C. FIELDWORK ACTIVITIES

This material speaks of the third objective of the project:

3. THE IDENTIFICATION AND DESCRIPTION OF THE MAIN TECTONIC ALIGNMENTS THAT WERE ASSOCIATED WITH MAGMATIC ACTIVITY, BASED ON GEOLOGICAL AND GEOPHYSICAL DATA - FIELDWORK

3.1. GEOLOGICAL STUDIES IN THE PERȘANI MOUNTAINS

Fieldwork was performed in the Perșani Mountains in order to identify the volcanic structures, to constrain the processes that influenced the types of eruption and in order to identify the tectonic elements which favored the transportation and extrusion of magmas. The working methodology was based on detailed mapping of the volcanic area and on describing the structural, textural and compositional features of the magmatic deposits, and the spatial relation between them. A first result was the discovery of 6 new volcanic structures that were previously unknown. They consist in 6 craters associated with phreatomagmatic deposits (tuff rings and maars), 4 lava flow fields and 3 strombolian scoria cones. A part of the new cartographic image is shown in figure 13, as an interpretative tectonic and volcanologic sketch.

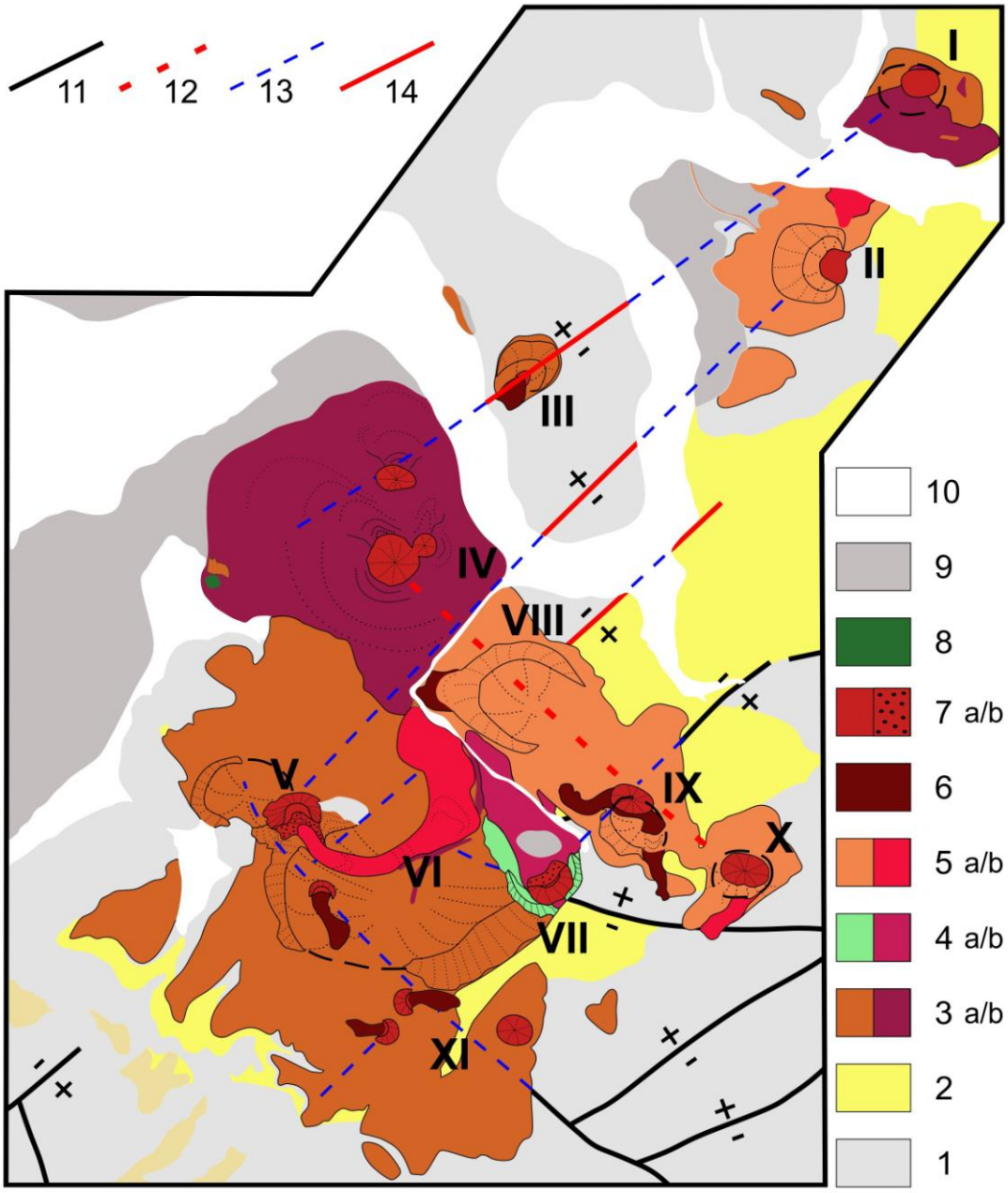

Fig. 13. – Tectonic and volcanologic interpretative sketch of the alkali basalt volcanic field from the Perșani Mountains. Legend: 1-Ante-pleistocene geological formations, 2-miocene tuffs, 3a-phreatomagmatic deposits 1.2Ma, 3b-lava flows 1.2Ma, 4a-phreatomagmatic deposits 800Ka, 4b-lava flows 800Ka, 5a-phreatomagmatic deposits 600Ka, 5b-lava flows 600Ka, 6-undated lava flows, 7a-strombolian scoria cones, 7b-strombolian debris deposits, 8-travertine, 9 – Pleistocene sedimentary deposits, 10 – quaternary sedimentary deposits, 11-faults, 12-presumed faults, 13-extension of faults, 14-faults derived from topographic profiles. I- Racoș volcano, II- Mateiaș volcano, III

Turzun volcano, IV- Măguricea volcanic structure, V- Gruiu volcano, VI- Bârc volcanic structure, VII- 636 volcanic structure, VIII- Bogata 1 volcano, IX- Bogata 2 volcano, X- Bogata 3 volcano (Pietrele).

