

Preliminary Sedimentological-Petrophysical Consideration on the Geotechnical Potential of the „Plaiul Păduchiosu” Land

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Abstract

On the base of the regional geological interpretation of the existing situation, combined with sedimentological-petrophysical analysis (from outcrops and drillings) of the shallower deposits from the „Plaiul Păduchiosu” area (extra-village Sinaia, Dâmbovița county), it is made a detailed geomorphological description, as a premise for the geotechnical division in zones, for a better appreciation of the future buildings.

Key words: *geological-sedimentological-petrophysical premises, geomorphologic diagnosis, the appreciation of geotechnical potential, geotechnical division in zones for „Plaiul Păduchiosu” area.*

The present paper is referring to an area of approximately 50.000 m², from „Plaiul Păduchiosu” zone (from the east pericline ending of the Păduchiosu Mountain, in Bucegi Massive) (fig. 1) situated on the west slope of the peak localized between the basin of the Izvor River and Ialomicioara River, afferent to the pasture administrated by Buciumeni City Hall from Dâmbovița county and towards north-west, near the road traversed by DN 71, Sinaia-Fieni.

From geological-regional point of view, the studied location belonging to the Bratocea sub-unit of Eastern Carpathians, Ceahlău Unit (fig. 2, 3, 4), on the north anticline flank (orientation north east-south west) of the Plaiul Hoților-Plaiul Păduchiosu, where the stratigraphical outcrop context of the *Comarnic Layers* formation (Barremian-Aptian) and *Superior Sinaia Layers* formation (Hauterivian) is facilitating, through the different lithology of the constitutive layers, the presents of same cuesta with incompetent deposits on top, deposits which had created a depression form of relief of platform type covered by deluvial-proluvial quaternary deposits also involved in old and actual large ground sliding.

Superior Sinaia Layers (Cretaceous – Hauterivian) are represented (fig. 5) by rithmites in metrical package of soft argillaceous shale, marly-argillaceous, silty argillaceous, with rare and thin sandstone. *Comarnic Layers* (Cretaceous – Barremian-Aptian) are made, in base, from strong, foliated and plate marls, light grey strong, foliated and plated marls, of few meters thick with rare intercalations of calcareous marls; followed by marly schistes with intercalations of yellow-browened calcarenites with graded lamination and with orbitolines, with rare intercalation of microbreccias and conglomeratic calcareous breccias, in top with grey-blued or reddish marls and sand deposits of alteration with thin intercalation of silt or thin, calcareous sandstone with current structure.

