

## Appendix A

### Thin section descriptions

#### MT11-1

Plagioclase, clinopyroxene, and olivine phenocrysts account for ~40% of the sample. Lath-shaped plagioclase is the most abundant phenocryst mineral (~80% by volume) with a maximum length of about 1.90 mm and an average of about 0.35 mm and exhibits sieve textures throughout the entire sample. Patches of devitrified glass occur adjacent to plagioclase phenocrysts exhibiting severe sieve texture. Clinopyroxene is the second most abundant phenocryst by volume (~15%) and often forms clusters. Equant olivine phenocrysts (<5%) range from 0.05 to 0.25 mm in length. The groundmass is dominated by plagioclase and Fe-Ti oxides. There is a pocket that is more densely populated with phenocrysts (>50%), approximately 240 mm<sup>2</sup> in area.

#### MT11-2

Phenocrysts comprise ~35% of the sample. Lath-shaped plagioclase composes 70% by volume of the phenocrysts and exhibits sieve textures. The maximum plagioclase length is about 2.5 mm with an average of 0.4 mm. Clinopyroxene is the second most abundant phenocryst by volume, making up ~20% of the sample. Clinopyroxenes are often clustered and appear up to 2.1 mm in length, notably larger than in MT11-1. Some clinopyroxenes have possible thin reaction rims. The maximum equant olivine length is ~0.3 mm in diameter. The groundmass is dominated by fine plagioclase and Fe-Ti oxides.

#### MT11-3

Phenocrysts account for ~35% of the sample. Lath-shaped and sieve-textured plagioclase composes about ~80% by volume of the phenocrysts. The maximum plagioclase length is 1.95 mm with an average of 0.32 mm. This sample is vesiculated (<10% vesicles). Clinopyroxene makes up ~15% by volume of the phenocrysts. Some clinopyroxenes may have thin reaction rims and olivine inclusions. Equant olivine phenocrysts (5%) have a maximum length of ~0.2 mm. The groundmass is a very fine plagioclase and oxide microlite.

#### MT11-4

Phenocrysts compose ~35% of the sample, dominated by lath-shaped and sieve-textured plagioclase (70-75% by volume). The maximum plagioclase length is ~2.2 mm with an average of 0.35 mm. Vesicles compose ~15% of this sample. Clinopyroxene is more abundant, clustered, and accounts for about 25% of the phenocrysts in this sample. Clusters of clinopyroxenes contain small oxide inclusions. Equant olivine makes up <2% of the phenocrysts by volume. The groundmass is composed of fine-grained plagioclase and Fe-Ti oxides with patches of devitrified glass.

#### MT11-5

Phenocrysts account for approximately ~40% of the sample. Lath-shaped and sieve-textured plagioclase composes about 75% by volume of the phenocrysts. The maximum plagioclase length is 2.83 mm with an average of 0.38 mm. Clinopyroxene composes ~20% of the phenocrysts by volume, while olivine phenocrysts (average 0.08 mm diameter) compose <5%. Clinopyroxenes appear with possible thin reaction rims and are occasionally clustered. The

sample is vesiculated (<10%) and Fe-Ti oxides are present in the very fine-grained groundmass along with the plagioclase.

#### **MT11-6**

Phenocrysts compose ~35% by volume of this sample; it is not vesiculated. Lath-shaped and sieve-textured plagioclase compose 85% of the phenocrysts by volume with a maximum length of 1.84 mm and an average of 0.34 mm. Clinopyroxene makes up ~10% of the phenocrysts and olivine (max. ~0.2 mm diameter) makes up <5% of the phenocrysts by volume. The groundmass is coarsely dominated by plagioclase and Fe-Ti oxides with patches indicating devitrification.

#### **MT11-7**

Phenocrysts compose ~30% of the sample by volume. Plagioclase is the most abundant phenocryst, comprising ~85% by volume of the crystals. The plagioclase phenocrysts are lath-shaped and sieve-textured. The maximum length of plagioclase crystals is about 2.4 mm with an average of about 0.33 mm. Clinopyroxene composes ~13% of the phenocrysts by volume. Olivine (up to 0.58 mm diameter) composes <2% of the phenocrysts. There are clusters of plagioclase, clinopyroxene, and olivine phenocrysts. The groundmass is dominated by fine-grained plagioclase and Fe-Ti oxides with rare patches of devitrified glass. There is a weak flow fabric manifest as alignment of plagioclase crystals.