The volcanic structures are disposed on NW-SE and NE-SW oriented alignments, which suggest a tectonic control. Two normal fault systems which coincide with this lineaments have been observed, the volcanoes being located especially at their intersection. The NE-SW trending faults are the most common, leading to the subsidence of basement compartments. These appear as depression-like structures, filled by volcanic material. The compartment that has subsided the most coincides with the volcanic field of Bogata valley, where lava flows from Măguricea, Gruiu, 636 and Bogata converge. As for Turzun volcano, which is considered to be one of the oldest structures, it can be observed that the volcanic deposits are slightly affected by faults, suggesting that the faults were active not only prior and during the eruption, but also afterwards. We can already conclude that the faults were the access routes for magmas towards the surface, and that the multitude of intersections between the two mentioned tectonic systems have controlled the monogenetic nature of volcanism. For mechanical reasons, it was easier for eruptive centers to migrate, than for magmas to erupt from the pre-existing vent areas.

Fieldwork data indicates that, with only a few exceptions, the eruptions followed the same general pattern, with each volcano passing through 3 phases. The first phase was explosive phreatomagmatic, generated by the interaction of magma and groundwater from basement Miocene tuffs, conglomerates and Cretaceous limestone. Sometimes, shifts from a phreatomagmatic to phreatic character and vice-versa can be observed. This was induced by varying amounts of magma and water that came into contact. Tuff ring and maar crater structures are developed in this first phase. The second phase is explosive magmatic, generating strombolian scoria cones. The third phase is effusive and characterized by the emplacement of successive lava flows fields, which either dislodge portions of the scoria cones (as in Gruiu and 636), either seep from the base of the cones. In this last case, observed at Măguricea, Bogata 3 (Pietrele), Trestia, Comana and Racoș, the morphology of the volcano is not evidently affected.

The exception from this pattern are the structures of Bârc valley (the widest tuff ring structure, with no strombolian phase and with lava flows infiltrated in the intra-crater

phreatomagmatic deposits), Bogata 1, Comana Nord and Comana Vest (similar in behavior with the previous example), NV Gruiu (which only shows the first phase) and the volcanoes from Trestia valley (with no phreatomagmatic structures, showing only strombolian and sometimes effusive behavior).