3.2. GEOLOGICAL STUDIES IN THE SUBVOLCANIC AREA FROM THE RODNA-BÂRGĂU MOUNTAINS

Structural fieldwork studies have been performed, focused on the tectonic evolution of the Upper Miocene intrusions from the western extremity of the Rodna-Bârgău area. Petrographic and tectonic observations were also made on the Paleogene sedimentary deposits and metamorphic rocks which host the intrusions. The structural relations between the intrusions and host rocks were described and measured.

The Eastern Carpathians, as we know them today, have been shaped during the Miocene-Pliocene tectonic events (Săndulescu, 1984; Huismans et al. 1997; Maţenco et al. 2003). This is due to the fact that the Middle Cretaceous to Paleogene continental accretion was followed by a similar event in the Middle Miocene. This second accretion resulted in the Moldavides being thrust over the East European Platform (Săndulescu, 1984, 1988; Csontos, 1995). This event generated transpressive – transtensive crustal movements (Tischler et al. 2006), witch lead to local crustal extension (in the Median Dacides and in the east side of the Transylvanian Basin). In areas such as Rodna and Bârgău, isostatic balance has been achieved through the movement of individual tectonic compartments (Sanders et al. 1999). All these Middle to Upper Miocene processes lead to the emplacement of the magmatic intrusions from Rodna and Bârgău, as well as in neighboring areas (Pécskay et al. 1995a,b; Pécskay et al. 2009). This was preceded by a rhyolitic explosive event that happened in the Transylvanian Basin and generated the Dej tuff (Szakacs, 2000). Afterwards, controlled by the same tectonic regime dominated by tectonic exhumation (Sanders et al. 1999), a dominantly extrusive magmatism was developed from the Călimani towards the Perşani Mountains in the south, and towards the north-west from Oaş to Gutâi (Fielitz, Seghedi 2005; Seghedi et al. 2005;

Kovacs et al. 1995; Szakacs, Seghedi, 1995, 1996; Seghedi et al. 1998; Mason et al. 1998; Downes et al., 1995).

In the Rodna-Bârgău area, according to the stratigraphy described in the 1:50000 scale maps (Rebra, Rodna Veche, Ineu, Pietrosul Rodnei sheets), the Paleocene deposits are missing, thus confirming the post-Austric exhumation which affected the Rodna Massif (Gröger, 2006). This was followed by subsidence in the Bârgău area, as the Eocene deposits that overly the metamorphic and Cretaceous basement suggest. Sedimentation continues generally uninterrupted until the Middle Miocene.

To the south-west of the Bârgău area, the Burdigalian molasses deposits formed during the Pienides thrust event can be found (Săndulescu 1984, 1994). At the end of the Burdigalian a transpressive – transtensive regime is initiated along the Dragoș Vodă and North-Transylvanian fault systems; this generates the Rodna asymmetric horst and also affects the neighboring areas and Pannonic Basin (Györfi et al. 1999).

