

REBUILDING OF THE PALEO-CLIMATICAL CONDITIONS IN WHICH THE SEDIMENTARY FILLING OF PETROSANI FIELD WAS FORMED AND ACCUMULATED

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ABSTRACT. The lithogenesis of the epiclastites, which composes the sedimentary filling of the Petrosani Field, had been developed under a permanent influence of the geologic and climatic factors. The feature of the epiclastites, respectively their granulation, morphometry, color and the fossil flora that is conserved inside them permitted to be rebuilt the paleo-climatic conditions in which they had been formed. So, during the five levels of Petrosani Field had been formed, for the first and the third levels the climate was warm and arid, for the second and the fourth levels it was warm, temperate and wet, and for the fifth level it was temperate and wet. The climatic factors had a decisive role in the litho genesis of the sediments from Petrosani Field, controlling their formation and accumulation during its whole geological evolution.

ПРЕСЪЗДАВАНЕ НА ПАЛЕОКЛИМАТИЧНИТЕ УСЛОВИЯ, ПРИ КОИТО Е БИЛА ФОРМИРАНА И АКУМУЛИРАНА СЕДИМЕНТАЦИЯТА НА ПЕТРУШАНСКОТО ПОЛЕ

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Petrosani Field is situated in the central zone of the Meridional Carpathians Mountains, in the SW part of Romania, in Hunedoara County. It is delimited at North by the Retezat and Sureanu Mountains, at East by the Parang Mountains and the South by the Vulcan Mountains (Fig. 1).

The sedimentary filling of this field consists of six lithostatigraphic units (Moisescu, 1984) grouped in five formations (Popa, 1993). The source area, which purchased this detrital material, is constituted of the Gethic crystalline and the Danubian crystalline together with their sedimentary covers. The superficial part of this area was controlled by the

dynamic of the meteorological factors, by the temperature variations, the air humidity, the frost etc. The rocks fragmentation and the appearance of the elastics rocks is the consequence of the losing the rocks cohesion inside the processes of thermoclasty and chrioclasty. During these processes it is added the mechanical action made by the rivers and the torrents from this field, these agents being controlled by the relief. The form of the epiclastites deposits inside the Petrosani Field expresses the field morphology, the transport mechanism of the epiclastical material, the water flow, the field subsidence and the sedimentation rate.

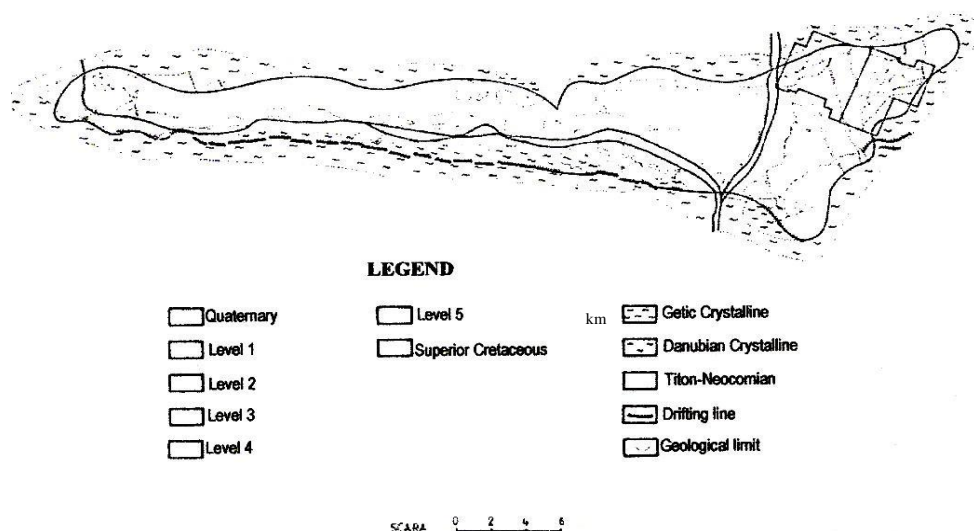


Fig. 1. The geological map of Petrosani basin

Under the action of the climatic factors, especially of the solar energy of the precipitation and atmosphere, in this field there had been developed the special litho genetics processes materialized in the formation of the sedimentary filling composed by five levels.

The five levels are, as follows:

- the first level or "Basic Level" has a thickness of 100-600 m having an average of 400 m. It consists of an alternation of clays (44.29%), grit stones (34%), conglomerates (20.66%), marls (0.51%), gresos lime (0.20%), red or green breccias (0.20%). The participation of the fossil flora and fauna is totally meaningless and the red color of the sediments and the absence of the fossil flora indicate a warm and arid climate in which there had been acted intense oxidation phenomena;
- the second level or "Productive Level" has a thickness of 300-500 m. It consists of an alternation of grey grit stones (34.4%), siltites (12.5%), black-grey clays (38%), black-grey marls (6.5%), micro-conglomerates (5.9%), limes (5%) and 20 layers of pit coal (5.5%).

During the sedimentation process of the inferior and middle part of this level, the climate was warm and wet, that is confirmed by the flora and fauna consisting of plants of wet and warm climate as follows: lauraceous (*Laurus primigenia*, *Paphnogene*), myriaceous (*Myrica lignitum*, *Myrica banksiaefolia*), moraceous (*Ficus*) basing on which there had been formed the coal reserves. The superior part of the level had been constituted in a climate that alternated from warm and arid to a temperate and wet one. The red deposits reflect the warm and arid climate characterized by the oxidation processes and the fossil flora with plants characterized by a temperate and wet climate.

