DEPARTMENT OF THE INTERIOR

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DENSITY AND MAGNETIC SUSCEPTIBILITY MEASUREMENTS NEAR THE GUADALUPE IGNEOUS COMPLEX, WEST-CENTRAL FOOTHILLS, SIERRA NEVADA, CALIFORNIA

By

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ABSTRACT

Density and magnetic susceptibility measurements of about 380 metasedimentary, metavolcanic, and igneous rocks from an area of the west-central Sierra Nevada foothills were determined. Density measurements were made using the buoyancy method, and magnetic susceptibility measurements were made using a portable magnetic susceptibility meter.

INTRODUCTION

Density and magnetic susceptibility measurements were made on about 380 rock samples. The samples are from an area of the Sierra Nevada foothills located west and south of the town of Mariposa, California (figure 1). The samples were collected between 1983 and 1986 in conjunction with various geology research projects affiliated with the University of California, Santa Cruz by C. Hardy, L. Hauke, S. Paterson, J. Radloff, and O. Tobisch. Density measurements were done while L. Hauke was a volunteer at the U.S. Geological Survey and was partly funded by the University of California, Santa Cruz. The samples include sedimentary and volcanic rocks of the Upper Jurassic Mariposa Formation, underlying volcanic belts that have been subjected to varying degrees of regional and contact metamorphism, and several Mesozoic intrusive bodies.

Densities were measured using an electronic balance and magnetic susceptibilities were measured using a portable magnetic susceptibility meter. The data are listed in table 1, and an explanation of rock types is shown in table 2.

ACKNOWLEDGMENTS

J. M. Glen, of the U.S. Geological Survey, assisted in the density measurements. Magnetic susceptibility measurements were made by T. V. Bare of the U.S. Geological Survey.

DENSITY DATA

All densities were determined using a Sartorius 1264 MP balance. Average sample size was about 450 grams. Samples were cleaned of dirt, organic matter, and loose particles before analysis. Each sample was weighed in air (sample or dry weight, W_a), then soaked in water at room temperature for at least one hour. The sample was then weighed in water (saturated weight in water, W_w), and then weighed surface-dry in air (saturated weight in air, W_s). Sample weight measurements were repeated until they agreed to within about 0.5 g. Figure 2 shows the locations of rock samples and their densities.

Three densities were calculated for each sample based on the following formulas:

$$D_1 = \frac{W_a}{W_a - W_w},$$

$$D_2 = \frac{W_a}{W_s - W_w}, \text{and}$$

$$D_3 = \frac{W_s}{W_s - W_w},$$

where,

D_1 = grain density,

D_2 = dry bulk density, and

D_3 =saturated bulk density.

SUSCEPTIBILITY DATA

Susceptibility measurements were made using a Scintrex SM-5 digital magnetic susceptibility meter. Magnetic susceptibility is determined by measuring the change in reluctance of magnetic flux, assuming no air-gap between the sample and the meter and that the sample shape is an infinite half-space. Uncertainty of the meter is 5%, with a resolution of about 0.1 x 10^{-3} cgs units, over an operating range of 0.1 to 99 x 10^{-3} cgs units. Because inaccurate measurements can result from small samples or irregular shapes, caution should be excersized in using these measurements quantitatively. The data are intended to be used as an aid to the geophysical interpretation of magnetic data. Each sample was measured several times, on various sides, and an average or representitive value was determined. Figure 3 shows the location of rock samples and their magnetic susceptibilities.

