

## An example of vesicle layering in laminar intrusive bodies from Neuquén basin

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**Keywords:** vesicles; Neuquén basin; basic magmatism

The study area is north from Mt. La Bandera, in the Picún Leufú anticline which constitute a major structure in the Neuquén basin located south to the Huincul High. This structure strikes E-W from Mt. Picún Leufú to Los Molles where it turns NNE-SSW. Along this anticline the sedimentary rocks from the Cuyo, Lotena and Mendoza Groups crops out (Leanza et al. 1997; Ponce et al. 2014). These rocks host mafic sills and dykes and are also covered by volcanic lava flows. In the area there are at least three main magmatic units related to basic magmatism: 1) the Paleocene to middle Eocene Auca Pan Andesites which crops out south and west of the study area, mostly in the North Patagonian Andes region; 2) the Lohan Mahuida olivinic basalts (Basaltos I by Lambert 1956 in Leanza et al. 1997) and their possible intrusive equivalents from the Cerro Horqueta Formation, both considered upper Miocene; 3) Zapala and Santo Tomás olivinic basalts (Basalto II by Groeber 1929 in Leanza et al. 1997) possible Miocene to Plesitocene. The laminar intrusive bodies object of this contribution have not been assigned to any lithostratigraphic unit yet. In this contribution we are going to describe their main characteristics, evaluate their relationship with the host rocks and establish a possible comparison with the known units previously mention.

The laminar intrusive bodies from Mt. La Bandera are hosted in different lithostratigraphic units as Molles (Cuyo Group), Quebrada del Sapo and Vaca Muerta (Mendoza Group). There are two main outcrops in an E-W strike-line separated by 5 km from each other. The width of the intrusives range between 1.5 to 4 mts and the outcrops extend for 2.5 km length. The bodies are sub-concordant with the stratigraphic sedimentary planes, dipping gently to the south (Fig. 1). The contacts with the country rocks are sharp and clear, no inclusions as enclaves or xenoliths were founded. There are no evidences of thermal effects over the country rocks in the contact with the igneous bodies.

The texture is lamprophyric (porphyritic where the phenocrysts are mafic), better defined (coarser) in the center than in the margins. The phenocrysts are biotite and they tend to form agglomerates of



Fig. 1 – General aspect of the Mt. La Bandera laminar igneous bodies.

several crystals. The base is seriated, and its crystal size varies from fine to coarse from the margins to the center of the bodies respectively. It is composed of plagioclase, biotite and amphibole with magnetite as an accessory phase. As key characteristic, the bodies are intensely vesiculated and these vesicles are fill with zeolites (Fig. 2). The vesicles fill consists of radial fibers and occasionally shows a concentric mineral zonation.

Regarding the structure of the bodies, an internal separation in layers can be observed (Fig. 2). A highly layered zone of tens of centimeters to few meters width can be individualized at the margins, in direct contact with the country rocks. In contrast, the center is coarse laminated or totally masive (as in not layered at all). There is a colour difference between light to medium grey in the center and dark to very dark grey margins. Both in the margins and in the center of the igneous body, the vesicles are elongated following the lamination. The vesicles in the center of the bodies are bigger than the ones in the margins and are less deformed. At the margins, the intense foliation is defined by the segregation of bands poor and rich in vesicles which are intensively stretched and elongated (Fig. 3). In both kinds of bands, the

elongated vesicles and the phenocrysts are oriented parallel to the contact surface with the country rock.

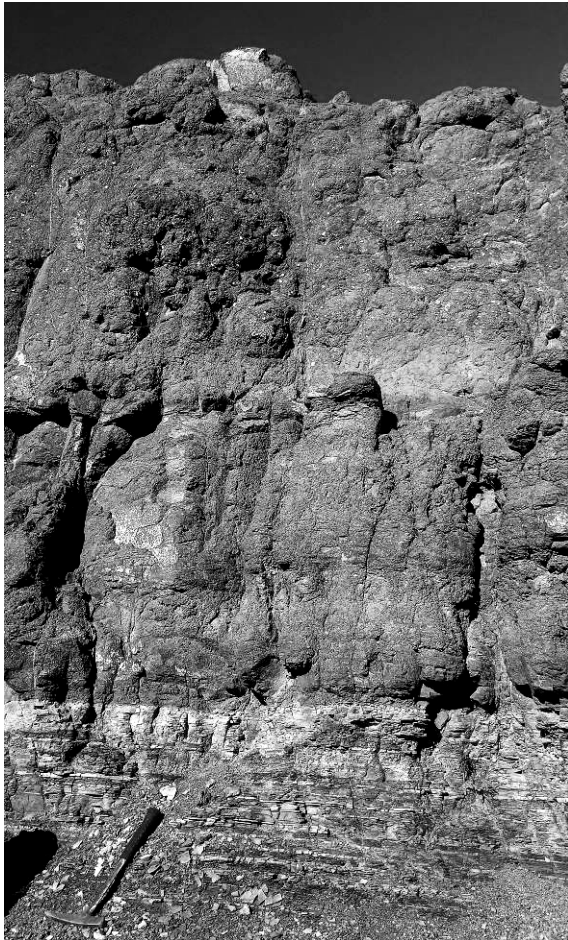


Fig. 2 – Close up to the igneous body and its contact with the country rock.

The homogeneous characteristic of igneous bodies in both trends of outcrops lead us to think that they belong to the same magmatic event. The contacts between the igneous bodies and its country rocks indicate a high rheological contrast between the magma and its country rocks at the time of the intrusion. Moreover, the absence of peperites in the country rocks and material flux from the host rock into the magmatic bodies indicate a dry condition for intrusion. The presence of vesicle shaped-preferred orientation is related to flow-related features in shallow level intrusions (Westerman et al., 2017). Moreover, vesicle layering has been mentioned by Toramaru et al., (1996) for igneous intrusions in shallow levels of the crust and involving low volumes of magma. The “thin in width” of the bodies described from Mt. La Bandera would probably

represent a minor magma injection or are satellite apophysis of a major magmatic body that has not been founded yet. Based on its primary stratigraphic relations and its composition, the bodies described in this work could be compared to the Paleocene to middle Eocene Auca Pan magmatism.

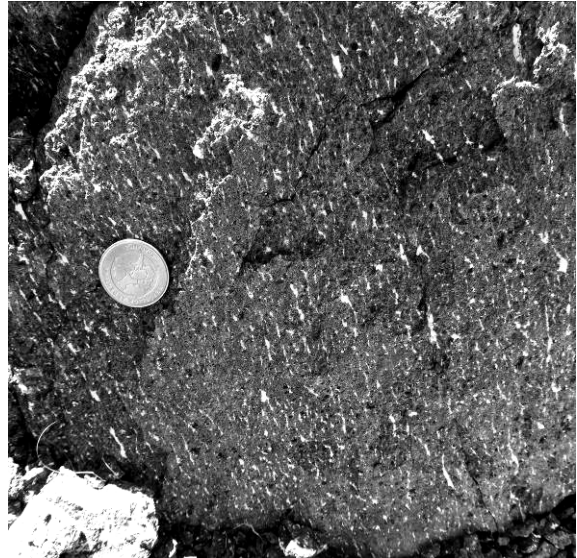


Fig 3 – Highly stretched and elongated vesicles in the margin of the igneous body.

#### Acknowledgements

Works in the area are being carried out by a team from Universidad Nacional del Comahue in order to better understand the relation of these bodies with the country rocks, oil and gas generation and deformational events.

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