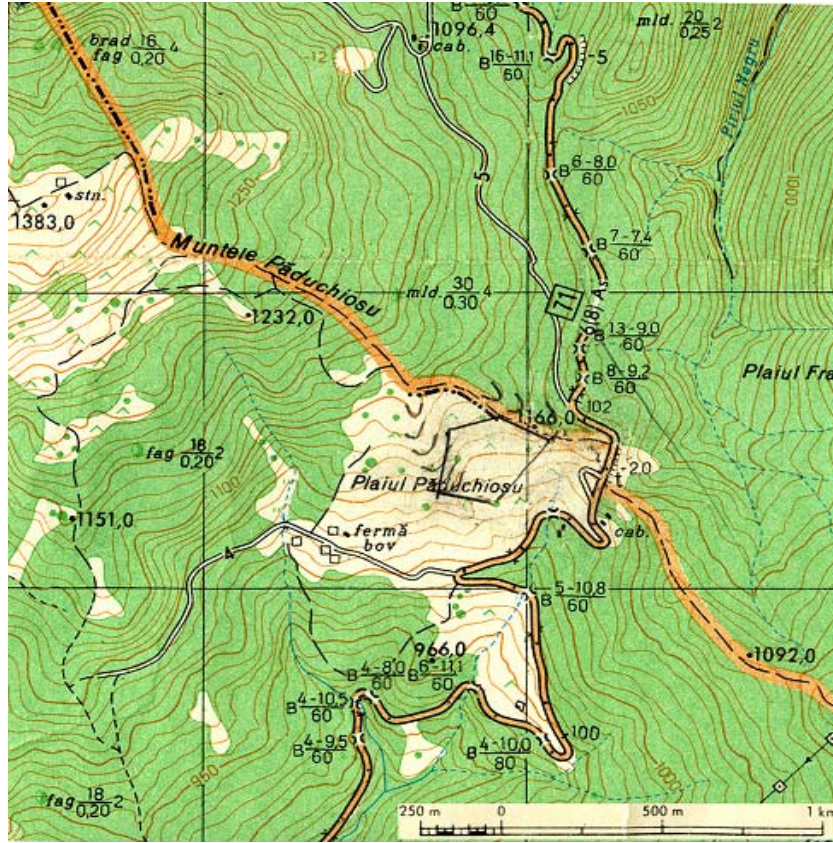


Fig. 1. Topographic map fragment in „Plaiul Păduchioșu” area, Bucegi Massif (scale 1:25.000).

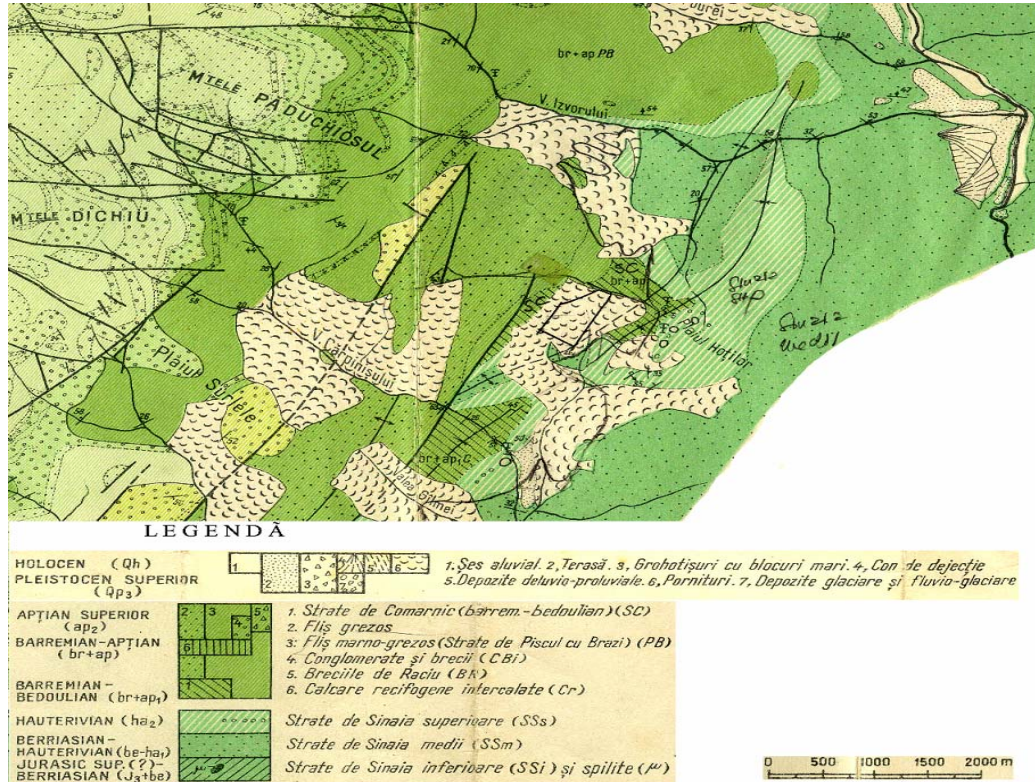


Fig. 2. Geologic map of the studied perimeter („Plaiul Păduchioșu” area, Păduchioșu Mountain, Bucegi Massif) (scale 1:50.000) (after D. Patrușiu, 1969).