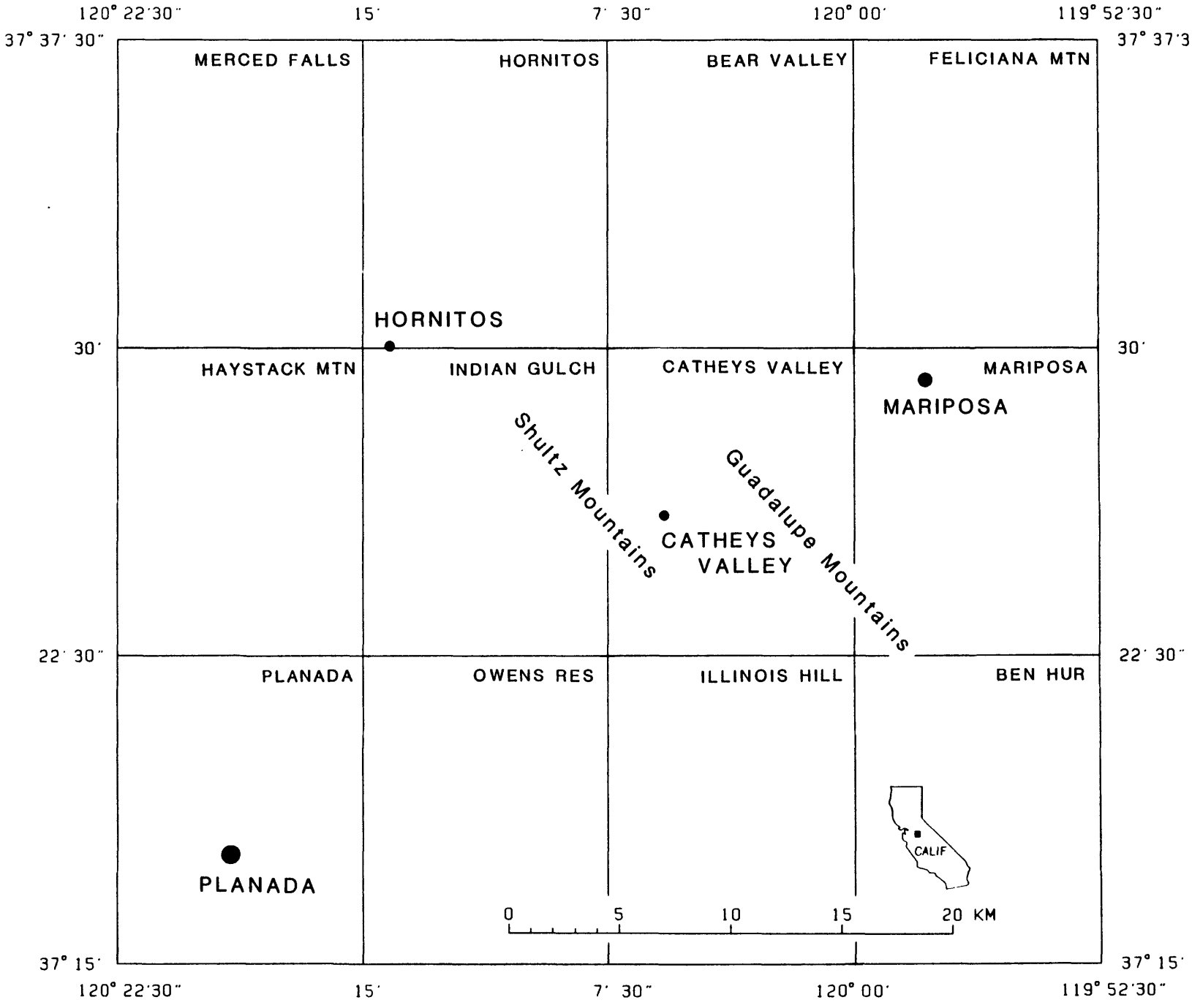

FIGURE. 1.–Index map of study area with names of $7\frac{1}{2}$' quadrangles.

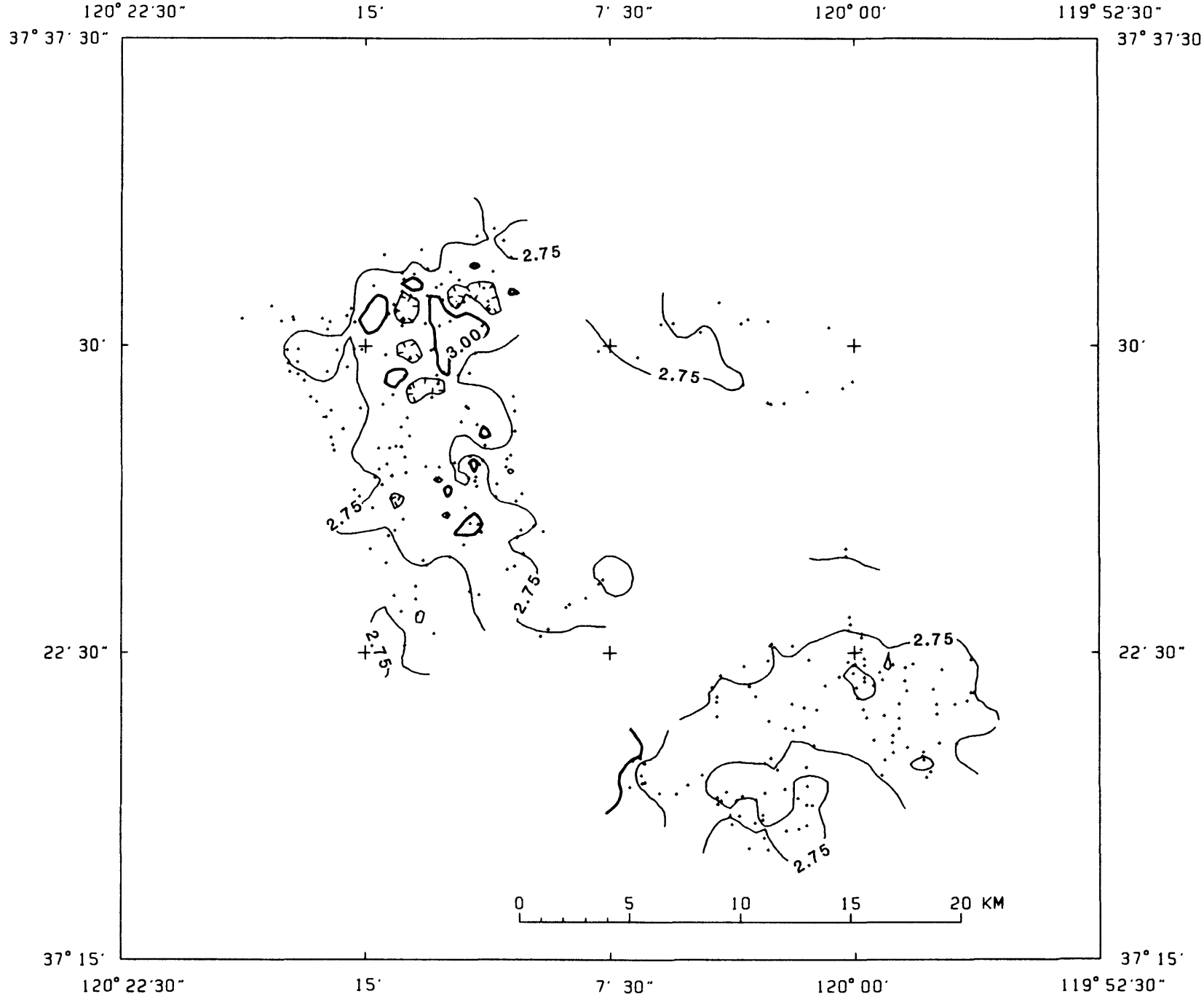

FIGURE. 2.-Station locations and contour map of density data. Contour intervals 0.25 g/cm^3 and 1.0 g/cm^3.