Metulaceous (*Betula*, *Alnus*), cosilaceous (*Corpus Carpius grandis*), fagaceous (*fagus*), *Quercus* and also the argyles with high mineralogical content of illite (48%), caolinit (42%) and montmorillonit (5.6%). These argyle minerals are produced after a primary mineral alteration of the rocks from the source area in a temperate and wet climax. The presence of the grossier epiclastites and the grit sands and the micro-conglomerates indicate a regime based on the precipitations and with a high relief that generated the transport agents (torrents, rivers and rivulets), very strong, and capable of transporting and to sort this detrital material.

• the third level or "Middle Level" has a medium thickness of 575 m and with values between 100-800 m. Lithologically speaking this level is formed of some red, green and yellow grit sands (61.5 5%), of red-violet, brown-green argyles lentils and green-white marls (2.34%) and green - white conglomerates (4.54%). These epiclastites are poor in fossil flora and fauna and they suggest that they had been sedimented in a warm and temperate climate, which predominates in lacuster waters that communicated with the sea field. The moments when the climate had been temperate and warm are indicated by the presence of coal and grossier epiclastites having a crossing stratification. The modest participation of the intercalations of calumin coming from a flora and fauna of temperate and warm climate is another fact that confirms this climate.

- the fourth level or "Clay level with coal intercalations" has a

thickness of 400-600 m, being constituted from an alternation of grit and sands being represented by clays (45.28%) and marls (2.81 %), conglomerates (3.15%) and coal (0.86%). The coal forms thin layers, discontinuous and lenticular ones. The climate in which this level is formed is a warm and temperate one and with many precipitations.

- the fifth level or "Terminal level" is divided into two sub-levels, as follows:

- the grezos sub-level with a marine fauna of the Corus layer type with a thickness that ranges between 400m and 500m. It is composed of smooth grits, grossier grits and yellow-grayed sands in subordinate marls mode, leticular intercalations of coal. These epiclastis have formed in a temperate climate rich in rains.

- the sub-level with gravel and rock gravel has a thickness between 120m and 800m. It is composed of weak concreted gravels with a different degree of rolling and structuring, grits, grezos marls of a gray-green color. The grossier texture of the clasts and the gray-green color of these plead for a temperate climate, very rich in rains which favorites by a mountain relief of the source area, has generated energy transport agents capable of carrying these grossier rudits.

Conclusions

The climate in Oligocen and inferior Miocen, the time interval in which has formed the sediment of Petrosani Field has been hot and arid for the first and third levels, hot temperate and humid for the second and fourth levels and temperate and humid for the fifth level and with very rich precipitations for the fifth level with gravel and rock gravel.

The arguments that justify the recognition of these types of climate are:

- for the hot and arid climate; the red color of the formations, the absence or the modest participation of the fossils flora; the existence of the oxidation and increased salinity of the water due to an intense evaporation process;
- for the hot and humid climate; the characteristic fossils flora, with lauraceae over miricaceae, the decreased salinity of the sedimentary environment;
- for the temperate and hot climate; the presence of the characteristic flora with betulacees, corilacees and fagocées; the presence of secondary kaolinite minerals, montomorillonite illite, etc., and the gray color of the epiclastics.

The epiclastics granulometry suggest the precipitation regime. Thus, the grossier formations with rounded and sorted clasts indicate energetic transportation agents that appear due to rich precipitations and a mountain relief in the source aria.

The smooth lutilical fraction indicates a suspension transport with decreased relief energetic and much modest precipitations contribution. The torrential stratification suggests energetic moments of transport with a reduced route and limited sorting.

Being known the actual cause which generates the appearance of epiclastics with their structural varieties, the chemical and color texture, we can reconstitute, through an adequate interpretation, the past conditions when similar rocks.

Table 1. Criteria which allowed the Paleo-climatic constitution

Levels	Color	Flora and fauna	Clayous minerals	Coals	Structure	Stratigraphic relations	Climate
L5	Yellowish-brown Grey-brown	Miricaceae Lauraceae Moraceae Betulaceae Corilaceae Fagaceae	5.2 kaolinite and 10% illite 26% montmorillonite 55% 5.1 kaolinite 20%, illite 28%, montmorillonite 43%	-	Torrential	Transgressive and discordant	Warm and arid Warm and damp Temperate and damp
L4	Grey	Fauna with molluscs crassostrea gryphoides aginensis	Kaolinite 17%, illite 28%, montmorillonite 44%	Thin interbedded Coals	Parallel stratification	Concordant	Warm, temperate and damp
L3	Greenish and red cherry-colored	Flora and fauna poor in fossil	Kaolinite 12%, illite 31%, Montmorillonite 49%	Thin interbedded coals	Crossed torrential	Concordant with L2	Warm and arid Temperate and damp
L2	Grey-greenish	Lauraceae Miricaceae Moraceae, Corilaceae betulaceae	Kaolinite 48%, illite 42 %, montmorillonite 5%	20 layers of coal productive horizon	Parallel stratification	Concordant with L1	Temperate and damp Warm and damp Episodic arid
L1	Reddish cherry-colored	-	Kaolinite 27%, illite 34%, montmorillonite 35%	-	Torrential	Transgressive and discordant over the foundation	Warm and arid Heavy precipitations episodically

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