



The Impact of Relief and Present-Day Geomorphological Processes on the Development of Rural Subcarpathian Settlements

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Originality of the Subcarpathian geography

Among the other geographical units of Romania, the Subcarpathians are outstanding through their peculiar morphology (Geografia României, 1992, pg. 178-189), and originality due to several individualizing traits such as:

- location at the periphery of the Carpathian Mountains, between the Moldova and the Motru valleys is the result of their evolution inside the - Pericarpathian Depression a vast Neogene molasses accumulation realm. Tectonisation of Mio-Pliocene formations is a pertinent proof that the Carpathian orogene has been a continuous process in this area.

- highly varied relief, and moreover, the association of depressions (some of them very large ones actual flat fields, as it were, others branched out by local subsidence) with hilly massifs (quite imposing close to the mountains, vere similar to them in point of landscape, but decreasing towards the outside, yet still dominating the landscape. It is not an aspect of transition alone, but rather one of Subcarpathian originality.

- vulnerability to the action of channel-bed and slope geomorphological processes ensuing both from brittle surface deposits and a highly variable regime of precipitation, with frequent cyclonic masses of air bringing about torrential rains;

- the main Subcarpathian valleys are usually transversal, as wide as some depressionary passageways, the physiognomy of settlements is marked by a succession of water junction areas;

- the dominance of hills over depressions accounts for the wealth of forestland (about 40% of

the Subcarpathian area) against other types of grounds;

- the wealth of natural resources has turned to Subcarpathians into by far the oldest and best populated relief unit (nearly 10% of Romania's inhabitants live on 6.9% of its territory), (Geografia României, 1992, p. 209);

- subcarpathian settlements, traditionally Divided into two large groups - permanent and temporary - are found up to altitudes of 600, sometimes 900m.

- the region features by a great density of settlements (12.2/100 sq. km against 5.6/100 sq. km, the all country density).

These are a few, but significant traits accounting for the originality of the Subcarpathian environment within the country's landscape, for the old-standing and intense humanization of the area and the peculiar functional and typological diversity of its settlements (size, structure, texture, shape).

The relief, a reference factor of the Subcarpathian settlements

If the geographical originality of the Subcarpathian land emerges from syntheses on its geographical components, the role played by its relief in engendering regional anthropogeographical differences is discussed mainly in regional studies (David, 1932; Conca, 1932; Rădulescu, 1937; Popp, 1939; Cucu, 1963; Băcănar, 1971), in surveys of several Subcarpathian regions (Baranovsky, Băcănar, Bugă, Rusenescu, 1975; Cucu, Cădea, Nancu, 1987), or approaches to the basic issues of the

countryside (Cucu, 1977; Erdeli, Căndea, 1984). In all of them the relief is seen as a factor of reference in the setting up and evolution of Subcarpathian settlements.

In undertaking the present study we proceeded from the same idea of the relief being the substrate of all the other environmental components. Together with geomorphological processes it accounts for the development of rural settlements in this zone. Appraising the evolution of villages in terms of relief index variations (Dinu, Cioca, 1997) may become a criterion for the classification of some of these settlements.

Although land degradation in the village hearth was reported in former studies too, (Basarabeanu, Buga, Erdeli, 1979), the aim of this approach is to outline the geomorphological limits of rural space use, based on morphometrical indicators and field investigation into the extension of current geomorphological processes, vulnerability of lands and constructions.

A characteristic feature of the Subcarpathian landscape is the dominance of hills against depressions. In the beginning, it was forest land that covered most of the area, a reality revealed by toponymy - a number of 70 villages (3.5% of all the Subcarpathian ones) being named accordingly: Pădureni (people of the forest), Stejaru (oak), Paltinu (sycamore), Păltinis (sycamore groove), Anini, Aninoasa (alder), Ulmetu (elm), Frasin (ash), Brădet, Brădetu, Brădişor, Brădăceşti (fir), Tisa (yew), Arşaru (maple), (Geografia României, 1992, p. 210). With the population increasing the woods were cut off and pasture land extended, a process reflected in the names of nearly 50 villages (2.5% of their Subcarpathian total): Arsuri, Arşiţa (burn), Poeni, Poiana, Poienari (glade), Runc, Runcu, Secătura, Băta (cut off).