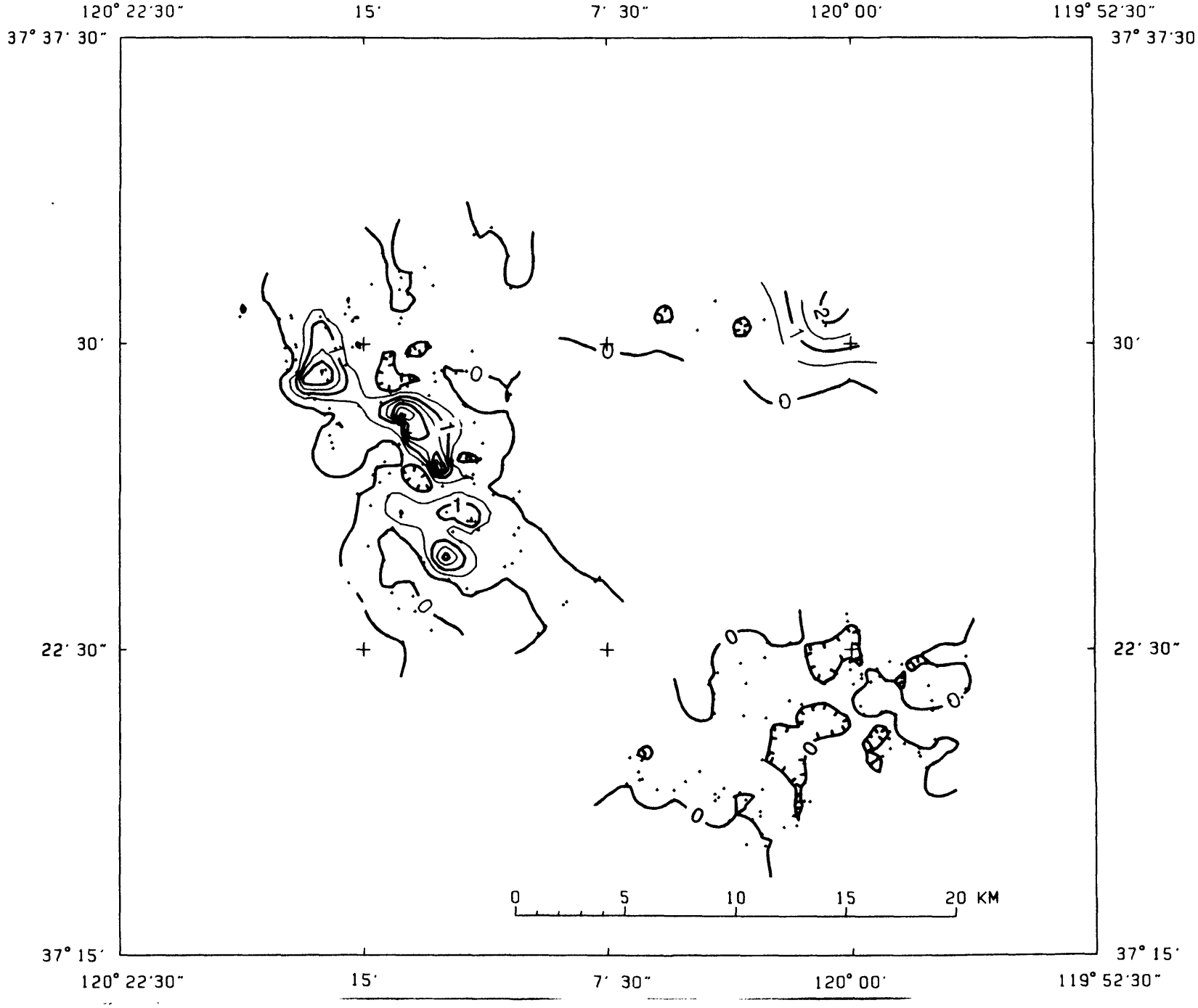

FIGURE. 3.–Station locations and contour map of magnetic susceptibility data. Contour intervals 0.5 and 1.0 x 10^{-3} cgs units.

