ESTIMATION OF SLOPE STABILITY IN THE SUBCARPATHIANS CURVATURE BASED ON DEM

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The Subcarpatians are an important study area of landslides and slope stability. The present study makes a computation analysis of stability.

The stability index (SI) is defined as the probability that a location is stable assuming uniform distributions of the parameters over uncertainty ranges. Index values range between 0 (most unstable) and 1 (least unstable). Wherever the most conservative (destabilizing) set of parameters in the model still results in stability, the stability index is defined as factor of safety (ratio of stabilizing-to-destabilizing forces) at this location under the most conservative set of parameters.

Field research by this method implies classifying and identifying the main classes of slope stability based on many indicators (slope gradient, soil density, water saturation, etc.)

During inventorying, the most important landslide was chosen in terms of slope gradient. Many landslides are associated with terrace scarps and steep areas without vegetations.

DEM analyses help improving the accuracy of landslide positioning and estimations of damage on road, houses and crops.

Shallow landslides are currently the most important geomorphological process, and an important sources of sediments for rivers.

This is a physically-based digital terrain model for mapping the relative potential of shallow slope stability across a landscape. Extensive testing of the model and application to practical contexts suggest that the model can be successfully used to delineate existing landslide scar locations and provide an objective procedure for outlining potential sites of future instability. It can be used as a parameter free model in which the only decision is how to rank the mapped pattern of relative stability under such categories as "high", "medium" and "low", for the practical purpose of prescribing some land management practice.

The higher number of houses in urban areas close to wood exploitations enhances the possibility for new shallow landslides to start. We have been drawn up numerous maps of shallow the landslide area and tried to find solutions to halt these processes without affecting the wood industry.

This analysis is important because it increases the chances of predicting new shallow landslides in the case of massive deforestation. Estimation of the potential of shallow landslides through computational modelling reduces the time for analysis and affords the elaboration of more environment evolution scenarios.
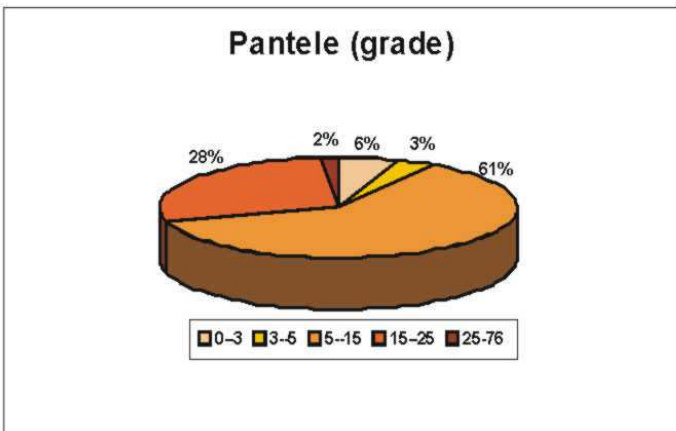