Other toponyms indicate homesteads or villages destroyed by slope or channel-bed geomorphological processes: Vârtop (slide), Ruptura, Pe Ruptură (gully), Glodu, Glodeni (mud), etc.

From times immemorial, the Subcarpathian depressions have been much more populated than their forest-rich hills. What made people raise settlements at the contact with the mountain and with the piedmont of the lowland, respectively was the possibility to use resources complementary to those landforms. There are two alignments of settlements in the submontane depressions: submountainous, which are older, and subhilly, of more recent date. In the course of centuries, hillsides and hilltops started being invaded by pastures and hayfields (representing 37% of today's agricultural land), occupied first by sheppens and next by villages. Rich in natural resources, the Subcarpathians have attracted many

settlers in the course of time. Their social-economic life used to concentrate on putting these riches to account. The old roads crossing the Subcarpathian valleys stand proof to a varied economic activity. They were used, as toponymy reveals, by local producers and traders - salt road; crude oil road; petroleum sellers' road; lime dealers' road; fruit-sellers' road. In time, a few settlements appeared along these routes. They were small, because flood-free spots were few. In the beginning, they were used as temporary residences, but as the population kept growing, they acquired a permanent character, developing first into small and, after a while, into larger villages and extending also on grounds at high risk from floods and slope geomorphological processes.

There are situations in which the relief index of some village hearths shows variations of between a few metres and hundreds of meters, which may to a certain extent suggest their location in the valley (on floodplain terraces, lower terraces, glacia base), on slopes or interfluves:

-villages based on floodplain terraces (Bengeşti Ciocădia, Gorj; Dumbrava, Neamţ), on lower terraces, and at the foot of glacia (Mateeşti-Turceşti, Berbeşti, Vâlcea; Brebu, Prahova; Borleşti, Bacău), relief index 25-35 m. This location offers the greatest stability. But, if extended to the fringes of the floodplain, they stand the risk of channel-bed geomorphological processes, or of the deposition of slope materials carried by them. This type of settlements, lining either one side of the channel (eg. The asymmetrical valleys) or both, depending on how much extended the lower terraces are, is characteristic of the Subcarpathians. Often enough, villages have come together, but in numerous cases they are separated by wide alluvial fans, formed concomitantly with, or subsequently to their emergence;

-villages situated on slopes, with lands at risk from major geomorphological processes, relief index over 150 m (Cătăuţi, 180 m; Secăria, 183 m; Brăduleţ, 228 m), or over 300 m (Jitia de Sus, 300 m; Pietroasele-Câlţeşti, 310 m; Rădăcineşti 330 m). Most of these slopes, corresponding to some old sliding deluvia, are rippled, which made people build their homesteads on segments of greater stability (milder declivity), or on insular outcrops of basic rock; therefore like constructions occur throughout the surface of the slope. The winding network of roads is often affected by landsliding and gullying;

-villages raised on interfluves with scattered hearth, relief index 50-100 m; on interfluve benches (Berteia, Predeal-Sărari), or on the structure-controlled areas (Runcu-Gropeni), relief index 40-60m; in the neighbourhood of the mountains (Băsăşti, Bahnele,

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Tazlău) or on the highly ramified interfluvial summits (Biceștii de Sus), relief index 80-100 m, in which case they are associated with the downsagging of some sources and with enhanced gullying. The village hearth itself presents ramifications and, unlike the classical case of Subcarpathian junction areas, it follows the large display of secondary summits separated by deep torrential valleys (Bordea-Corni).

- complex villages have the widest spread.

