

Appendix C

Petrographic Data

Edward F. Stoddard

Standard size (27×46 mm) petrographic thin sections ($30 \mu\text{m}$) of all rock and artifact samples were examined with a binocular Zeiss polarizing microscope using standard techniques. Sections were studied under both plane-polarized light and crossed polars. Photomicrographs of thin sections were taken using a Nikon Coolpix 4500 digital camera integrated with a Nikon Optiphot-Pol microscope. Lower magnification images were captured by manually scanning the thin sections, with polarizing filters, using a 35 mm slide scanner. Length measurements of microscopic features were determined by reference to a calibrated ocular micrometer. Table C.1 summarizes the petrographic features. For metavolcanic rocks containing phenocrysts, the visually estimated percentage of phenocrysts is given. In addition, the typical maximum dimension of individual phenocrysts is tabulated, although it should be understood that phenocrysts commonly occur in clumps (glomerocrysts) and these would be larger. For metasedimentary rocks, typical maximum grain size for clastic grains is given where determinable.

Table C.1. Selected Petrographic Characteristics.

Sample	Primary Igneous Features				Primary Sedimentary Features			Distinctive Metamorphic Minerals ^b	Secondary Features ^c	Other
	Phenocrysts		Other Features		Clast Size (mm)	Structures	Minerals ^b			
	Type ^d	Volume (%)	Size (mm)	Features						
FBL001	Pl; Qtz	1	1.2	glass shards?	-	-	gBt; Stp	Ep/Qtz clusters	-	
FBL002	Pl; Qtz	1	1.4	-	-	-	-	Ep/Qtz clusters	-	
FBL003	Pl; Qtz	1	1	-	-	-	-	Chl/Ep clusters	-	
FBL004	Pl; Qtz	2	1.3	-	-	-	Py; Cal; Grt; Pd	Qtz clusters	-	
FBL005	Pl; Qtz	4	1.6	flow banding; rock fragments; pumice	-	-	Stp	-	-	
FBL006	Pl; Qtz	7	1.2	flow banding	-	-	-	-	-	
FBL007	Pl; Qtz	2	1.2	flow banding; pumice	-	-	Stp	Qtz veins	-	
FBL008	Pl	2	1.1	-	-	-	gBt	-	-	
FBL009	Pl	1	1	-	-	-	-	Qtz/Ep clusters	-	
FBL010	Pl	2	2.1	-	-	-	gBt	Qtz/Ep veins; Qtz/Chl veins	-	
FBL011	Pl	1	1.8	spherulites	-	-	-	-	-	
FBL012	Pl; Kfs	2	2	spherulites	-	-	Op	-	-	
FBL013	Pl	3	2.1	-	-	-	-	-	-	
FBL014	Pl; Kfs?	2	1.5	-	-	-	-	-	sericitized phenocrysts	
FBL015	-	-	0.1	spherulites	-	-	Stp?	-	-	
FBL016	-	-	-	-	-	-	Stp	-	-	
FBL017	-	-	0.1	spherulites	-	-	-	cleavage	layers	
FBL018	-	-	0.1	-	-	-	-	-	layers	
FBL019	-	-	-	-	-	-	Stp	cleavage	layers	
FBL020	-	-	-	pumice	-	-	bBt; Grt	-	-	
FBL021	Pl	1	1	-	-	-	Py; Cal; Grt	-	-	
FBL022	Pl	1	1.2	-	-	-	Py; Grt	-	sericitized phenocrysts	
FBL023	Pl; Qtz	15	2.5	-	-	-	bBt	-	-	
FBL024	-	-	-	-	-	-	Grt	-	-	
FBL025	Pl; Qtz	1	1.5	spherulites	-	-	-	Qtz clusters ^d	-	
FBL026	Pl; Qtz	1	1.5	spherulites	-	-	-	Qtz clusters ^e	-	

Table C.1. Selected Petrographic Characteristics (continued).

Sample	Primary Igneous Features				Primary Sedimentary Features		Distinctive Metamorphic Minerals ^b	Secondary Features ^c	Other
	Phenocrysts		Other Features		Clast Size (mm)	Structures			
	Type ^d	Volume (%)	Size (mm)	Features					
FBL027	-	-	-	spherulites	0.05	X	-	cleavage	layers
FBL028	-	-	-	-	0.08	X	-	cleavage	layers
FBL029	-	-	-	-	0.3	X	-	-	layers
FBL030	-	-	-	rock fragments	0.6	-	-	-	-
FBL031	Pl; Kfs	1	0.6	glass shards; rock fragments	-	-	Op; Pd	Ep/Qtz clusters	-
FBL032	-	-	-	glass shards; mafic rock fragments	-	-	Pd	-	-
FBL033	Pl	<1	1	rock fragments	-	-	-	-	-
FBL034	-	-	-	glass shards; mafic rock fragments	-	-	Pd	-	-
FBL035	-	-	-	-	0.03	graded bedding	-	-	layers
FBL036	Pl	5	1.3	glass shards; mafic rock fragments	-	-	-	-	-
FBL037	-	-	-	pumice	-	-	gBt	-	layers
FBL038	-	-	-	-	0.4	graded bedding	gBt	-	layers
FBL039	-	-	-	-	-	-	-	-	aplite
FBL040	-	-	-	-	-	-	-	-	metabasalt
FBL041	-	-	-	-	-	-	-	Qtz/Chl/Ep veins	-
FBL042	-	-	-	pumice	-	-	-	Czo clusters	-
FBL043	-	-	-	-	-	-	-	Qtz/Chl/Cal/Ep veins	-
FBL044	-	-	-	pumice	0.1	-	Cal	-	layers
FBL045	-	-	-	-	0.04	-	-	-	layers
FBL046	-	-	-	-	0.15	better graded bedding	-	-	layers
FBL047	Pl	3	0.7	rock fragments	-	-	-	-	-
FBL048	-	-	0.15	-	-	-	Py	Ep veins	layers
FBL049	-	-	0.15	-	-	-	Py	Ep veins	layers
FBL050	-	-	-	rock fragments	-	-	-	Ep veins	layers
FBL051	Pl; Qtz	3	1.3	-	-	-	Act	-	-

