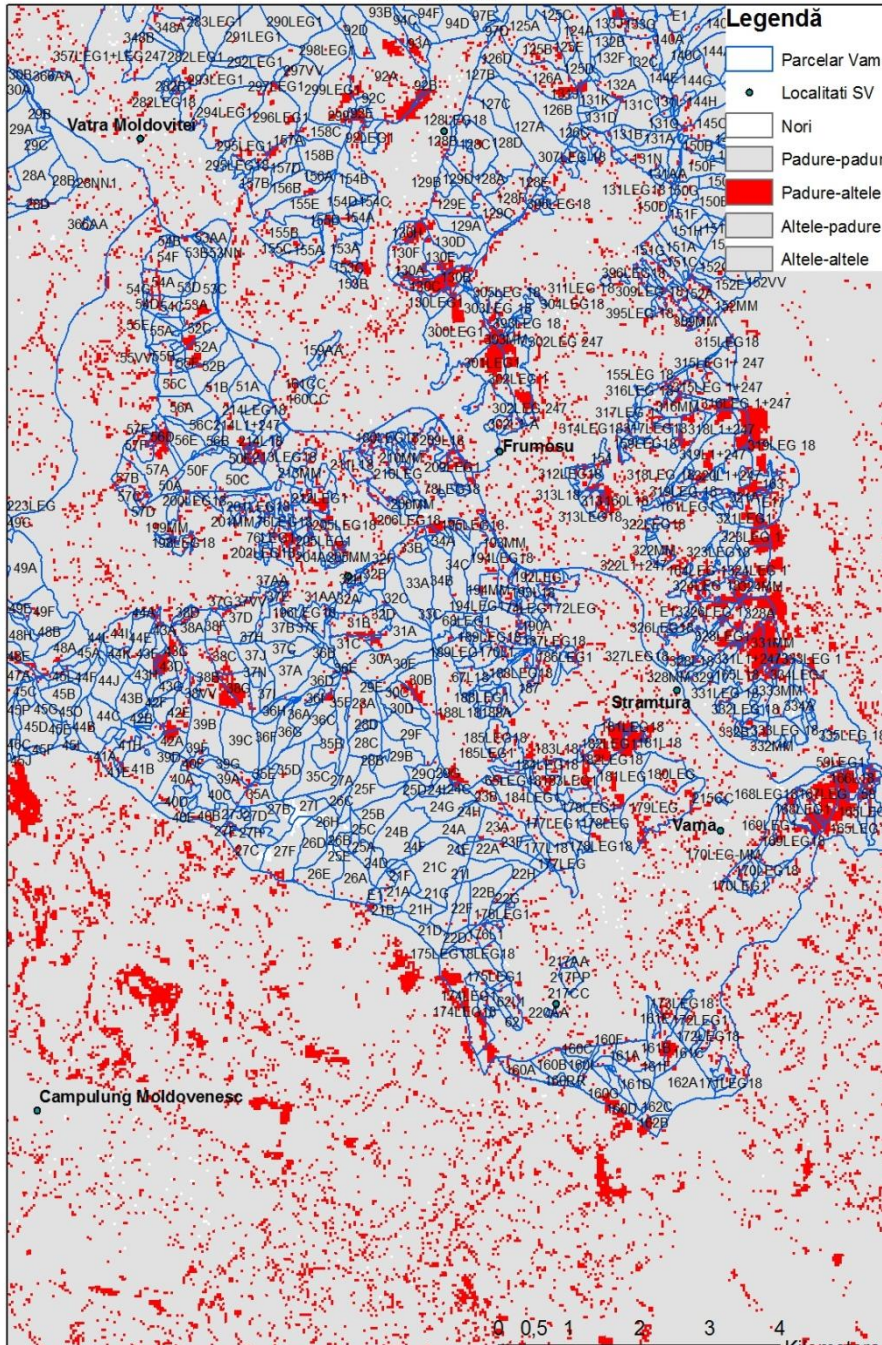
Evoluţia vegetaţiei forestiere
Zona Vama - 2002



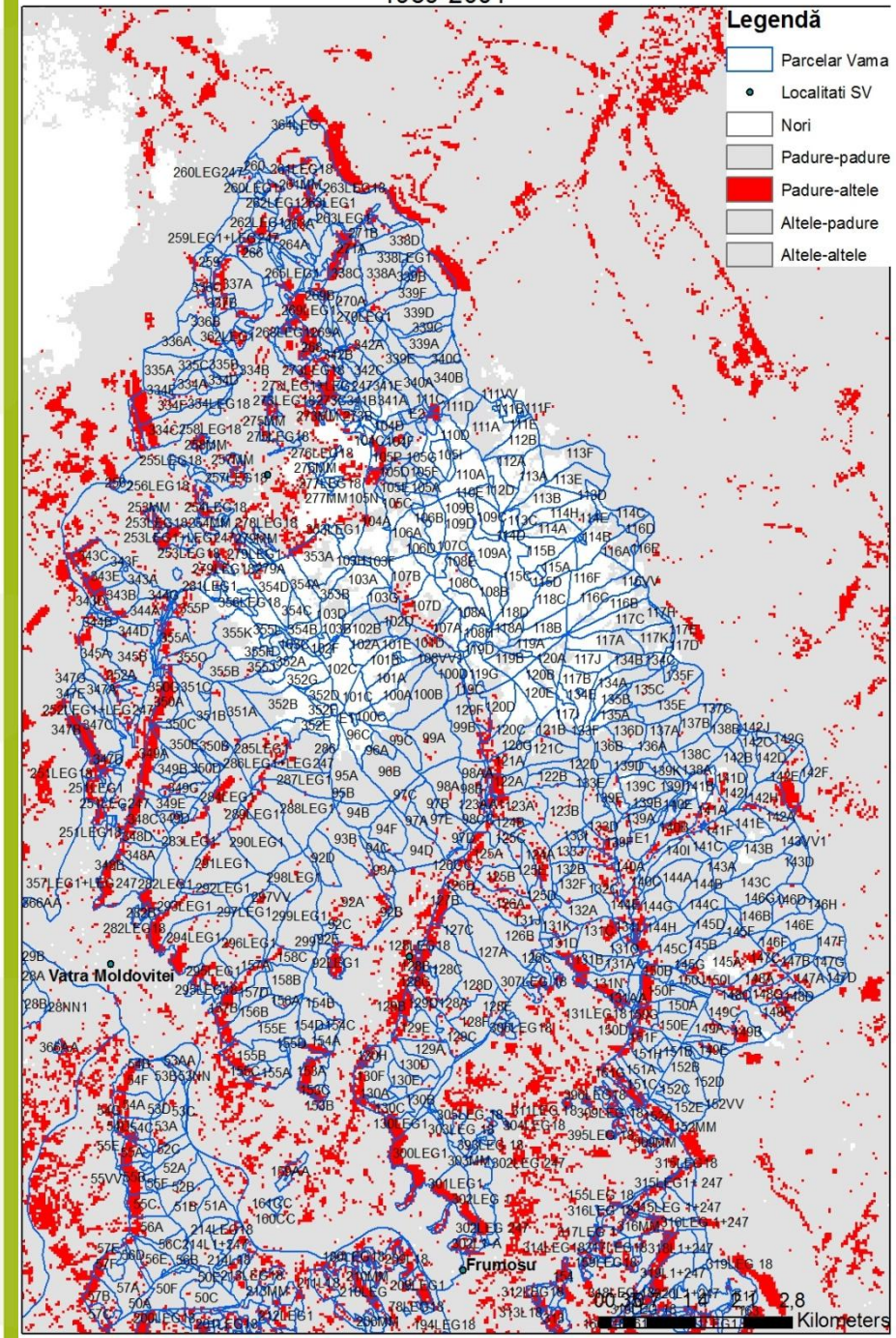
Perturbări Vama
1989-2001



Perturbări Vama
2001-2002



Perturbări Vama
1989-2001



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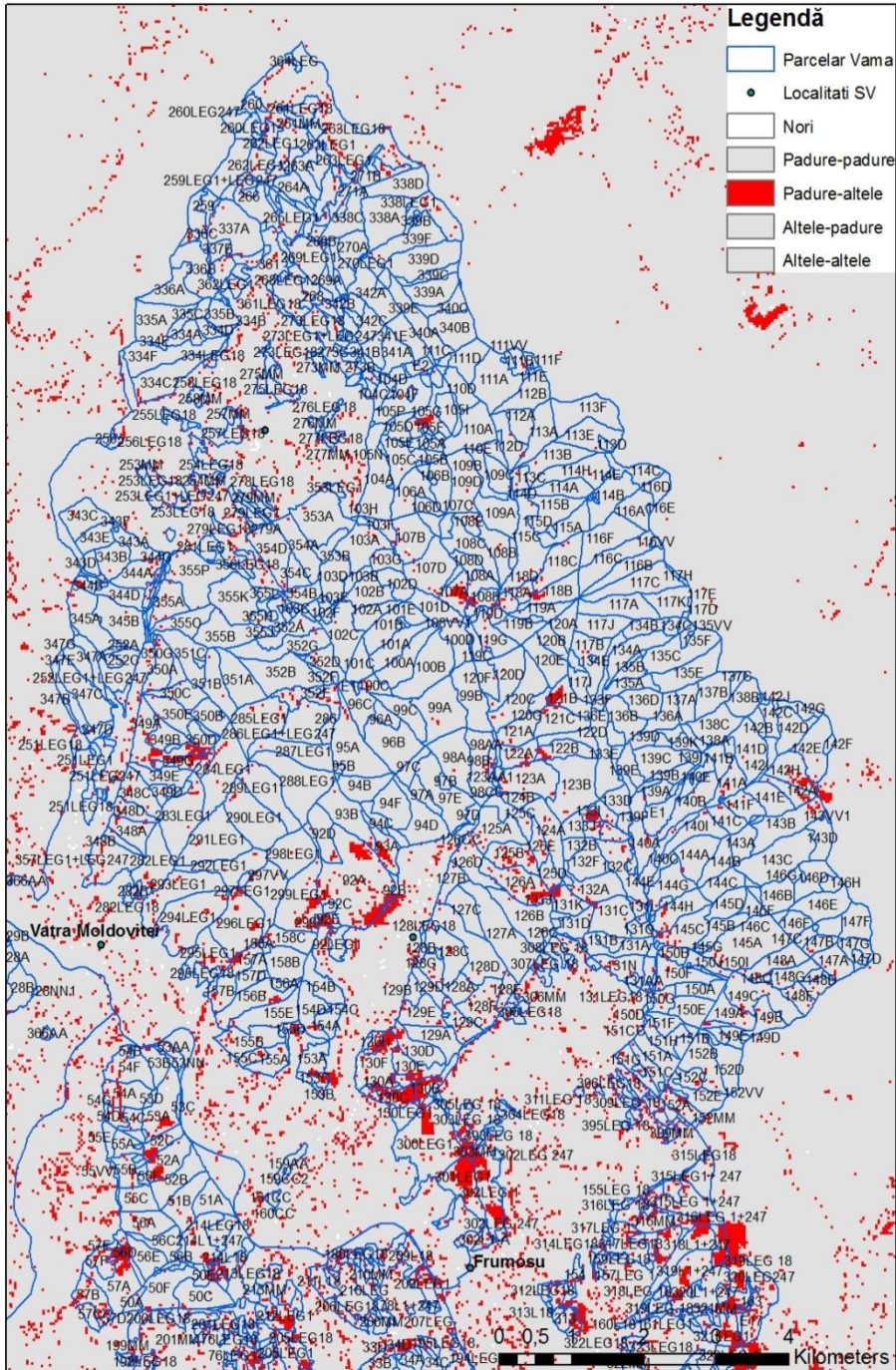
2001-2002