When summits are narrowing, becoming unfit for the construction of new homesteads, villages would extend on the upper third section of slopes (Zmcărău, Bogdănești - Vâlcea county). In other situations, the settlements originally set up in a valley sector, would climb up on slopes or secondary summits, eg. Muereasca de Jos lying in the homonymous valley (relief index 40 m), enlarged farther upstream into Muereasca de Sus, which climbs upside the two, over 110 m high, slopes.

Geomorphological processes and the physiognomy of rural settlements

Although settlements were set up in areas apparently risk-free at a given moment, yet specific village evolution has created relief problems that have been impacting their very existence over the past century. The brutal reactivation of catastrophic processes after long periods of quiet has affected and changed the very structure of the village hearth or of its subsequently enlarged perimeter, the newly-built homesteads occupying risk-prone lands.

In time, the position and extension, development or regression of settlements suffered the impact of relief degradation processes.

In the beginning, settlement in the Subcarpathians involved only the terraces along transversal valleys (Băcănar, 1971); later on, many villages would be set up on tributary valleys, glacis, and hillsides. In many cases, the grounds formed of sliding deluvia stocked in the median and lower slope sections, appeared to be stable.

Even the villages set up on terraces or on summits, and often on interfluvial benches, if extended to marginal areas, would run geomorphological risks. Interfluvial may shrink as the source area of small torrential basins is expanding, or slide scarps retreat, eventually working substantial changes in the village hearth itself. There are cases when some villages developed in the source area of secondary basins

(Popești, Vâlcea county, at the sources of the Cacova Brook, where a few hamlets "climbed" up radially on the steep slopes: Deleni, Piscu Mare, Neghinești and Gruiu), or of small basins (Cățiașu, Buzău county, at the sources of its homonymous brook 600-900 m alt., avoiding the major valley and the torrential valleys of its tributaries.

The grounds on which these settlements stood would change their aspect not only from one valley to the other, but also from one day to the next, subjecting the Subcarpathian rural settlements to permanent transformations.

Unfortunately, the experience acquired by the recurrence of catastrophic natural phenomena has been ignored (dwellings and homesteads damaged by landslides, mudflows and floods), the population continuing to build their houses on the same spot two or three times in a row.

Experience has shown that people are resisting suggestions to have their homesteads rebuilt on safer ground. This happened also before 1989, and the more so today, when by virtue of their recently acquired ownership right over their landed property (Law No 18/1991) they are suspicious of any interference.

Insofar as village hearths and commons are affected, natural, risk-prone settlements in the Subcarpathians fall into four categories:

- settlements at low risk from erosion lie on the surface of terraces and interfluvial summits (Fig. 1), but if enlarged to the edge point, they stand, the risk of erosion advancing on the terrace scarps and on the steep slopes;

- settlements at moderate and high risk are located on slopes with 5°-25° dip and a 0,5 - 3 m-thick cover of deluvial deposits affected by mass movements and deep erosion, susceptible of seasonal reactivation in case of exceptionally heavy rainfalls and strong earthquakes (Fig. 2);

- settlements situated at the foot of steep slopes (cuestas, high terrace scarps), on terraces, alluvial fans or along valleysides subjected to gravitational processes and sensitive to seismic shocks. Whenever such events occur, it is not only fine-grained particles that start moving, but also block-sized-rock fragments, (Fig. 3, 4, 5);

- settlements standing on the floodplain terrace and at the foot of glacis, or along the small torrential basins are at low, moderate and high risk from floods and floodwaves.

