APPENDIX 4

LIST OF THIN SECTIONS

(App. 4.1)

and

THIN SECTION STUDIES

(App. 4-2)

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APPENDIX 4-1

LIST OF THIN SECTIONS

(Location: see App. 2)

Thin Section Number	Type of Rock	Formation
131 E-RB 1034	Calc-alkalic Granite	gm
131 E-RB 1036	Alkalic Microgranite	Dike
131 E-RB 1037	Calc-alkalic Granite	gm
131 E-RB 1039	Microgranite	Dike
131 E-RB 1040	Feldspathic Sandstone	Murdamah Formation
131 E-RB 1041	Microgranodiorite	Dike
131 E-RB 1043	Calc-alkalic Granite	gm
131 E-RB 1046	Calc-alkalic Granite	gm
131 E-RB 1049	Diorite	Plutonic Rock intrusive in the Halaban.
131 E-RB 1052	Mylonitized Alkalic Granite	gm
131 E-RB 1053	Feldspathic Sandstone	Murdamah Formation
131 E-RB 1055	Rhyolite	Shammar Formation
131 E-RB 1056	Welded Rhyolitic Crystal Tuff	Shammar Formation
131 E-RB 1060	Amphibole Gneiss	Halaban Gneiss
131 E-RB 1061	Mylonitized Alkalic Granite	gm
131 E-RB 1063	Feldspathic Sandstone with Volcanic Fragments	Murdamah Formation
131 E-RB 1064	Alkalic Granite	gm
131 E-RB 1065	Alkalic Microgranite	Dike
131 E-RB 1069	Feldspathic Sandstone	Umm Sulaym Formation
131 E-RB 1071	Andesite	Andesitic Halaban
131 E-RB 1080	Diorite	Plutonic Rock intrusive in the Umm Sulaym Formation.
131 E-RB 1082	Calc-alkalic Granite	gm
131 E-RB 1084	Calc-alkalic Granite	gm
131 F-RB 1097	Granodiorite	gn
131 E-RB 1101	Amphibolite	Halaban Gneiss
131 E-RB 1102	Amphibolite	Halaban Gneiss

APPENDIX 4-1

LIST OF THIN SECTIONS

(Cont.)

Thin Section Number	Type of Rock	Formation
131 E-RB 1105	Rhyolite	Shammar Formation
131 A-RB 1110	Uralitized Gabbro	Plutonic Rock intrusive in the Andesitic Halaban
131 A-RB 1118	Andesite	Andesitic Halaban
131 A-RB 1126	Monzonitic Calc-alkalic Granite	Plutonic Rock intrusive in the Andesitic Halaban
131 A-RB 1128	Quartz Diorite	Plutonic Rock intrusive in the Andesitic Halaban
131 A-RB 1133	Calc-alkalic Granite	gm
131 A-RB 1137	Alkalic Granite	gm
131 B-RB 1142	Calc-alkalic Granite	gm
131 A-RB 1143	Dacite	Pyroclastic Halaban
131 A-RB 1147	Gabbro	Plutonic Rock intrusive in the Pyroclastic Halaban.
131 A-RB 1148	Granodiorite	Plutonic Rock intrusive in the Pyroclastic Halaban.
131 A-RB 1149	Alkalic Microgranite	Dike
131 B-RB 1160	Pyroxenite	Ophiolitic Complex
131 B-RB 1167	Basaltic Andesite	Ophiolitic Complex

APPENDIX 4-2

THIN SECTION STUDIES

OPHIOLITIC COMPLEX

131 B-RB 1160 - Pyroxenite

- Xenomorphic-granular texture
- Rock mainly composed of orthorhombic pyroxene (enstatite) and monoclinic pyroxene (augite, diallage).
- Local development of bastite in the fissures.
- Opaque minerals.

131 B-RB 1167 - Basaltic Andesite

- Pilotaxitic texture
- Microlites of plagioclase and some hypidiomorphic zoned plagioclase swimming in a brownish crypto-crystalline groundmass.
- Small fissures with a secondary quartz mosaic infill.

HALABAN GROUP

Andesitic Halaban Formation (ha)

131 E-RB 1071 - Andesite

- Microlitic texture slightly flow structured.
- Microlites of plagioclase.
- Dark cryptocrystalline groundmass.
- Amygdales of calcite and chlorite.

131 A-RB 1118 - Andesite

- Microlitic pilotaxitic texture.
- Phenocrysts of augite.
- Groundmass of andesine microlites.
- Granules of calcite and epidote.