TABLE 1.–*Physical property measurements of rock samples*

Station Name	Lat deg	Lat min	Lon deg	Lon min	Rock Type	D1 g/cm^3	D2 g/cm^3	D3 g/cm^3	Susceptibility 10^{-3} cgs units
C84IG011	37	28.52	120	11.92	UV	2.92	2.90	2.91	0.0
C84IG012	37	28.47	120	11.86	UV	3.07	3.05	3.06	0.1
C84IG013	37	28.07	120	11.58	UV	2.87	2.81	2.83	0.1
C84IG014	37	27.80	120	11.43	UV	3.14	3.13	3.14	–
C84IG025	37	27.19	120	11.39	- -	2.68	2.65	2.66	0.0
C84IG027	37	27.10	120	11.51	GS	2.82	2.76	2.78	0.1
C84IG031	37	26.80	120	11.63	GS	2.89	2.87	2.88	0.0
C84IG032	37	26.70	120	11.65	Q DI	2.71	2.66	2.68	0.8
C84IG032A	37	26.70	120	11.65	UV	2.66	2.59	2.62	0.2
C84IG032B	37	26.70	120	11.65	UV	2.92	2.86	2.88	0.6
C84IG034B	37	26.57	120	11.60	UP	2.88	2.87	2.87	0.0
C84IG046A	37	27.04	120	10.71	US	2.77	2.77	2.77	0.0
C84IG051	37	27.33	120	10.55	- -	2.70	2.64	2.66	0.0
C84IG052	37	27.91	120	10.42	1 GN	2.72	2.64	2.67	0.0
C84IG063B	37	29.28	120	12.81	1 GN	2.65	2.50	2.56	0.1
C84IG063C	37	29.28	120	12.81	1 DI	2.91	2.85	2.87	0.1
C84IG065	37	29.28	120	12.16	1 SC	2.71	2.60	2.64	0.0
C84IG084B	37	28.76	120	10.47	3 MI	2.68	2.67	2.68	0.0
C84IG088B	37	28.40	120	10.44	? ?MI	2.68	2.62	2.64	–
C84IG089	–	–	–	–	PXGB	3.01	3.00	3.00	0.0
C85IG088B	–	–	–	–	- -	–	–	–	0.0
H86BH001	37	22.21	119	59.99	HFPH	2.71	2.67	2.68	0.1
H86BH004	37	22.35	119	59.70	COPH	2.73	2.70	2.71	0.0
H86BH006	37	22.19	119	58.83	HFPH	2.75	2.69	2.71	0.1
H86BH007	37	22.13	119	58.46	FISS	2.64	2.62	2.63	0.0
H86BH009	37	22.22	119	58.22	D PH	2.72	2.71	2.71	0.0
H86BH010	37	21.31	119	56.60	5 SC	2.65	2.57	2.60	0.0
H86BH012	37	21.51	119	56.39	FOTO	2.75	2.72	2.73	0.0
H86BH013C	37	21.51	119	56.48	5 SC	2.68	2.66	2.67	0.0
H86BH016	37	21.23	119	56.97	FISS	2.65	2.51	2.56	0.0
H86BH017	37	21.60	119	57.63	S PH	2.73	2.68	2.70	0.1
H86BH018	37	21.23	119	57.52	5 SC	2.68	2.61	2.64	0.0
H86BH020	37	20.99	119	57.51	COPH	2.70	2.65	2.67	0.0
H86BH021	37	22.08	119	57.37	COPH	2.66	2.56	2.60	0.0
H86BH022A	37	19.45	119	57.82	5 SC	2.67	2.60	2.62	–
H86BH023A	–	–	–	–	- -	–	–	–	0.0
H86BH025	37	19.58	119	57.71	HFPH	2.69	2.62	2.65	0.0
H86BH029	37	19.87	119	57.90	FOSS	2.82	2.80	2.81	0.1
H86BH030B	37	19.96	119	57.94	COPH	2.73	2.70	2.71	0.0
H86BH031	37	20.06	119	57.91	COPH	2.68	2.64	2.65	0.0
H86BH033	37	19.50	119	59.17	HFPH	2.74	2.70	2.71	0.0
H86BH035B	37	19.87	119	59.07	CIPH	2.73	2.67	2.69	0.0
H86BH037	37	20.06	119	58.82	CIPH	2.70	2.60	2.64	0.1
H86BH039	37	21.81	119	58.47	COPH	2.70	2.58	2.63	0.0
H86BH040	37	21.57	119	58.42	D SS	2.72	2.71	2.72	0.0
H86BH042	37	21.24	119	58.65	COST	2.73	2.71	2.72	–
H86BH044B	37	22.19	119	59.69	COST	2.71	2.67	2.69	0.0
H86BH046A	37	21.89	119	59.70	D PH	2.71	2.67	2.68	0.0
H86BH048A	37	21.79	119	59.70	UV	3.04	2.98	3.00	0.0
H86BH050B	37	21.64	119	59.95	COPH	2.72	2.68	2.70	0.1
H86BH052	37	21.38	119	59.91	UV	2.88	2.80	2.82	0.0
H86BH052C	37	21.38	119	59.91	D PH	2.71	2.64	2.67	0.0
H86BH053B	37	21.11	119	59.73	COPH	2.69	2.59	2.63	0.0
H86BH054	37	20.90	119	59.63	QZ	2.65	2.63	2.64	0.0
H86BH058	37	20.35	119	59.41	FISS	2.70	2.68	2.69	0.0
H86BH060	37	21.83	119	59.14	COPH	2.70	2.64	2.66	0.0
H86BH061	37	21.69	119	59.42	CIPH	2.75	2.73	2.74	0.0
H86BH063	37	22.01	119	59.23	SS	2.73	2.71	2.72	0.0
H86BH066A	37	20.96	119	59.09	FISS	2.68	2.54	2.60	0.0
H86BH066B	37	20.96	119	59.09	CIPH	2.73	2.67	2.69	0.0
H86BH069	37	20.89	119	58.65	COPH	2.69	2.60	2.63	0.0
H86BH071	37	20.64	119	58.64	CRSS	2.71	2.65	2.67	0.0
H86BH072	37	20.47	119	58.84	CIPH	2.68	2.56	2.60	0.0
H86BH075	37	20.29	119	58.85	CIPH	2.73	2.69	2.70	0.0
H86BH077	37	20.18	119	58.39	SS	2.66	2.59	2.61	0.0
H86BH079	37	22.32	119	56.47	TO	2.75	2.69	2.71	0.0
H86BH080A	37	20.28	119	57.44	5 SC	2.67	2.55	2.59	0.0
H86BH084	37	20.27	119	56.91	S PH	2.76	2.69	2.71	0.0
H86BH200	–	–	–	–	- -	–	–	–	0.0
H86BH210A	–	–	–	–	- -	–	–	–	0.0