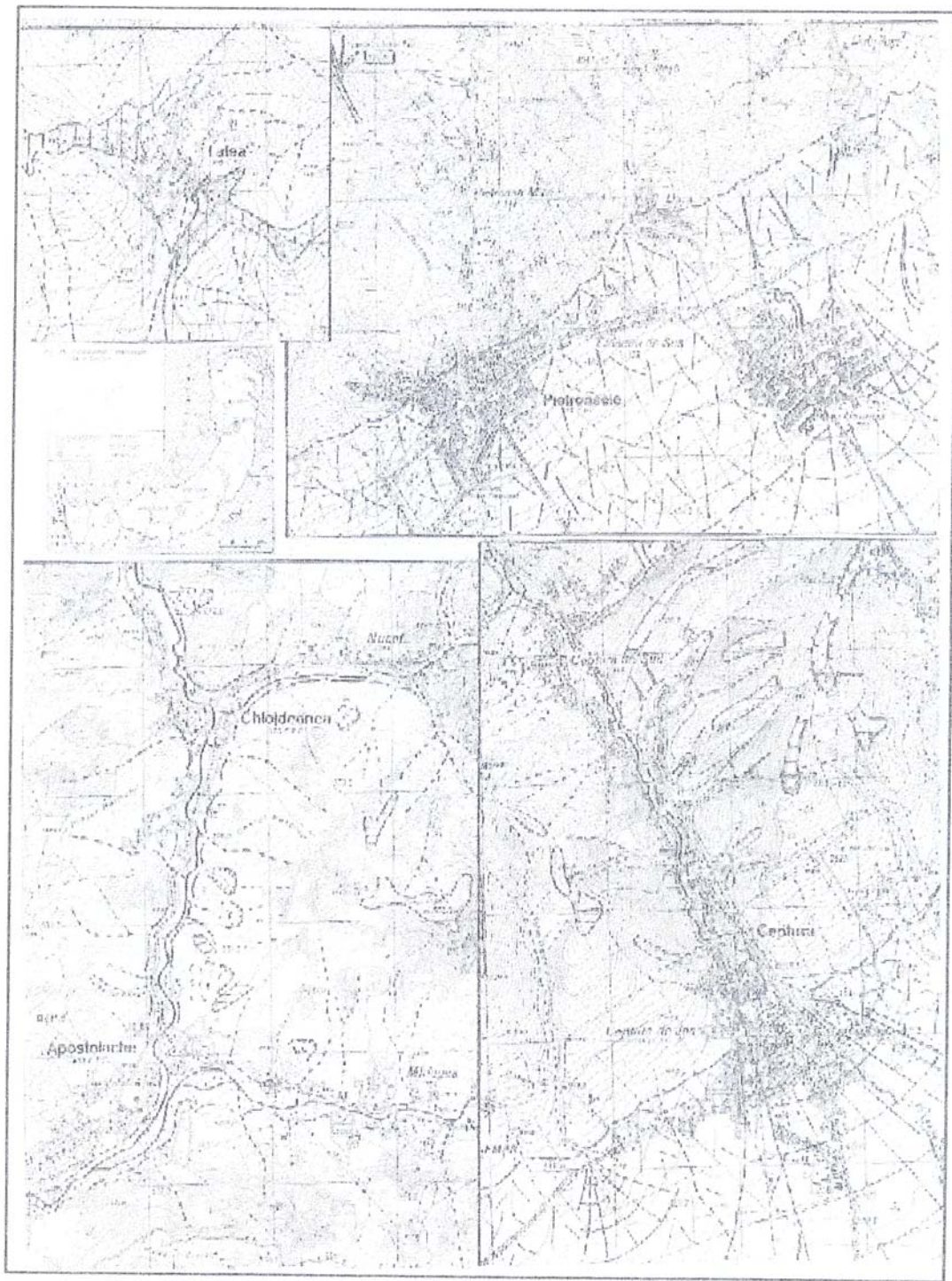


Figure 2. Curvature Subcarpathian.