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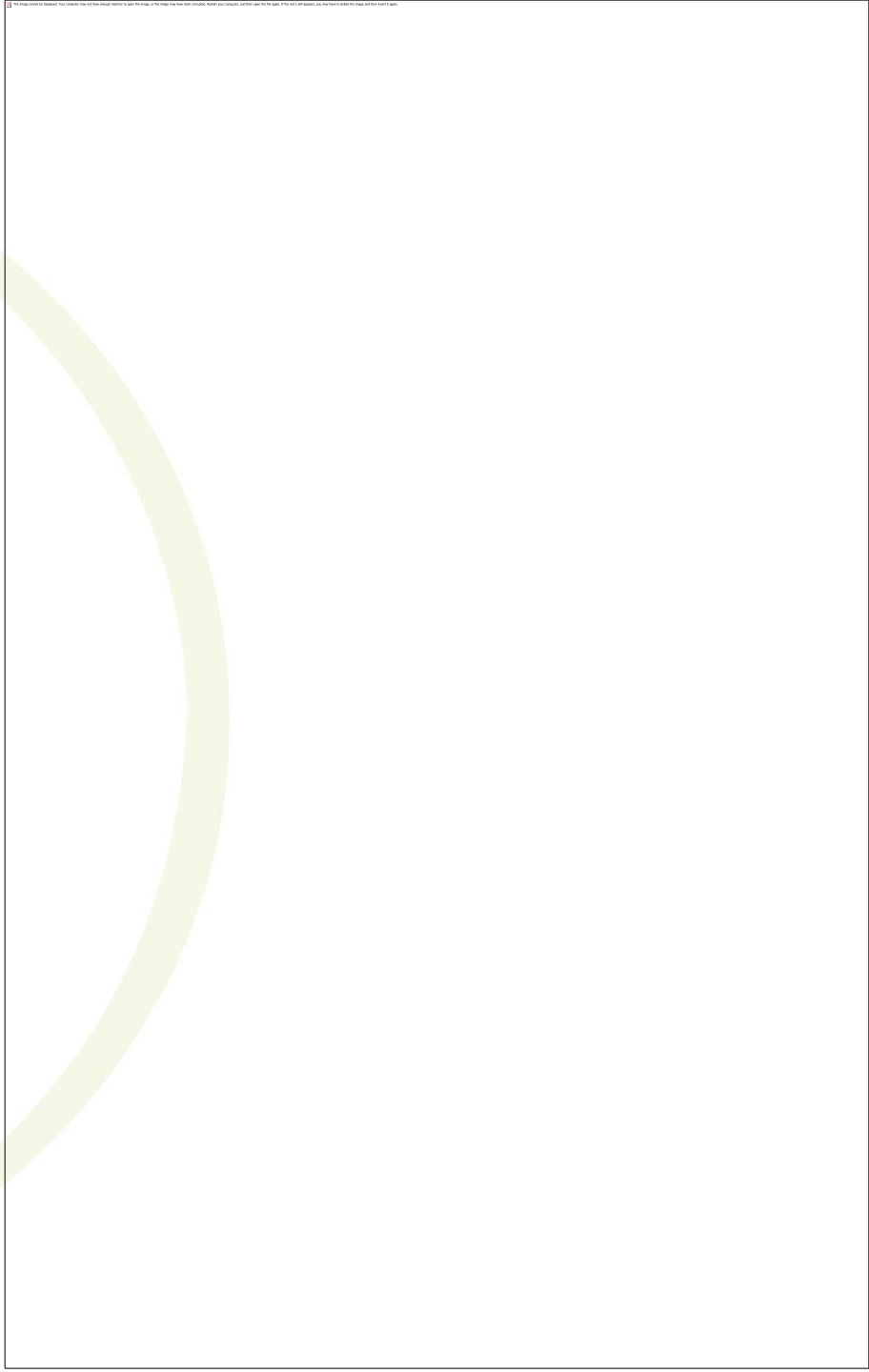
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8. Conclusions

- Image Classification Landsat 5 TM and Landsat 7 ETM+ was the principal component in drawing disturbance maps. The work aimed that the number of classes to be optimum in classification in order to present as closely as possible the reality of forest fund
- The study has shown that satellite Landsat images may be used in the analysis of surface changes and changes of the limits of the forest.
- The result of the analysis provided an overview of disturbances in the northern Carpathians. Major advantages include low cost of images and the existance of 30 years archive which offers the opportunity to keep track of the transformations which takes place on large scale territories.
- Anthropogenic disturbances in the period 1989-2011 are distinguished by the natural disturbances from 2001/2002 by the fact that these surfaces are larger and spread evenly over the entire area of Vama forest division in comparison with those affected by windthrows.