TABLE 1.–*Physical property measurements of rock samples–Continued*

Station Name	Lat deg	Lat min	Lon deg	Lon min	Rock Type	D1 g/cm^3	D2 g/cm^3	D3 g/cm^3	Susceptibility 10^{-3} cgs units
H86IH104	—	—	—	—	- -	—	—	—	0.0
H86IH149	—	—	—	—	- -	—	—	—	0.0
H86IH178	—	—	—	—	- -	—	—	—	0.1
J85HO003	37	33.99	121	21.46	- -	2.66	2.61	2.63	0.1
J85HO007	37	34.52	121	20.33	- -	2.72	2.71	2.71	0.1
J85HO024	37	33.93	121	13.68	- -	2.69	2.65	2.67	0.0
J85HO033	—	—	—	—	- -	2.76	2.75	2.76	0.0
J85HO040	37	34.35	120	58.55	- -	2.90	2.87	2.88	—
P83IG001	37	24.28	120	7.73	- -	2.91	2.86	2.87	0.0
P83IG002A	37	23.84	120	8.26	- -	2.80	2.78	2.79	—
P83IG002B	37	23.84	120	8.26	A UV	2.68	2.64	2.65	—
P83IG003	37	23.68	120	8.75	- -	2.73	2.65	2.68	0.0
P83IG004A	37	23.61	120	8.85	- -	2.61	2.35	2.45	0.1
P83IG005	37	23.07	120	9.39	GASL	2.72	2.70	2.71	0.0
P83IG006A	37	22.90	120	9.62	- -	2.72	2.67	2.69	0.0
P83IG006B	37	22.90	120	9.62	- -	2.82	2.67	2.72	0.0
P83IG021	37	29.12	120	0.05	- -	2.60	2.48	2.53	0.0
P83IG022B	37	28.96	120	0.36	MUSL	2.57	2.35	2.44	0.0
P83IG025	37	28.59	120	2.17	HFUV	2.65	2.51	2.56	0.0
P83IG026	37	28.57	120	2.56	EPUV	2.65	2.63	2.64	0.0
P83IG029A	37	29.78	120	14.38	CLUV	2.95	2.94	2.94	0.4
P83IG029B	37	29.78	120	14.38	ACUV	2.79	2.64	2.69	0.0
P83IG030A	37	25.46	120	9.55	- -	—	—	—	0.0
P83IG030B	37	25.46	120	9.55	5 SC	2.61	2.55	2.58	0.0
P83IG033	37	27.57	120	11.34	5 SC	2.79	2.76	2.77	0.2
P83IG034	37	29.08	120	12.77	- -	2.59	0.00	0.00	0.1
P83IG036	37	29.33	120	11.83	5 SC	2.71	2.61	2.64	0.0
P83IG040A	37	26.05	120	11.94	A GS	2.89	2.79	2.82	—
P83IG040B	37	26.05	120	11.94	A GS	2.94	2.79	2.84	—
P83IG041	37	26.63	120	10.98	GASC	2.63	2.53	2.57	0.0
P83IG043	37	27.23	120	10.67	5 SC	2.61	2.54	2.57	0.0
P83IG045	—	—	—	—	5 SC	2.69	2.68	2.68	0.0
P83IG062	—	—	—	—	- -	—	—	—	0.0
P83IG063	—	—	—	—	- -	—	—	—	0.0
P83IG086	—	—	—	—	- -	—	—	—	0.0
P83IG093	—	—	—	—	- -	—	—	—	0.0
P83IG098	—	—	—	—	- -	—	—	—	0.0
P85CO002B	37	30.44	120	0.78	- -	—	—	—	2.0
P85CO002B	37	30.44	120	0.78	- -	2.61	2.59	2.60	2.0
P85CO004	37	30.59	120	2.66	D SS	2.58	2.46	2.51	0.1
P85CO005C	37	30.64	120	3.28	MUSS	2.55	2.37	2.44	0.0
P85CO006B	37	30.54	120	3.50	MUMS	2.63	2.57	2.60	0.0
P85CO008	37	30.33	120	4.73	- -	2.78	2.76	2.78	0.1
P85CO009	37	30.54	120	5.56	CLSL	2.65	2.59	2.62	0.0
P85CO010	37	30.51	120	5.94	EPVB	2.85	2.85	2.85	0.0
P85CO031C	—	—	—	—	4 SC	2.81	2.79	2.80	0.0
P85CO044A	37	31.05	120	4.17	Q SL	2.55	2.44	2.48	0.0
P85HO003	37	32.85	120	11.06	- -	2.82	2.82	2.82	0.0
P85HO004B	37	32.67	120	11.59	- -	2.67	2.63	2.65	0.0
P85HO013	37	31.42	120	12.85	1 SC	2.78	2.77	2.77	0.0
P85HO019A	37	31.22	120	13.63	Q DI	2.92	2.82	2.86	0.0
P85HO020	37	32.57	120	10.77	GRPH	2.70	2.67	2.68	0.0
P85HO021	37	32.16	120	10.54	UV	2.72	2.71	2.64	0.0
P85HO023	37	31.37	120	10.48	UP	3.03	2.97	2.99	0.0
P85HO028	37	30.77	120	14.29	A DI	2.98	2.91	2.93	—
P85HO035	37	31.50	120	12.69	5 SC	2.75	2.72	2.73	—
P85HO040	37	31.00	120	14.15	1 GN	2.88	2.86	2.86	0.0
P85HO044	37	30.49	120	13.89	1 GN	2.86	2.83	2.84	0.1
P85HO052	37	32.22	120	14.43	UV	2.61	2.45	2.52	0.0
P85HO054	37	31.46	120	14.76	- -	2.91	2.89	2.90	0.1
P85HO060	37	31.32	120	13.89	GD	2.64	2.60	2.62	0.0
P85HO061A	37	31.62	120	13.84	UP	2.98	2.96	2.97	0.0
P85HO062	37	31.77	120	13.89	UV	2.67	2.62	2.64	0.0
P85HO064	37	31.75	120	13.52	VB	2.98	2.97	2.98	0.0
P85HO065	37	31.87	120	13.10	Q SC	2.71	2.67	2.69	0.1
P85HO073	37	31.93	120	11.76	AMVB	3.03	3.01	3.02	—
P85HO075	37	31.81	120	11.10	DI	2.95	2.92	2.93	—
P85HO076	37	31.43	120	11.08	- -	2.72	2.63	2.66	—
P85HO078	37	31.40	120	11.39	Q SC	2.65	2.61	2.63	—
P85HO080	37	31.08	120	11.26	- -	2.67	2.63	2.65	—