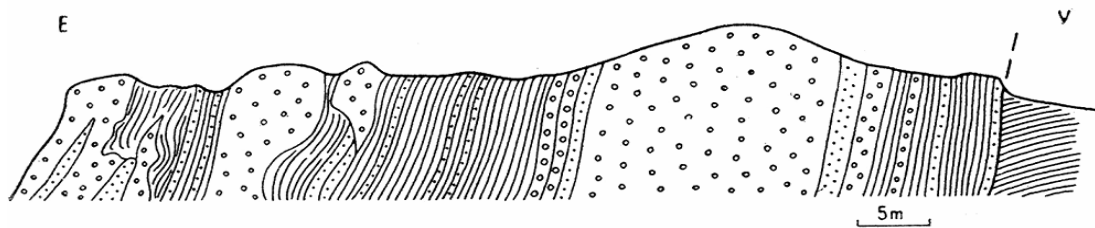


Fig. 3. Geological section across road Sinaia-Bolboci on the Păduchiosu mountain feet (marly-gresous facies with conglomeratic intercalations) (after D. Patrulea, 1969).

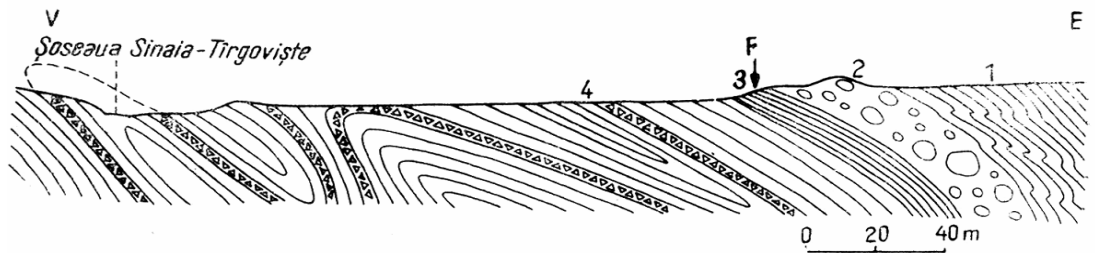


Fig. 4. Geological section in „Plaiul Hoților” (1. superior Sinaia layers: marly-clay schists and sandstone intercalations and variegated micro-breccias; 2. tilloidal conglomerates with olistolites from limestone Stramberg type; 3. strong marls with fucoids, ammonites and plants debris; 4. marl-sandy schists with calcarenites intercalations; F – fossil-bearing) (after D. Patrulea, 1969).

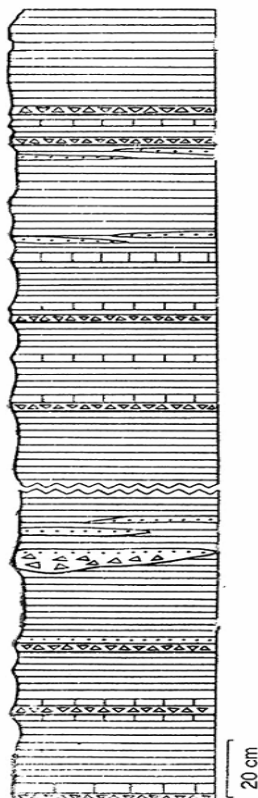


Fig. 5. Synthetic lithological column of the superior Sinaia layers (after D. Patrulea, 1969).

Quaternary deluvium (superior Pleistocene-Holocene) is made of dejection cons and slides planes at over 850 meters, situated on same erosion platforms in the interval 1050-1150 meters. In section, the deluvial material is assimilated with a mélange of heterogenic detritus, predominantly thick and medium, associated with argillaceous shale and thin foliated sandstones matrix, holded together by a binger formed of sandy, yellow shale which in top are becoming predominantly. The deluvial material lend has a maximum thickness of 6-8 meters, in the central-west aria of the perimeter and is finishing at 3-2-0 meters thickness in the east extremity of the perimeter.