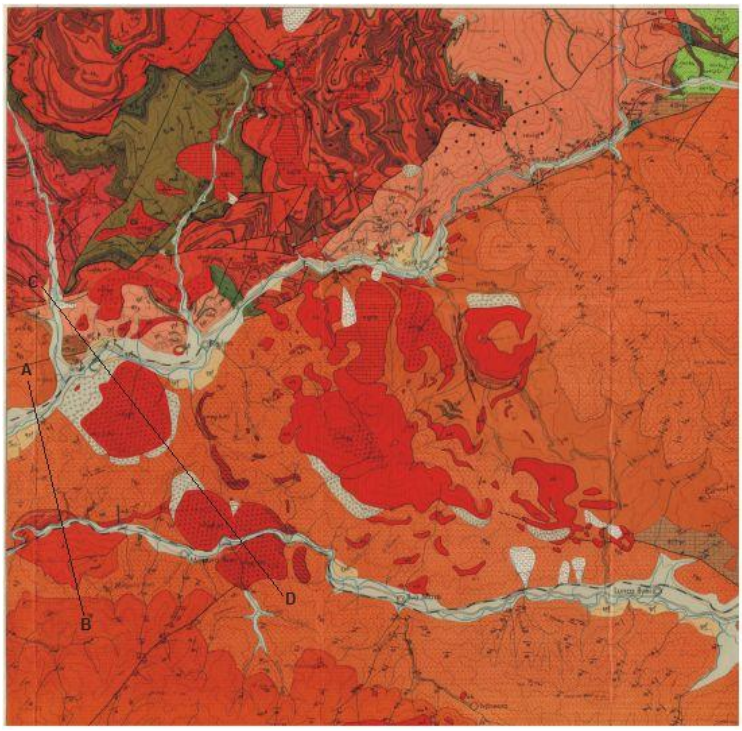

Fig. 14. - Rodna Veche geological map, 1:50000 scale, (Kraütner et al., 1978) showing the orientation of the A-B and C-D geological profiles. Legend according to the geological map of Romania, edited by the Geological Institute of Romania.

This tectonic regime was also active during the Upper Miocene, when then transtensive component became dominant on a large extent, from the Rodna-Bârgău region to the Pannonian Basin (Györfi et al. 1999; Ciulavu, 1999; Gröger, 2006; Tischler et al. 2006). This results in local extensions, which favour the generation, transport and emplacement of magmas (Pécskay et al. 1995a,b; Pécskay et al. 2009), the intrusions being emplaced in a relatively short time interval, between 11,5 and 8 Ma. The intrusions pierce through all the basement formation, starting with the Rodna metamorphic unit, until the Upper Miocene sedimentary deposits (Figs. 14, 15, 16). Their spatial distribution and relation with the host rocks suggests that an extensional regime was involved. At this moment, a relevant statistical analysis is not yet possible, due to the fact that more cinematic indicators need to be measured.

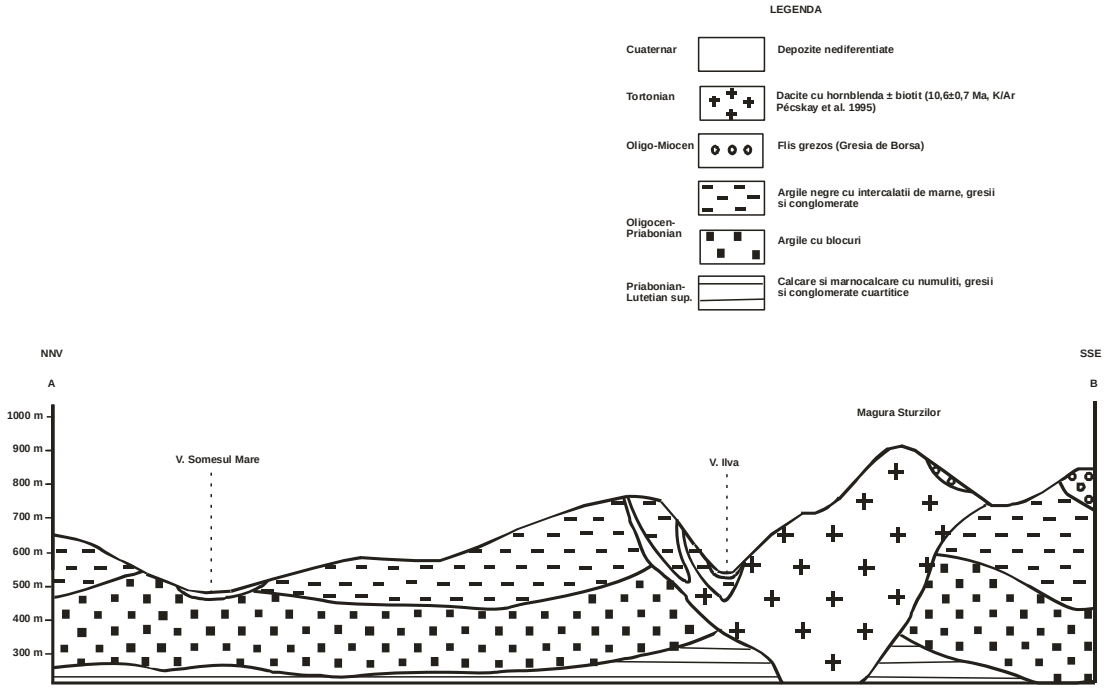

Fig. 15 - Interpretative geological profile A-B (see Fig. 14), showing the intrusive structure from Măgura Sturzilor