TABLE 1.–*Physical property measurements of rock samples–Continued*

Station Name	Lat deg	Lat min	Lon deg	Lon min	Rock Type	D1 g/cm^3	D2 g/cm^3	D3 g/cm^3	Susceptibility 10^{-3} cgs units
P85HO081	37	31.20	120	11.80	Q SC	2.71	2.70	2.70	—
P85HO084	37	31.61	120	12.14	1 UP	2.83	2.81	2.81	—
P85HO085	37	31.80	120	12.40	--	2.91	2.90	2.90	—
P85HO088A	37	31.22	120	13.11	DI	2.95	2.92	2.93	—
P85HO091	37	30.49	120	12.75	??DI	3.03	3.02	3.02	—
P85HO093	37	30.60	120	12.42	VB	3.19	3.19	3.19	—
P85HO094A	37	30.99	120	12.35	EPDI	2.64	2.60	2.61	—
P85HO094B	37	30.99	120	12.35	EPDI	2.60	2.58	2.59	—
P85HO097	37	31.07	120	11.99	N UV	3.00	2.95	2.96	—
P85HO104	37	30.49	120	11.44	VB	3.10	3.09	3.10	—
P85HO105	37	30.89	120	11.22	GN	2.67	2.62	2.64	—
P85HO106A	37	31.14	120	13.48	UP	3.04	3.03	3.04	—
P85HO106E	37	31.14	120	13.48	UP	2.63	2.60	2.61	—
P85HO109	37	30.54	120	13.18	DI	2.93	2.92	2.93	—
P85HO117	37	31.12	120	12.64	AM	2.99	2.97	2.98	—
P85HO124	37	32.34	120	13.29	AISC	2.73	2.72	2.73	—
P85HO28	—	—	—	—	--	—	—	—	0.0
P85HO35	—	—	—	—	--	—	—	—	0.1
P85IG050A	37	24.18	120	7.85	EPUP	2.97	2.96	2.96	0.2
P85IG050G	37	24.18	120	7.85	??UV	2.65	2.60	2.62	0.0
P85IG056	37	29.72	120	6.66	HFSL	2.77	2.76	2.77	0.0
P85IH089	—	—	—	—	--	—	—	—	0.0
P86HO176	—	—	—	—	--	—	—	—	0.1
P86HO136	37	29.89	120	13.00	DI	2.96	2.95	2.95	0.0
P86HO137	37	29.93	120	12.91	DI	2.98	2.97	2.97	0.1
P86HO139B	—	—	—	—	--	2.93	2.90	2.91	0.1
P86HO150	37	29.35	120	12.60	??GS	3.08	3.05	3.06	0.0
P86HO162	—	—	—	—	GN	2.69	2.56	2.61	0.0
P86HO168	37	30.83	120	14.08	AM	2.86	2.81	2.83	0.0
P86HO168B	37	30.83	120	14.08	DI	2.66	2.60	2.62	0.0
P86HO171	37	30.64	120	13.83	??TU	2.65	2.56	2.60	0.0
P86HO176	—	—	—	—	AM	2.93	2.90	2.91	—
P86HO187	37	29.82	120	11.65	Q GN	2.71	2.66	2.68	0.1
P86IG062	37	25.04	120	0.27	RH	2.62	2.51	2.55	—
P86IG063	37	24.85	120	0.27	5 PH	2.76	2.72	2.73	—
P86IG073	37	29.87	120	7.86	D PH	2.73	2.72	2.72	0.0
P86IG076	—	—	—	—	??PH	2.98	2.97	2.98	0.0
P86IG086	37	29.05	120	3.43	HFTU	2.75	2.71	2.72	—
P86IG093	37	28.87	120	1.44	--	2.72	2.70	2.71	—
P86IG098	37	28.60	120	2.67	--	2.65	2.63	2.63	—
P86IG105	37	25.60	120	9.83	EPDI	2.77	2.71	2.73	0.0
P86IH001	37	22.19	120	0.06	HFSS	2.75	2.74	2.75	0.0
P86IH004	37	21.99	120	0.05	1 UP	2.93	2.88	2.90	0.1
P86IH007	37	21.90	120	0.48	PH	2.69	2.66	2.67	0.0
P86IH011	37	21.68	120	0.91	5 SL	2.67	2.49	2.55	0.0
P86IH018	37	21.10	120	1.16	UP	2.75	2.66	2.69	0.0
P86IH021	37	20.60	120	1.90	5 UV	2.79	2.71	2.74	0.0
P86IH023	37	20.68	120	1.56	5 SS	2.66	2.46	2.54	0.0
P86IH027	37	21.15	120	1.56	PH	2.73	2.66	2.68	0.0
P86IH029	37	21.24	120	1.92	Q GN	2.64	2.55	2.59	0.1
P86IH035	37	20.65	120	2.13	5 SC	2.65	2.59	2.61	0.0
P86IH042	37	19.79	120	2.76	SC	2.76	2.72	2.74	0.0
P86IH045	37	19.91	120	2.58	GN	2.70	2.69	2.70	0.0
P86IH048	37	21.42	120	4.24	5 SC	2.67	2.52	2.57	0.0
P86IH051	37	21.64	120	4.39	--	2.77	2.75	2.76	0.0
P86IH054	37	21.93	120	4.13	5 SC	2.76	2.73	2.74	0.0
P86IH055	37	18.82	120	3.27	--	—	—	—	0.0
P86IH055	37	18.82	120	3.27	--	—	—	—	0.0
P86IH059	37	22.16	120	3.41	UV	2.97	2.96	2.96	0.1
P86IH063	37	21.66	120	3.25	UV	2.72	2.70	2.71	0.0
P86IH068	37	21.29	120	4.25	CLSC	2.71	2.64	2.68	0.0
P86IH070	37	20.93	120	4.23	CIPH	2.67	0.00	0.00	0.0
P86IH073	—	—	—	—	UP	2.86	2.77	2.80	0.1
P86IH076	37	20.88	120	3.33	--	—	—	—	0.2
P86IH080	37	20.82	120	2.65	??	2.62	2.58	2.59	0.0
P86IH089	37	21.43	120	3.05	??	2.63	2.62	2.62	—
P86IH097	37	22.32	120	1.40	LCGN	2.61	2.58	2.59	0.0
P86IH102	37	22.66	120	1.91	UP	2.83	2.80	2.81	0.0
P86IH104	37	22.70	120	2.55	LCUP	2.78	2.77	2.78	—
P86IH105	37	22.66	120	2.59	HFAR	2.75	2.74	2.75	0.0

