

## **Lava correlation along the Serra Geral cuesta between Torres and Maquiné, southern Brazil, based on geological and scintillometric field survey and rock geochemistry**

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The geological survey of basaltic rocks along the Serra Geral cuesta between Torres and Maquiné, southern Brazil, integrated with scintillometry and rock geochemistry, permitted the flow-by-flow stratigraphic correlation of flows present in three serras (climbs). Lava flows in the Serra do Faxinal occur between 78 and 1007 m altitude, Serra do Umbu between 178 and 833 m, Serra da Boa Vista between 80 and 847 m, over a total distance of 60 km from north to south. Discontinuous exposures were surveyed along dirt roads. Basaltic andesite is predominant, with a smaller number of basalt and rhyodacite, distributed in 14 flows in the Serra do Faxinal, 13 flows in the Serra do Umbu and 16 flows in the Serra da Boa Vista (all lava units with similar geochemical and geophysical properties along length and thickness are here called “flows”). Rhyodacite flows are present at the top of all three serras, four flows intercalated with basalts in the Serra do Faxinal, three in the Serra do Umbu and one in the Serra da Boa Vista. The Lobo quarry, situated between Terra de Areia and Maquiné, was also examined because it has well-developed multiple lobate, pahoehoe structures with 0.5-1.5 m thickness of individual lobes. These are outstanding because the pahoehoe rock is chemically a basalt. Another quarry at the base of the Serra da Boa Vista displays multiple lobes 1.0-1.5 m thick; only the integrated use of scintillometry and rock geochemistry allowed the division of the many lobes into two lava effusion structures. The lowest multiple pahoehoe flow from this quarry is correlated with the Lobo quarry multiple pahoehoe flow. All basaltic flows in the cuesta are low-TiO<sub>2</sub> (<2 wt.%) of the Gramado type (Ti/Y < 60, Zr/Y < 330). The rhyodacites are also low-TiO<sub>2</sub>, Palma type, Caxias do Sul subtype (Zr <400 ppm, Ba <800 ppm, Sr <170 ppm). The stratigraphic position in the field integrated with chemical composition led to the correlation of several flows among the serras and quarries. Scintillometry is very useful for correlation and for the distinction between rock types in the field. We have thus demonstrated the capability of long-distance (50 km) correlation of Paraná volcanic province lava flows both basaltic and rhyodacitic.