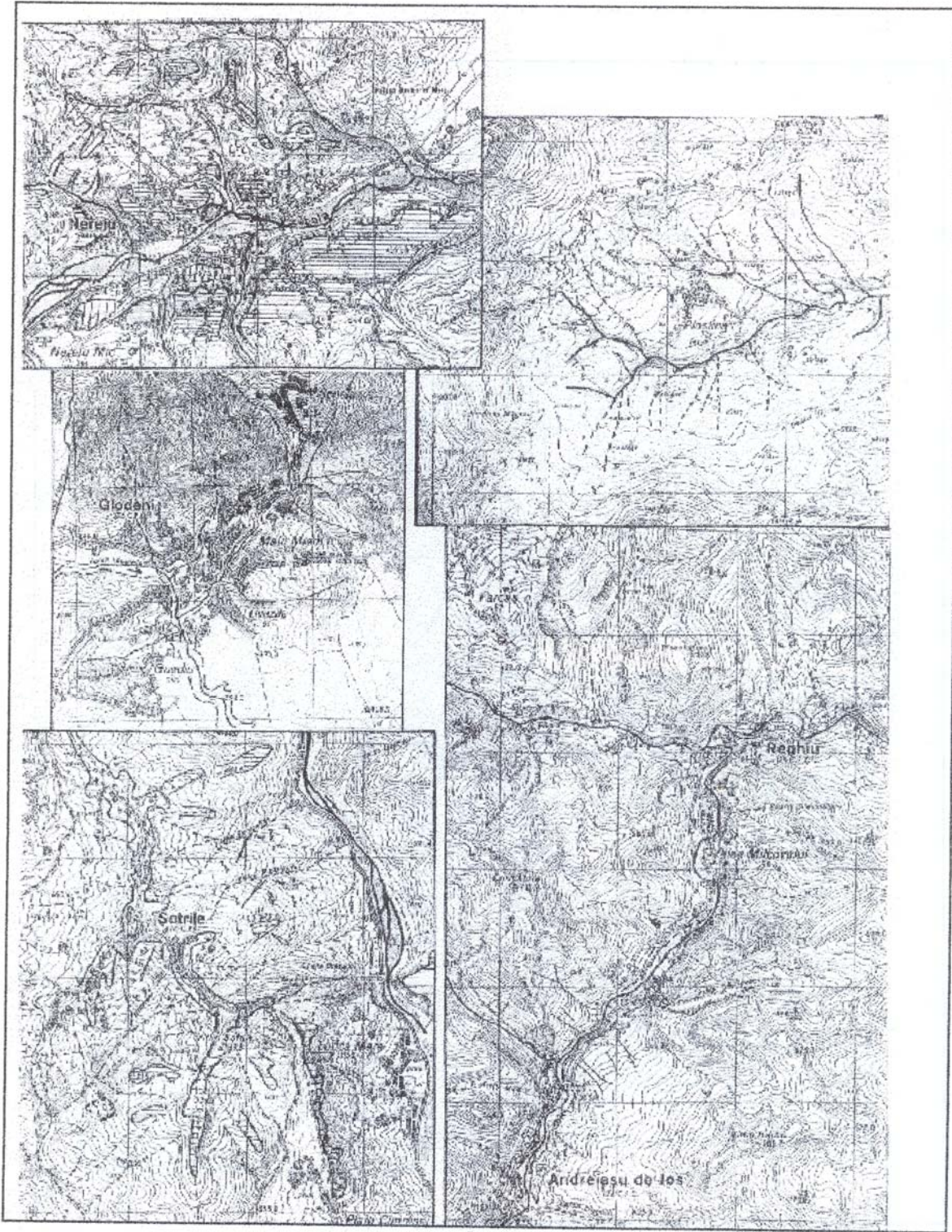


Figure 3. Curvature Subcarpathian.