TABLE 1.–*Physical property measurements of rock samples–Continued*

Station Name	Lat deg	Lat min	Lon deg	Lon min	Rock Type	D1 g/cm^3	D2 g/cm^3	D3 g/cm^3	Susceptibility 10^{-3} cgs units
P86IH108	37	22.29	120	2.67	HFSS	2.78	2.78	2.78	0.1
P86IH126	37	19.69	120	1.48	5 SC	2.87	2.84	2.85	—
P86IH126A	37	19.69	120	1.48	--	—	—	—	0.1
P86IH126B	37	19.69	120	1.48	5 SC	2.96	2.95	2.96	0.0
P86IH130	37	20.22	120	1.26	SS	2.72	2.71	2.71	0.0
P86IH135	37	18.94	120	1.75	S PH	2.71	2.59	2.63	0.0
P86IH138	37	18.78	120	1.48	CIPH	2.72	2.61	2.65	0.0
P86IH139A	37	18.77	120	1.30	D PH	3.05	3.01	3.02	0.2
P86IH149	37	18.28	120	1.46	M SS	2.65	2.54	2.58	—
P86IH151	37	18.19	120	1.72	CIPH	2.72	2.65	2.67	0.0
P86IH159	37	19.24	120	1.46	CIPH	2.59	2.36	2.45	0.0
P86IH178	37	19.16	120	2.15	FOUV	2.87	2.83	2.84	—
P86IH185	37	19.63	120	2.38	COSS	2.76	2.69	2.72	0.0
P86IH195	37	22.59	119	59.78	UB	2.63	2.62	2.63	0.0
P86IH198	37	22.86	119	59.78	HFPH	2.73	2.67	2.69	0.0
P86IH200	37	22.27	120	0.20	??	2.69	2.66	2.67	—
P86IH210A	37	23.03	120	0.19	AP	2.74	2.72	2.73	—
P86IH212	37	22.95	119	59.77	D SS	2.75	2.71	2.72	0.0
P86IH214	37	23.18	120	0.13	HF	2.83	2.82	2.82	0.0
P86IH215	37	23.37	120	0.15	GS	2.95	2.87	2.90	0.1
T84IG002A	37	25.49	120	10.23	MUSL	2.83	2.81	2.82	0.0
T84IG004	37	25.32	120	10.36	MUSC	2.67	2.55	2.60	0.0
T84IG006	37	25.31	120	10.36	5 SC	2.69	2.55	2.60	0.1
T84IG009	37	26.20	120	10.40	CLSS	2.73	2.72	2.72	0.0
T84IG010	37	26.39	120	10.20	EPUV	2.61	2.55	2.57	0.0
T84IG013	37	26.31	120	11.01	5 SC	2.74	2.65	2.68	0.0
T84IG016	37	25.87	120	12.45	EPUV	2.68	2.66	2.66	1.4
T84IG019	37	26.51	120	12.58	TOAM	3.10	3.06	3.07	0.1
T84IG020	37	26.77	120	12.85	CLUV	2.64	2.54	2.58	0.4
T84IG022	37	27.04	120	12.74	CLGB	3.00	2.98	2.99	3.7
T84IG025	37	27.05	120	13.16	1 DI	2.95	2.92	2.93	0.0
T84IG026	37	26.91	120	13.76	EPUP	2.96	2.93	2.94	0.0
T84IG027	37	25.39	120	12.24	ACDI	3.03	3.02	3.02	0.1
T84IG033	37	26.26	120	14.23	CLQD	2.70	2.66	2.68	0.5
T84IG035	37	24.92	120	10.16	CLSC	2.74	2.73	2.74	0.1
T84IG037	37	24.62	120	10.44	A UV	2.96	2.95	2.96	0.1
T84IG038	37	24.54	120	10.66	A UV	2.96	2.94	2.95	0.0
T84IG046	37	22.68	120	13.79	COSC	2.75	2.74	2.75	0.0
T84IG048	37	23.44	120	13.41	CISL	2.76	2.71	2.73	0.1
T84IG049	37	22.97	120	12.91	CISL	2.72	2.55	2.62	0.1
T84IG050	37	23.51	120	13.91	COSL	2.73	2.72	2.72	0.1
T84IG051	37	24.12	120	13.46	CLSL	2.69	2.59	2.62	0.0
T84IG052	37	24.75	120	13.24	CLTU	2.77	2.69	2.72	0.0
T84IG053	37	29.48	120	15.56	--	2.68	2.67	2.67	0.6
T84IG055	37	27.76	120	16.04	--	2.64	2.56	2.59	0.2
T84IG058	37	26.32	120	15.19	CLSL	2.62	2.57	2.59	0.0
T84IG065	37	23.92	120	11.53	ACDB	2.85	2.80	2.82	0.0
T84IG068	37	24.70	120	14.37	CISL	2.70	2.62	2.65	0.0
T84IG069	37	25.36	120	14.29	ACTU	2.71	2.68	2.69	0.0
T84IG070	37	25.49	120	14.11	EPDI	2.79	2.71	2.74	0.0
T84IG073	37	27.97	120	15.69	EPUV	2.64	2.58	2.60	0.0
T84IG074	37	27.97	120	15.68	CLTU	2.88	2.85	2.86	0.0
T84IG079	37	28.47	120	15.14	EPQD	2.67	2.64	2.68	0.5
T84IG081	37	27.44	120	15.94	CLTU	2.73	2.63	2.66	0.3
T84IG082	37	27.58	120	15.99	5 TU	2.72	2.66	2.68	0.1
T84IG084	37	27.54	120	13.91	--	2.68	2.63	2.65	1.4
T84IG085	37	27.54	120	13.90	A UP	2.97	2.94	2.95	0.0
T84IG086	37	27.55	120	14.06	A UP	2.95	2.93	2.94	0.0
T84IG088	37	27.50	120	14.25	EPQD	2.92	2.87	2.88	—
T84IG090	37	27.11	120	14.34	MYDI	2.92	2.86	2.88	0.0
T84IG092	37	27.28	120	13.80	EPMY	2.99	2.97	2.98	0.0
T84IG098	37	28.41	120	16.04	MUUV	2.63	2.53	2.57	0.0
T84IG099	37	28.25	120	16.20	CLTU	2.75	2.70	2.74	0.0
T84IG105	37	28.63	120	16.51	--	2.64	2.58	2.60	0.3
T84IG110	37	28.75	120	16.69	EPUS	2.75	2.74	2.75	0.0
T84IG113	37	29.15	120	16.90	CLQD	2.68	2.54	2.60	2.2
T84IG115	37	29.31	120	17.08	5 ?	2.62	2.59	2.60	0.1
T84IG116	37	29.37	120	17.36	--	2.61	2.46	2.52	0.0
T84IG118	37	29.57	120	17.40	CLTU	2.71	2.65	2.67	0.0
T84IG119	37	29.61	120	17.09	EPUV	2.97	2.88	2.91	0.0