Pyroclastic Halaban Formation (hp)

131 A-RB 1143 - Dacite

- Porphyritic microlitic texture.
- Phenocrysts of plagioclase (oligoclase).
- Spherical amygdales of quartz mosaic.
- Groundmass of quartzo-feldspathic dust.

HALABAN GNEISS

131 E-RB 1060 - Amphibole Gneiss

- Enmeshed granolepidoblastic texture.
- Granular quartzo-feldspathic beds alternating with beds of green amphibole.
- Some biotite and chlorite.
- Opaque minerals.

131 E-RB 1101 - Amphibolite

- Fine-grained laminated granolepidoblastic texture.
- Beds of green amphibole (hornblende) with intercalations of thin sinuous quartzo-feldspathic beds.
- Some grains of calcite.
- Opaque minerals.

131 E-RB 1102 - Amphibolite

- Identical to E-RB 1101 but coarser grained.
- Granolepidoblastic texture.
- Mainly beds of green amphibole (hornblende) and some quartzo-feldspathic beds (andesine).
- Calcite.
- Opaque minerals.

PLUTONIC ROCKS INTRUSIVE IN THE HALABAN

131 E-RB 1049 - Diorite

- Hypidiomorphic-granular texture.
- Andesine and green hornblende exclusively.
- Very rare interstitial quartz.
- Sphene.

131 F-RB 1097 - Granodiorite

- Poikilitic granular texture.
- Xenomorphic quartz.
- Altered feldspars: kaolinized alkalic feldspar and damouritized oligoclase with inclusions of quartz.
- Altered green indented amphibole.
- Some sphene.

131 A-RB 1110 - Uralitized Gabbro

- Hypidiomorphic-granular texture.
- Labradorite.
- Uralitized pyroxenes, with development of bastite or antigorite, in a net structure.
- Opaque minerals.

131 A-RB 1126 - Monzonitic Calc-alkalic Granite

- Hypidiomorphic-granular texture.
- Xenomorphic quartz.
- Hypidiomorphic zoned plagioclase and perthite.
- Biotite and chlorite.

131 A-RB 1128 - Quartz Diorite

- Poikilitic granular texture.
- Damouritized plagioclase (andesine).
- Green hornblende with inclusions of quartz.
- Some biotite.
- Opaque minerals.

131 A-RB 1147 - Gabbro

- Poikilitic granular texture.
- Labradorite in large hypidiomorphic crystals and as small inclusions in the pyroxenes.
- Uralitized pyroxene and brown hornblende.
- Olivine either as dispersed grains or as inclusions in the pyroxenes.
- Abundant opaque minerals.

131 A-RB 1148 - Granodiorite

- Fine-grained hypidiomorphic texture.
- Xenomorphic quartz.
- Kaolinized alkali feldspar (oligoclase).
- Bleached biotite.
- Calcite, chlorite and sericite.
- Opaque minerals.

UMM SULAYM FORMATION

131 E-RB 1069 - Feldspathic Sandstone

- Arenitic texture with hazy bedding.
- Small angular isometric detrital grains of quartz and feldspar in a brownish (pelitic) cement.
- Development of fine biotite in the cement indicating the beginning of metamorphism.

PLUTONIC ROCKS INTRUSIVE IN THE UMM SULAYM FORMATION

131 E-RB 1080 - Diorite

- Hypidiomorphic-granular texture.
- Altered plagioclase with development of calcite and epidote.
- Very abundant green hornblende.

MURDAMAH FORMATION

131 E-RB 1040 - Feldspathic Sandstone

- Fine-grained arenitic texture with hazy bedding.
- Small angular isometric detrital grains of quartz and feldspar.
- Brownish pelitic cement.

131 E-RB 1053 - Feldspathic Sandstone

- Identical to 131 E-RB 1040
- Not very much cement with some chlorite.

131 E-RB 1063 - Feldspathic Sandstone with Volcanic Fragments

- Arenitic texture.
- Angular isometric grains of quartz and feldspar and small lithic components.
- Poorly developed pelitic cement.
- Chlorite.

131 E-RB 1055 - Rhyolite

- Porphyritic microlitic texture.
- Phenocrysts of corroded hypidiomorphic quartz and sanidine in a cryptocrystalline groundmass, locally flow structured.

131 E-RB 1056 - Welded Rhyolitic Crystal Tuff

- Heterogranular pyroclastic texture.
- Fine-grained felsitic groundmass enclosing broken crystals of quartz and sericitized feldspar (sanidine) whose outlines are marked by a fusion aureole.