Study area

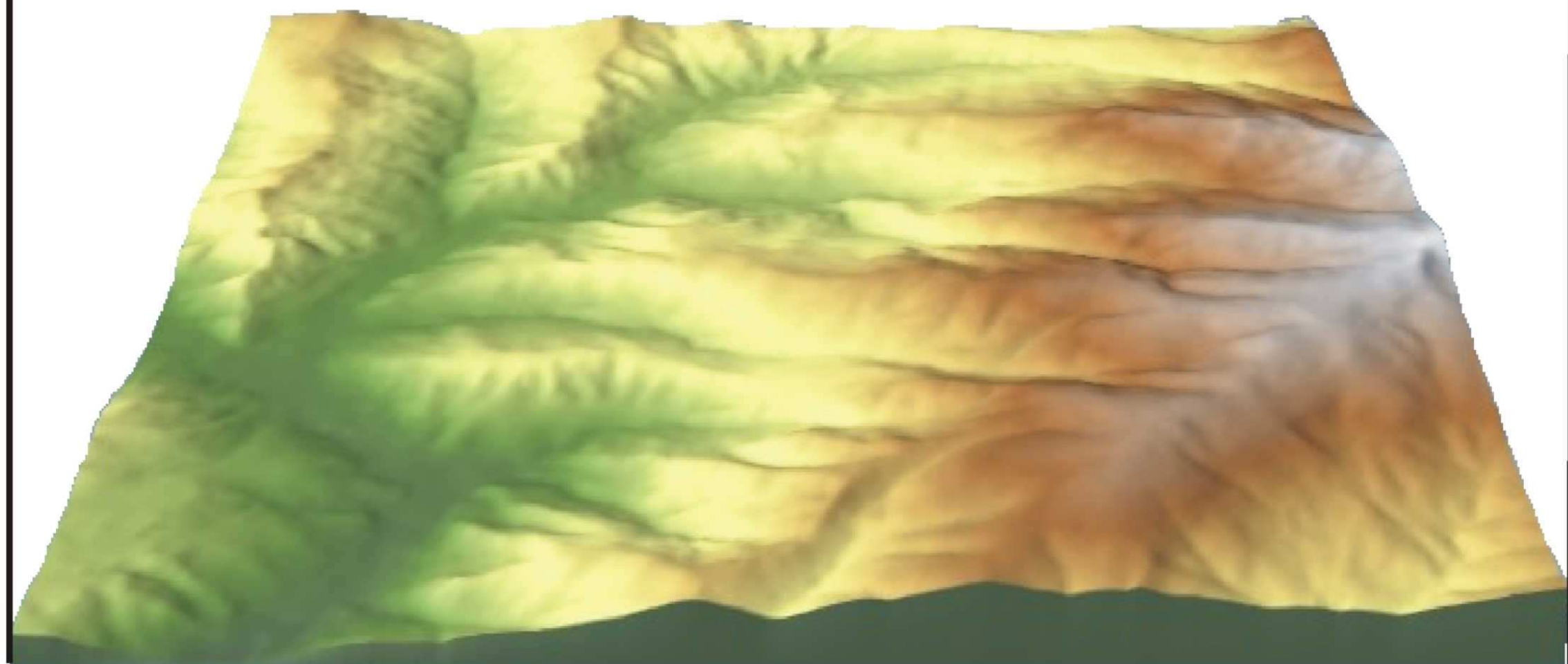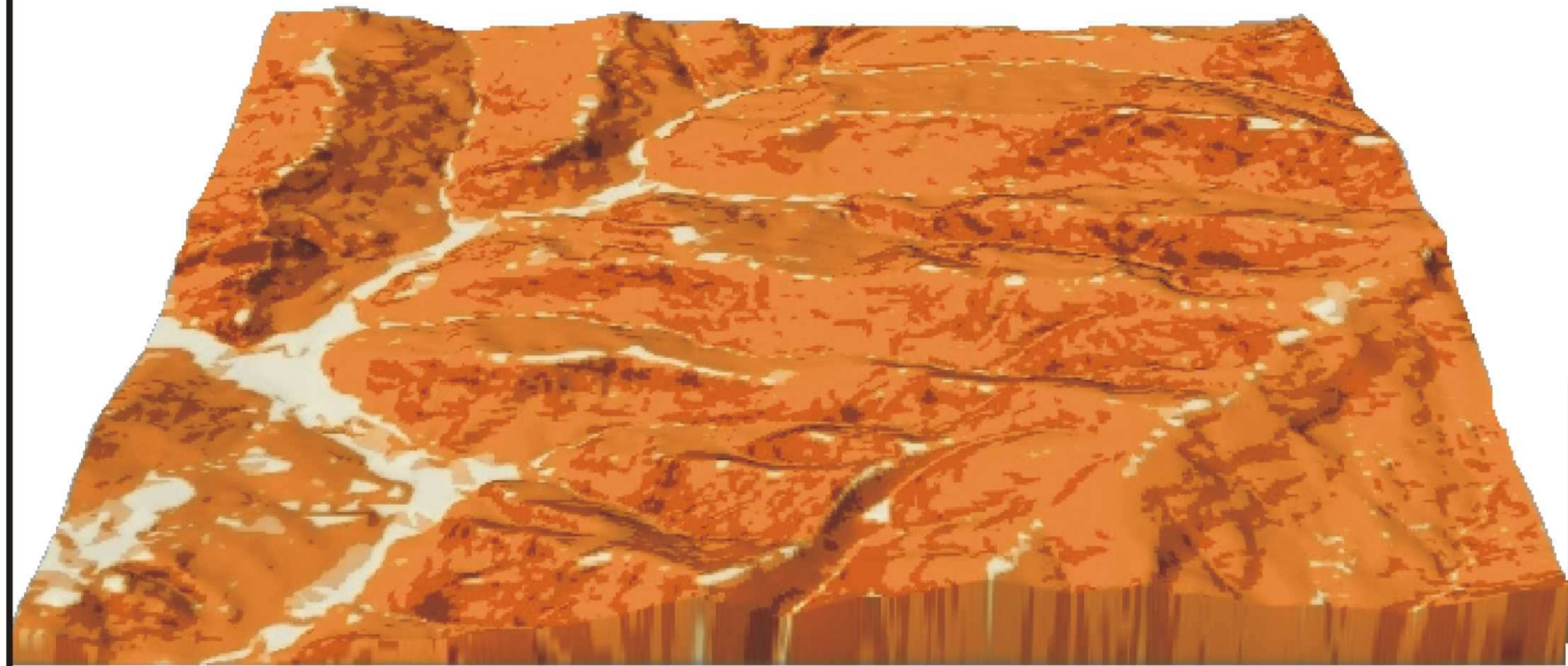**Shallow landslides in the study area**
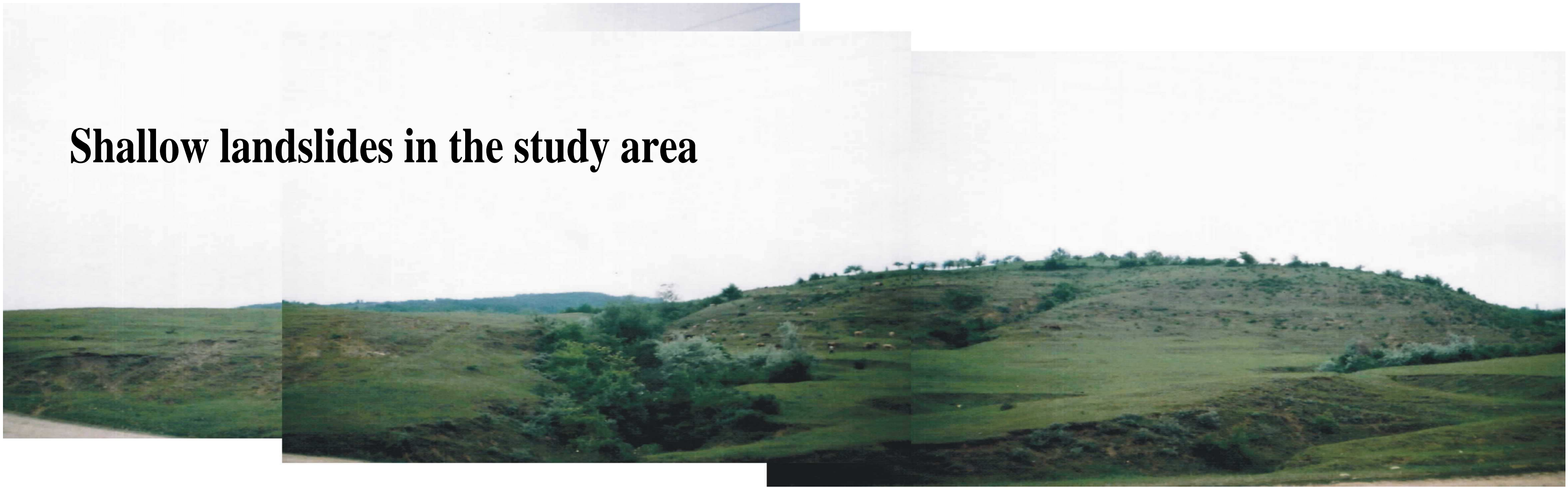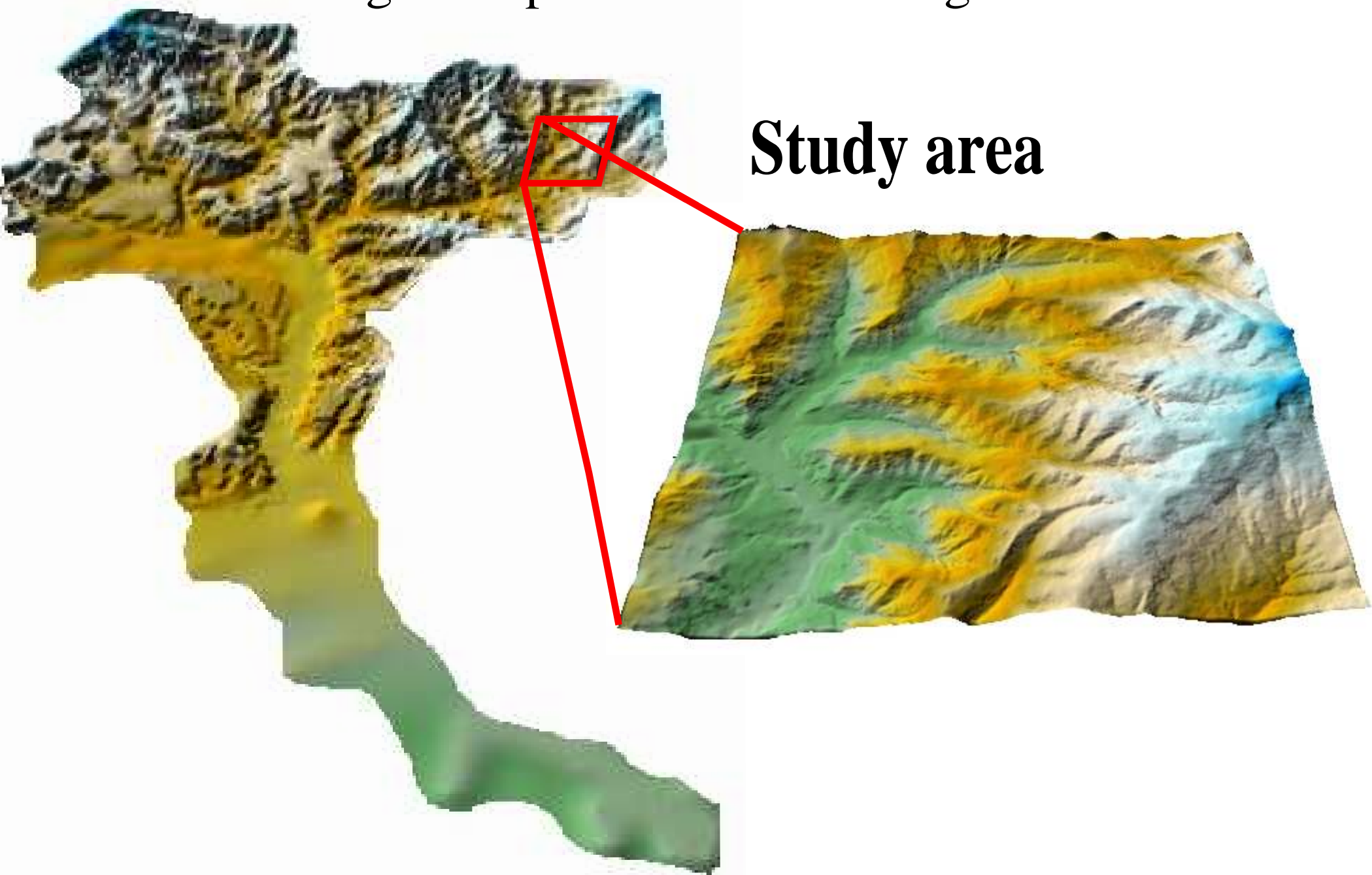
Shallow landslide

Vegetatie
Padure
Pasune
Alunecari superficiale
Unghi de frictiune: 20 grade
Densitatea solului: 1500 t/mc
Adancimea solului: 1m
Instabilitate cronica
< -3.1
-3.1 - -2.8
-2.8 - -2.5
-2.5 - -2.2
> -2.2
Stabil

Padure
Pasune

Pantele (grade)

Pantele (grade)
0 - 3
3 - 5
5 - 15
15 - 25
25 - 76

Stability index

Saturation

Saturation
Saturation Zone
Threshold Saturation
Partially Wet
Low Moisture
No Data

Contributing Area

Contributing Area
0 - 10
10 - 100
100 - 1000
1000 - 10000
10000 - 100000
100000 - 1e+006
1e+006 - 1e+010
No Data

Stability Index

Stability Index
Stable
Moderately Stable
Quasi-stable
Lower Threshold
Upper Threshold
Defended
No Data