From geomorphologic-regional point of view, the studied perimeter is framing in the east pericline of Păduchiosu Mountain, from south-east edge of Bucegi Massive, situated on the west slope of the peak localized between the basin of the Izvor River and Ialomicioara River, in the local context of a depression circle of ground slides, delimited in the east part by the above remembered peak and proximal peak in west side. This peaks are delimited by detach abrupts of same ground slides stronger in the depth (6-8m) towards the center of the depression and attenuated toward the east side (2-4m). This is drained by a valley (orientated north-south), which at the entering in the depression is separating, because of the different slided ground masses from the slopes, in two-three torrential valleys, in which are connected other erosion valleys or little depressions which are spreading from the east and

west edges of the remembered peaks. The greatest gradient of the depression slope is in medium 20-25° in south, attenuated at 10-15° toward the south limit of the perimeter, from were, the gradient rises toward the first curve of DN 1 (from the height of inter-channel towards Fieni).

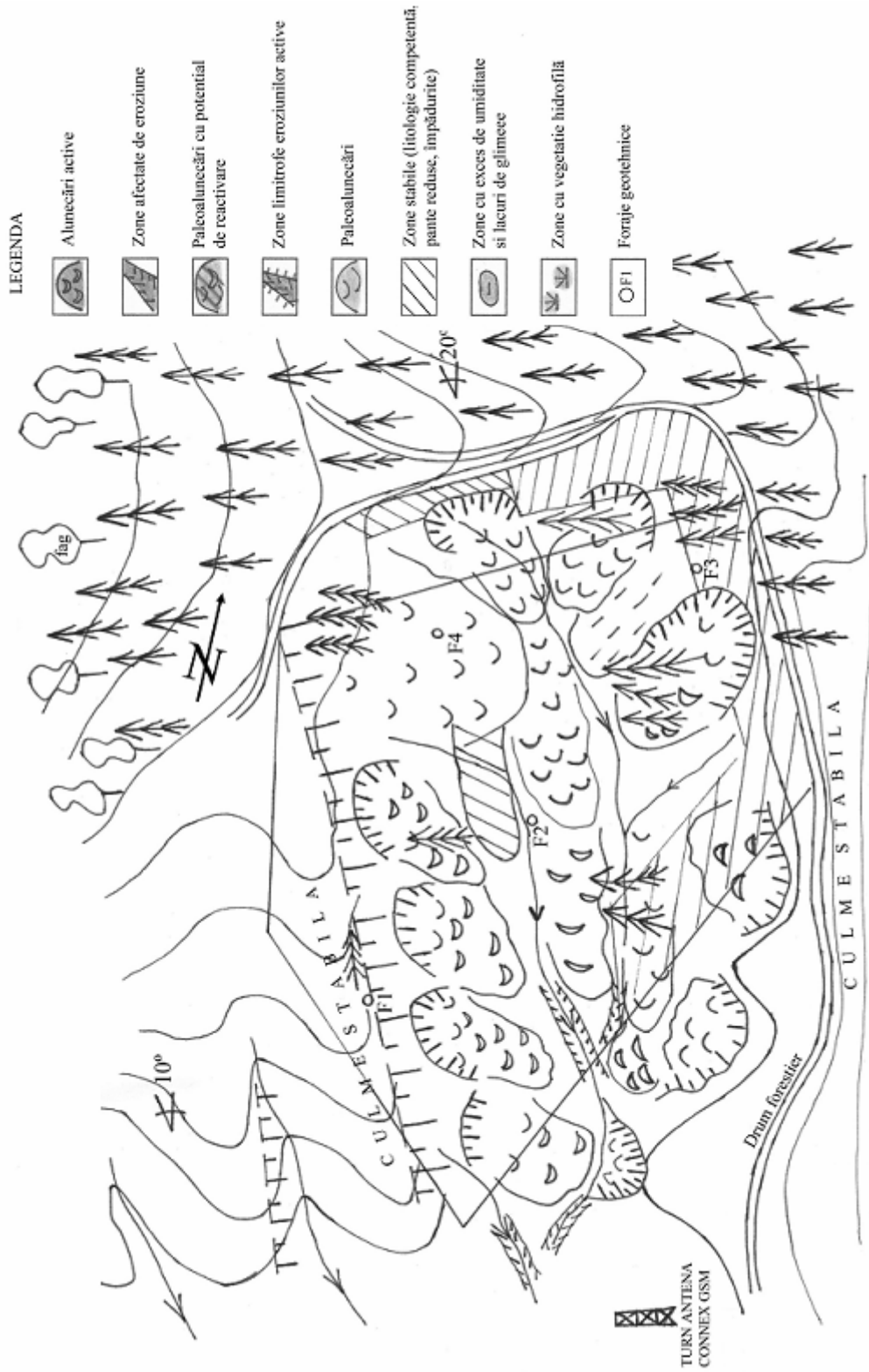


Fig. 6. Geomorphological sketch of the studied perimeter from „Plaiul Păduchiosu” area, Bucegi Massive (no scale).

The ensemble of ground slides masses is creating in the central area a specific form of relief of convexes and little depression with „glimee” lakes or with humidity excess, marked by a large hydrophilic vegetation development. The appearance of profound slide in the center of the depression with attenuation toward the nearby peaks is underlined also by the aspect of „fallen forest” of the pins and beeches from the mentioned perimeter. The big level difference between the central part of the depression and downstream extremity (the first curve, downstream motel PETROM towards Fieni), much more low, is creating a strong erosion appeal, determining greater depths for the erosion valleys thalweg (valley floor) and a strong erosion of the space between the slided masses with the accentuation of upstream masses unsteadiness. In the downstream half of the studied perimeter, the general gradient attenuation, and in particularly the attenuation of the east peak, is determining the sliming of the slided prism and the diminution of the movement tendency toward a stabile zone aspect, unaffected by slides.