#### **MT11-8**

Phenocrysts compose ~35% of the sample. The dominant phenocryst phase (~75%) is lath-shaped and sieve-textured plagioclase. The maximum length of plagioclase crystals is 3.7 mm with an average of 0.25 mm. Some large plagioclase phenocrysts have clinopyroxene inclusions along the rims. Clinopyroxene composes 23% of the phenocrysts by volume and may have reaction rims and plagioclase and oxide inclusions. Rare olivine (0.20 mm diameter) makes up <2% of the sample by volume. The groundmass is dominated by very fine plagioclase and Fe-Ti oxides.

#### **MT11-9**

Phenocrysts compose about 40% of the sample. The most abundant phenocryst (70% by volume) is plagioclase. Most plagioclase crystals are lath-shaped and sieve-textured. The maximum plagioclase long axis is 2.58 mm with an average 0.31 mm. Clinopyroxene is the second most abundant phase (~22% of the phenocrysts by volume); these crystals often appear in clusters. Most olivine are <0.15 mm in diameter, but some are larger up to ~0.40 mm; all are equant. Bands of devitrified glass can be observed throughout the sample. The groundmass is dominated by very fine plagioclase and Fe-Ti oxides.

#### **MT11-10**

Phenocrysts compose about 45% of the sample. Plagioclase is the most abundant, making up about 75% by volume of the phenocrysts. The maximum length of the plagioclase crystals is 2.25 mm with an average of ~0.35 mm. All plagioclase are lath-shaped and highly sieve-textured. Clinopyroxene is the second most abundant phase (20% by volume) and often appears in clusters and with oxide inclusions. Equant olivine (0.20 mm diameter) composes <5% of the phenocrysts by volume. The groundmass is dominated by fine plagioclase and Fe-Ti oxides. Some vesicles are present and there is a densely phyrlic patch approximately 120 mm<sup>2</sup> in area.

### **MT11-11**

Phenocrysts compose about 50% of the sample. The most abundant phase is lath-shaped and sieve-textured plagioclase, which makes up about 80% by volume. The maximum plagioclase long axis is 1.75 mm with an average of 0.26 mm. Clinopyroxene composes ~15% of the phenocrysts by volume. Equant olivine phenocrysts compose <5% by volume and the average size is about 0.2 mm in diameter. The groundmass is dominated by fine plagioclase and Fe-Ti oxides.

### **MT11-12**

Phenocrysts compose about 40% of the sample. The most abundant phase is lath-shaped and sieve-textured plagioclase that makes up about 80% of the phenocrysts by volume. The maximum length for plagioclase phenocrysts is >3 mm with an average of 0.40 mm. Clinopyroxene is the second most abundant phase and composes 15% of the phenocrysts by volume; crystals often have thin reaction rims. Equant olivine phenocrysts compose 5% of the phenocrysts and on average are about 0.3 mm. The groundmass is plagioclase and Fe-Ti oxide-dominated. Few vesicles are present.

### **MT11-CW**

Phenocrysts compose ~45% of the sample. Plagioclase is the dominant phase, making up about 75% of the phenocrysts by volume. Plagioclase crystals are lath-shaped and sieve-textured with a maximum long axis of about 1.75 mm and average of 0.31 mm. Clinopyroxene is the second most abundant and composes about 20% of the phenocrysts by volume. Equant olivine phenocrysts (5 vol. %) are 0.05 mm in diameter. Both clinopyroxene and olivine crystals may exhibit reaction rims. Minor oxides are present as phenocrysts. The groundmass is dominated by fine plagioclase and Fe-Ti oxides.. Sample was collected from a lava flow in a possible old crater wall of the volcanic complex.

### **MT11-RB**

Phenocrysts compose ~40% of the sample. Phenocrysts appear more weathered and altered in this sample. The most abundant (~70% by volume) is lath-shaped and sieve-textured plagioclase with a maximum long axis of about 1.73 mm and an average of 0.41 mm. Clinopyroxene is the second most abundant and composes about 25% of the phenocrysts by volume. Clinopyroxenes show moderate reaction/weathering rims. Equant olivine phenocrysts (0.15 mm diameter) make up about 5% of the phenocrysts by volume. Some larger olivine crystals are about 0.50 mm in diameter. The groundmass is slightly coarser than the other samples, but remains plagioclase and Fe-Ti oxide-dominated.

**Photomicrograph of major mineral phases (MT11-1)**