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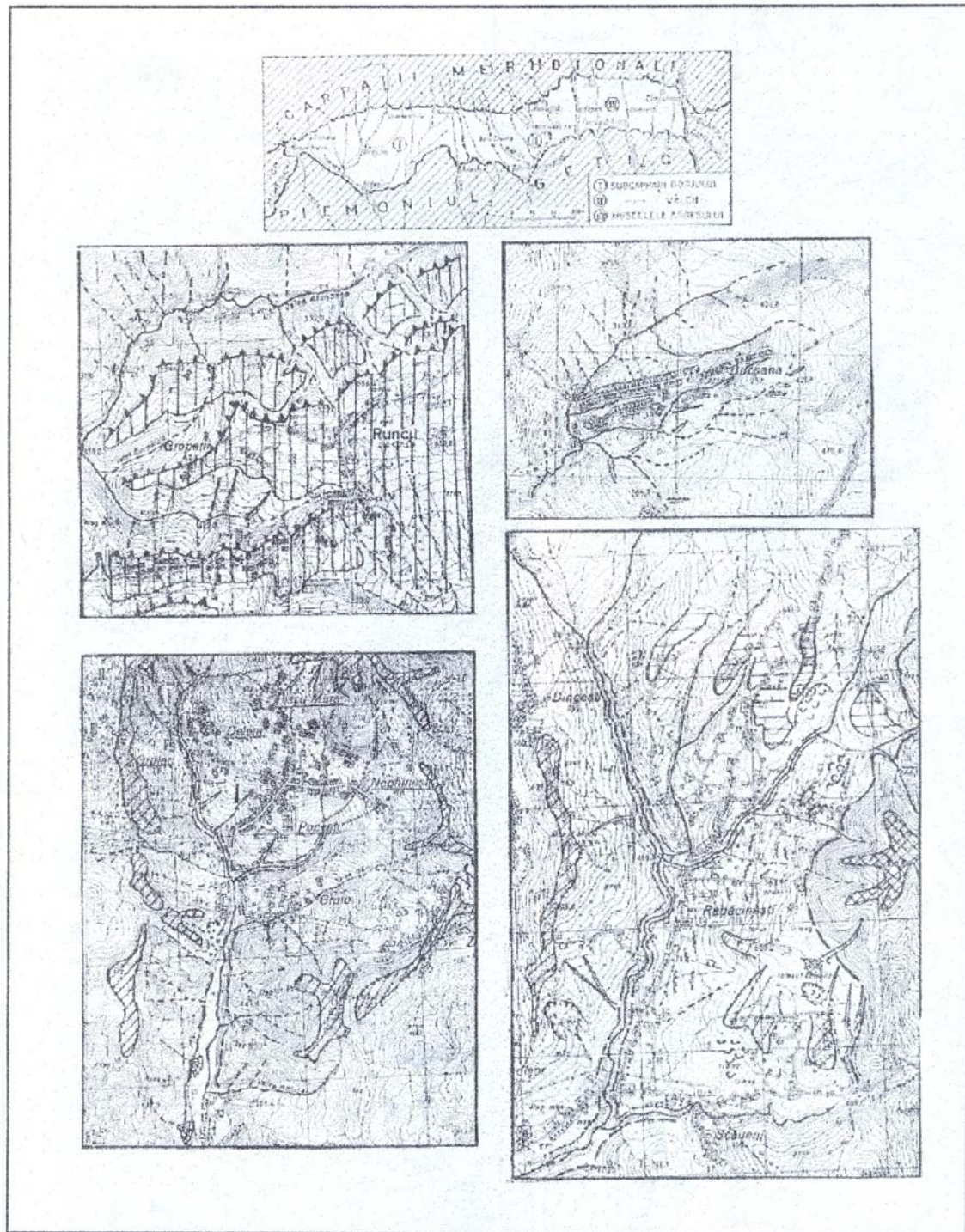


Figure 4. Getical Subcarpathian.

