

Appendix I. New Mexico Tech Electron microprobe lab analysis report

Analyses: Samples for D. Koning, State Map

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Objective of analyses:

Evaluate the samples to determine whether basalt flows are correlative.

Analytical Methods:

The analyses were performed using a Cameca SX-100 electron microprobe with 3 wavelength-dispersive spectrometers. An accelerating voltage of 15kV and a 20nA beam current were used. Backscatter electron (BSE) images were generated for selected areas of the sample surface for each sample. Quantitative analyses were performed in order to determine the composition of major phases, groundmass crystals or glass, and any alteration phases (see attachments).

Summary:

Both the Sierra Negra Upper and GS0606 flows consist of dominantly plagioclase laths with distinct low z (sodic) rims, subtly zoned pyroxene (augite), small subhedral-euhedral magnetite crystals with ilmenite/magnetite zonation, and some residual glassy interstitial material. Both flows show a crude alignment of the plagioclase laths (flow texture). Olivine phenocrysts of relatively equal parts FeO and MgO were present in the Sierra Negra flow. Larger olivine phenocrysts (Sierra Negra pt 01) were slightly more Mg-rich (see Figure A1-1). No olivine was present in the analyzed sample of GS0606, although olivine phenocrysts were described in hand sample. The GS0606 flow does contain a second pyroxene phase (Mg-Fe rich opx) that was not present in the Sierra Negra flow. The grouping of compositions in the upper right corner of Figure A1-2 reflects this phase.

In general, the morphology and chemical composition of the Sierra Negra Upper and GS0606 flows are permissive of these being the same lava. However, the presence of a second pyroxene in GS0606), raises uncertainty as to whether or not they are correlative.

The GS0603 flow appears to be distinct from the other two flows. It is a finer holocrystalline sample consisting of dominantly plagioclase laths (unzoned), subtly zoned pyroxene, and small subhedral-euhedral, unzoned magnetite crystals. The sample contains olivine phenocrysts with distinct compositions based on size. One large Mg-rich olivine phenocryst was analyzed as well as several smaller more Fe-rich olivine phenocrysts. The compositional distinction between olivine in Sierra Negra and in GS0603, as well as differences in both based on phenocryst size (with Sierra Negra pt 01 being the largest) is apparent in Figure A1-1.

Related documents:

Table A1-1. List of submitted basalt samples with their descriptions and locations.

Table A2-2. Electron microprobe results

Figures A1-1 through A1-3 (compositional plots)