Morphologically, the entire studied perimeter (fig. 6) is framing in a larger ground sliding zone, instable from geotechnical point of view. However, it can be appreciated that the land proximal to the forest road from east wing of the perimeter, is able for constructions on a band of approximate 10-15 m wide, which toward south can be enlarged to 50-100m wide. In north wing is also such a stability zone on an approximate 50m wide band, measured from the forest road toward west.

From lithological point of view, the local drilling investigation is showing the presence of some rock debris with medium-thick sandstone clast-rudites and conglomerates in argillaceous-sandy matrix, on top with yellowish sandy clays, of total thickness of 6-8 meters, in the central-west area; and a lithology of thin rock debris with argillaceous silts clast-rudites and thin sandstone, on top with sandy clays toward to east perimeter extremity. The under layer is presenting humidity excess in the entire perimeter, and in the middle is flooded.

In the case of building placement in the studied perimeter is suggested some preliminary ameliorate working of the land regarding the extension of the stable areas. Is also suggested the drainage of rain waters and of humidity excess from the slope by executing a draining ditch lag from the nearby peaks in a central outlet placed according to the greatest slope gradient. In the downstream wedge of the perimeter it will be made erosion stopping works: gabion or concrete wall with weepers. The entire area will be provided with a discrete lag of deep water homes for taking over the water from the slopes, with guidance towards a ditch projected lag. In the possibility is suggested the massive tree planting for land stabilization and slope draining humidity.

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Considerații sedimentologice-petrografice preliminare asupra potențialului geotehnic al terenului din „Plaiul Păduchiosu” (extravilan Sinaia, jud. Dâmbovița)

Rezumat

Pe baza interpretării situației geologice regionale existente, corelat cu analiza sedimentologică-petrografică (din aflorimente și foraje) a depozitelor superficiale din perimetrul „Plaiului Păduchiosu” (extravilan Sinaia) se face descrierea geomorfologică detaliată, ca premiză a zonării din punct de vedere geotehnic, în vederea aprecierii oportunității de amplasare a unor viitoare construcții.