



## SUBAQUEOUS PYROCLASTIC DEPOSITS OF THE HILÁRIO FORMATION, RS.

FAMBRINI, G.L. - granted by FAPESP; MARTIN, M.A.B.; McREATH, I.;  
FRAGOSO, A. R. S. C. - IGc-USP.

Volcaniclastic deposits and associated lavas belonging to the Hilário Formation occur in the Coxilha das Flores region. Here we describe mainly an outcrop about 500m long in a BR-153 highway road cut at km 529. The Hilário Formation here is composed of intercalated breccias containing andesitic fragments which fine upwards with massive to highly vesicular or amygdaloidal andesites, cut by a large discordant intrusion containing enclaves of the host rocks.

In the volcanic breccias clasts are in contact and show features of welding or plastic-state compacting. These clasts have normal grading within each bed, are relatively well-sorted and have a mean diameter of 8cm with a range from 2 to 15cm, making them lapilli to blocks. The fragments are primary, very vesicular and porphyritic andesites with breadcrust shapes, like scoriae, which suggest that they underwent chilling in the plastic state in the presence of water. The fragments are enveloped by a groundmass of volcanic grains and plagioclase crystals, the latter becoming more abundant to the top. The breccias grade into high-to-low-density turbidity currents in which the lithoclasts are rare. The groundmass composition becomes epiclastic, consisting of plagioclase crystals, single-crystal quartz grains, mica and lithic fragments. The presence of unidirectional structures such as cross laminae, climbing-ripples and assymetrical ripple marks associated with horizontal bedding, suggest subaqueous deposition by turbidity currents. The sequence ends with a moderately thick (5-6m) andesite flow, similar to the breccia fragments. The andesite is fractured and cavities and fractures are mainly filled by fibrous calcite and chalcedony, which is evidence of intense hydrothermalism. The andesite textures are either porphyritic with andesine phenocrysts and calcite pseudomorphs after piroxene, intersertal with chaotic arrangement of tablets or accicular prisms of andesine set in a microcrystalline groundmass, or intergranular.

The presence of monocompositional volcanic breccias in the lower part of each cycle, whose fragments have irregular shapes, show clast-to-clast contacts and have flow orientation suggest that the breccias are detrital pyroclastics formed by primary material. On the other hand, the presence of primary structures such as laminar flow clast orientation defining a horizontal bedding, climbing-ripples cross lamination and ripple marks indicates that the volcaniclastic sequence was deposited under water; subaerial volcaniclastic deposits tend to be less sorted and organized than the subaqueous.

The sequence described might represent reworked juvenile or secondary pyroclastic material deposited from mass flows associated with turbidity currents and reworked by wave action marked by the epiclastic intercalations, such as was described by Stix (1991) for the Onverwacht Group in South Africa. Researchers of the UFRGS identified subaerial volcanism in the Lavras do Sul region which is the most important occurrence of the Hilário Formation, the recognition of subaqueous pyroclastic deposits in the Coxilha das Flores region suggest that the volcanic products must have entered a shallow water body here, and formed a distal facies of the Lavras do Sul shoshonitic volcanism.