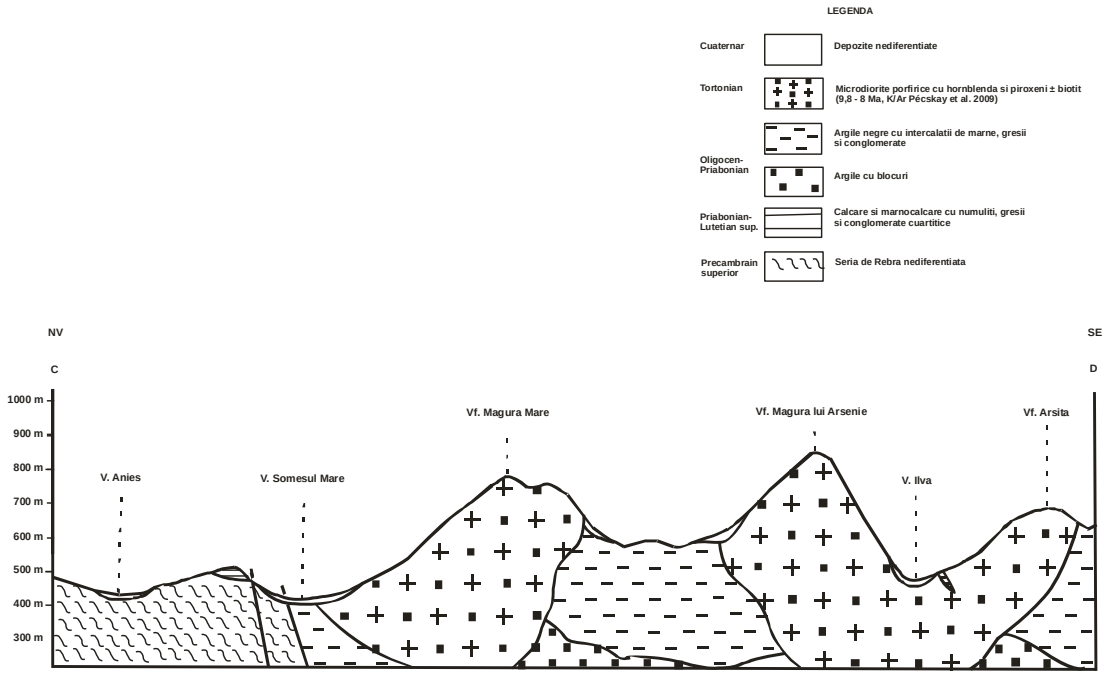

Fig. 16 - Interpretative geological profile C-D (see Fig 14), showing the Măgura Mare and Măgura lui Arsenie – Arşiţa intrusive structures

In this stage, we can state the following:

– the tectonic elements that facilitated magma transportation are preferentially oriented, following NW-SE, NE-SW and E-W trends. NW-SE and NE-SW trends are the outcome of the Dragoș Vodă and North-Transylvanian Fault systems, while the third direction observed in the southern parts of the studied area (Valea Vinului and Cormaia Transilvană) follows parallel faults. These were active for short time periods, while the extensional setting was active. Afterwards, the intrusions and host rocks were subjected to transpressive stress (Cormaia valley basin).

– most of the magmatic bodies are surrounded by smaller, secondary intrusions (Sturzilor, Arșița, Lunca Ilvei – Șanț), which is characteristic for fan-like opening of fractures during extension processes.