131 E-RB 1105 - Rhyolite

- Porphyritic microlitic texture.
- Corroded hypidiomorphic quartz and altered feldspars (sanidine, perthitic microcline) in a cement composed of quartz and feldspar dust.

LATE TECTONIC INTRUSIVE ROCKS (gm)

131 E-RB 1034 - Calc-alkalic Granite

- Hypidiomorphic-granular texture with planar orientation.
- Xenomorphic quartz, sometimes with undulating extinction.
- Orthoclase and microcline.
- Albite-oligoclase, frequently damouritized.
- Biotite, locally chloritized.
- Some opaque minerals.

131 E-RB 1037 - Calc-alkalic Granite

- Hypidiomorphic-granular texture.
- Enmeshed xenomorphic quartz.
- Alkali feldspar (microcline-orthoclase) more abundant than plagioclase (oligoclase).
- Biotite and some green hornblende.
- Opaque minerals.

131 E-RB 1043 - Calc-alkalic Granite

- Hypidiomorphic-granular texture.
- Xenomorphic quartz mosaic.
- Microcline-albite, oligoclase.
- Indented and bleached biotite.

131 E-RB 1046 - Calc-alkalic Granite

- Hypidiomorphic-granular texture
- Xenomorphic quartz mosaic.
- Perthitic microcline and orthoclase.
- Albite-oligoclase.
- Epidote.
- A few ferromagnesian minerals: biotite.
- Opaque minerals.

131 E-RB 1052 - Mylonitized Alkalic Granite

- Laminated granular texture.
- Quartzo-feldspathic beds with recrystallized granulitic quartz texture.
- Orthoclase and albite.
- Rare ferromagnesian minerals: bleached and indented biotite.
- Opaque minerals.

131 E-RB 1061 - Mylonitized Alkalic Granite

- The same as 131 E-RB 1052.

131 E-RB 1064 - Alkalic Granite

- Hypidiomorphic-granular texture.
- Xenomorphic quartz.
- Perthitic orthoclase - albite.
- Green amphibole.
- Opaque minerals.

131 E-RB 1082 - Calc-alkalic Granite

- Hypidiomorphic-granular texture with planar orientation.
- Xenomorphic quartz.
- Microcline - albite-oligoclase.
- Biotite, frequently chloritized, and green amphibole.

131 E-RB 1084 - Calc-alkalic Granite

- The same as 131 E-RB 1082.

131 A-RB 1133 - Calc-alkalic Granite

- Fine-grained hypidiomorphic texture.
- Xenomorphic quartz mosaic.
- Kaolinized orthoclase - altered albite-oligoclase.
- Biotite.
- Calcite and opaque minerals.

131 A-RB 1137 - Alkalic Granite

- Hypidiomorphic-granular texture.
- Xenomorphic quartz.
- Perthitic orthoclase and microcline.
- Albite-oligoclase (not very abundant).
- Rare very dark biotite with strong pleochrism.
- Opaque minerals.

131 B-RB 1142 - Calc-alkalic Granite

- Hypidiomorphic-granular texture; rapakivi.
- Xenomorphic quartz.
- Altered orthoclase - zoned plagioclase (oligoclase).
- Green amphibole.

DIKES

131 E-RB 1036 - Alkalic Microgranite

- Porphyritic microgranular texture.
- Phenocrysts of quartz with undulating extinction and altered alkali feldspar.
- Quartzo-feldspathic groundmass.
- Fine biotite and chlorite.
- Opaque minerals.

131 E-RB 1039 - Microgranite

- Porphyritic microgranular texture.
- Xenomorphic quartz.
- Small hypidiomorphic crystals of orthoclase and oligoclase.
- Green amphibole in large elongate idiomorphic crystals.
- Opaque minerals.

131 E-RB 1041 - Microgranodiorite

- Porphyritic microgranular texture.
- Phenocrysts of xenomorphic quartz and zoned plagioclase enclosed in a very fine-grained quartzo-feldspathic groundmass.
- Some altered orthoclase.
- Brown and bleached biotite, partly transformed to chlorite.

131 E-RB 1065 - Microgranite

- Porphyritic microgranular texture.
- Phenocrysts of quartz and hypidiomorphic feldspar: perthitic orthoclase and some zoned plagioclase.
- Felsitic groundmass.
- Rare biotite.
- Opaque minerals.

131 A-RB 1149 - Alkalic Microgranite

- Porphyritic microgranular texture; red colored.
- Phenocrysts of hypidiomorphic globular quartz and of altered orthoclase: perthitic microcline and orthoclase with small inclusions of quartz mosaic.
- Felsitic groundmass.
- Rare biotite.
- Opaque minerals.