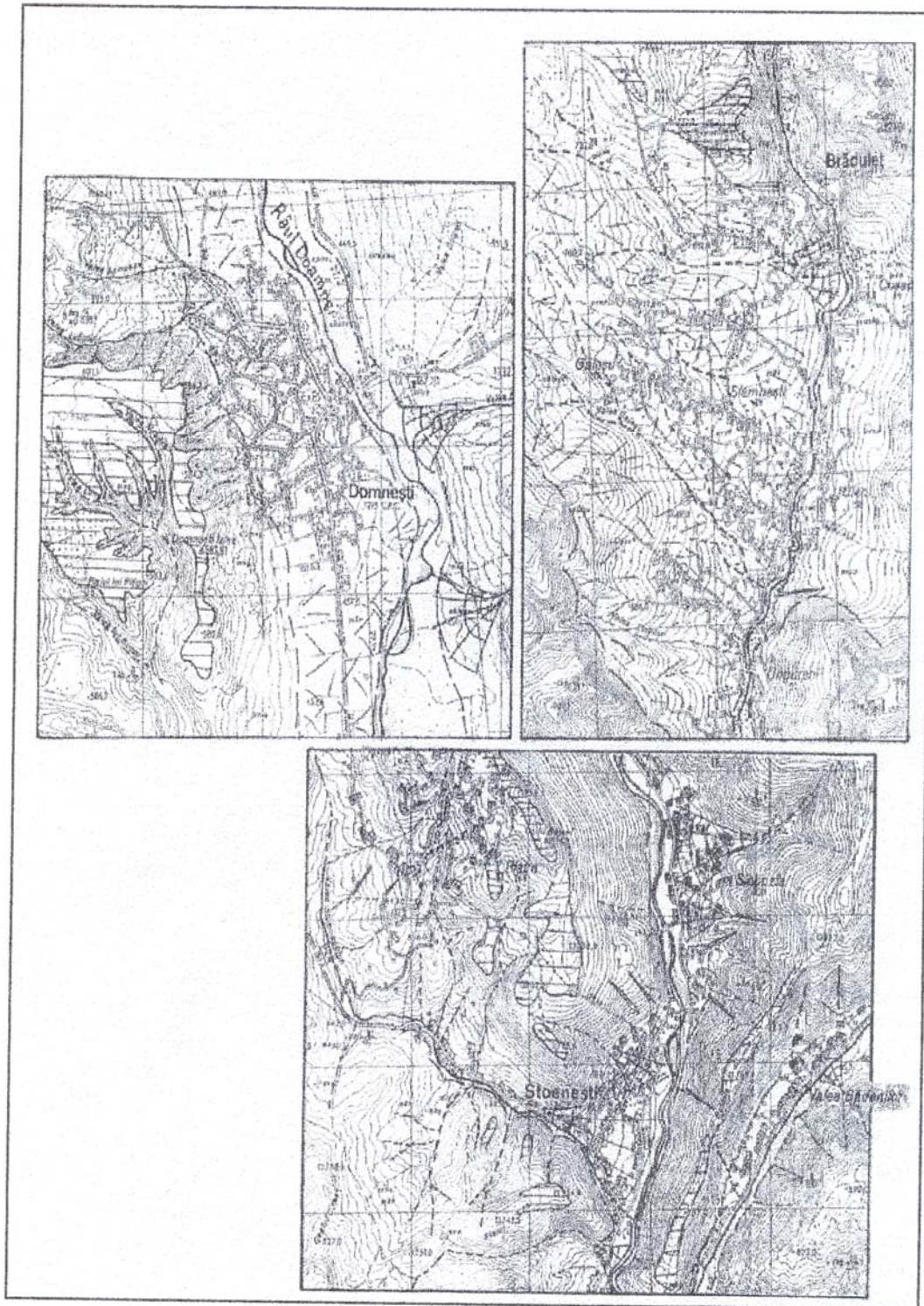


Figure 5. Getical Subcarpathian.

Conclusions

1) The great diversity of natural elements in the Subcarpathian space, among which the relief is outstandingly unique, has produced a "Subcarpathian model" of humanisation of this geographical area.

2) The Subcarpathian relief is dominated by slopes and fragmentation, prone to fastgoing natural dynamics, to great climatic variability and an increasingly stronger human pressure over the past century. This reality raises serious problems for rural planners today. Building a modern settlement network in the Subcarpathians means concentrating the population and avoid constructing on the fragile soil of slopes; homesteads, should be located on flat and as secure as possible ground, in other words, "back onto terrace land".

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