Table C.1. Selected Petrographic Characteristics (continued).

Sample	Primary Igneous Features				Primary Sedimentary Features			Distinctive Metamorphic Minerals ^b	Secondary Features ^c	Other
	Phenocrysts		Other Features		Clast Size (mm)	Structures	Minerals ^b			
	Type ^d	Volume (%)	Size (mm)	Features						
FBL052	Pl; Qtz	2	1.6	-	-	-	Act	-	-	
FBL053	Pl; Qtz	3	1.5	-	-	-	Stp	-	-	
FBL054	Pl; Qtz	2	1.2	-	-	-	Py; Act	-	-	
FBL055	Pl	1	0.7	flow banding	-	-	bBt; Grt	-	layers	
FBL056	-	-	-	-	0.01	-	-	-	-	
FBL057	-	-	-	-	-	-	-	Qtz veins	-	
FBL058	Pl	<1	0.5	glass shards; mafic rock fragments	-	-	-	-	-	
FBL059	Pl	<1	0.5	glass shards; mafic rock fragments; felsic rock fragments	-	-	Cal; Pd	-	-	
FBL060	Pl; Qtz	15	2	-	-	-	-	-	-	
FBL061	Pl; Qtz	15	2	-	-	-	-	-	-	
FBL062	Pl; Qtz	20	2.1	-	-	-	-	-	-	
FBL063	Pl; Qtz	15	1.8	-	-	-	-	-	-	
FBL064	Pl; Qtz	20	2.5	-	-	-	-	-	-	
FBL065	Pl; Qtz	20	1.9	-	-	-	-	-	-	
FBL066	Pl	1	0.3	-	-	cluster of minerals	-	-	-	
FBL067	-	-	-	-	0.25	-	-	-	-	
FBL068	-	-	-	-	0.1	-	Py	-	-	
FBL069	-	-	-	-	0.05	graded bedding	-	faults	layers	
FBL070	-	-	-	-	-	-	-	-	greenstone	
FBL071	-	-	-	-	-	-	-	-	metagabbro	
FBL072	Pl	2	0.7	aligned plagioclase laths; flow banding	-	-	bBt; Grt; Stp?	-	-	
FBL073	Pl; Qtz	20	2	-	-	-	Ep; Pd?	mafic pseudomorphs	-	
FBL074	Pl; Qtz	1	0.5	weak alignment	-	-	Ep; Bt; Act;	saussuritization;	-	
FBL075	Pl	<<1	0.3	-	-	-	Chl	amygdules?	-	
							Ep	saussuritization	-	

Table C.1. Selected Petrographic Characteristics (continued).

Sample	Primary Igneous Features				Primary Sedimentary Features		Distinctive Metamorphic Minerals ^b	Secondary Features ^c	Other
	Phenocrysts		Other Features		Clast Size (mm)	Structures			
	Type ^d	Volume (%)	Size (mm)	Other Features					
FBL076	Pl	<<1	0.05	-	-	0.05	Act; Ep; bBt	-	-
FBL077	-	-	-	-	bedding?	0.05	gBt	-	-
FBL078	Pl; Qtz	3	1.2	flow banding; zoned plagioclase	-	-	Ep; Act; Op	saussuritization; mafic pseudomorph of epidote after	quartz-epidote after clinopyroxene?
FBL079	Pl	1	0.5	-	-	-	bBt; Ep; Act; Ms	quartz-epidote amygdule	-
FBL080	Pl	1	1.2	oriented plagioclase laths; banding	-	-	bBt; Grt; Ep; Ms	-	-

^a Key: Kfs, K-feldspar; Pl, plagioclase; Qtz, quartz.

^b Key: Act, actinolite; Bt, biotite; bBt, brown biotite; Cal, calcite; Chl, chlorite; Ep, epidote; gBt, green biotite; Grt, garnet; Ms, muscovite; Op, opaque minerals; Pd, piemontite; Py, pyrite; Slp, stilpnomelane.

^c Key: Cal, calcite; Chl, chlorite; Czo, clinzoisite; Ep, epidote; Qtz, quartz.

^d Size ranges to at least 3 mm; abundance is 10%.

^e Size ranges to at least 3 mm; abundance is 5%.