TABLE 1.–*Physical property measurements of rock samples–Continued*

Station Name	Lat deg	Lat min	Lon deg	Lon min	Rock Type	D1 g/cm^3	D2 g/cm^3	D3 g/cm^3	Susceptibility 10^{-3} cgs units
T84 I G123	37	29.37	120	16.18	C L T U	2.81	2.76	2.78	2.4
T84 I G124	37	29.11	120	16.10	- -	—	—	—	2.2
T84 I G134	37	25.44	120	11.45	S P A M	2.94	2.90	2.92	0.1
T84 I G138	37	26.48	120	15.34	5 T U	2.67	2.60	2.62	—
T84 I G173	—	—	—	—	- -	—	—	—	0.0
T84 I G178	—	—	—	—	- -	—	—	—	0.1
T85 H S 138	—	—	—	—	- -	—	—	—	0.0
T85 H S 145	—	—	—	—	C I S L	2.67	2.58	2.61	0.0
T85 H S 147	—	—	—	—	C I S L	2.74	2.73	2.73	0.1
T85 H S 150	—	—	—	—	G A Q D	2.64	2.59	2.61	0.0
T85 H S 153	—	—	—	—	C L S L	2.60	2.35	2.45	0.0
T85 H S 154	—	—	—	—	2 Q D	2.92	2.91	2.91	0.0
T85 H S 155	—	—	—	—	C I S L	2.76	2.75	2.75	0.0
T85 H S 157	—	—	—	—	D S L	2.73	2.72	2.72	0.0
T85 H S 158	—	—	—	—	D S L	2.77	2.75	2.77	0.0
T85 H S 161	—	—	—	—	D S L	2.75	2.66	2.69	0.0
T85 H S 162	—	—	—	—	2 D I	2.83	2.80	2.81	0.0
T85 H S 163	—	—	—	—	G A Q D	2.66	2.63	2.64	0.0
T85 H S 169	37	25.04	120	14.85	C I S L	2.65	2.55	2.59	0.1
T85 I G159	—	—	—	—	D S L	2.67	2.57	2.61	0.0
T85 I G160	—	—	—	—	D S L	2.74	2.65	2.68	0.0
T85 I G172	37	25.76	120	13.85	1 D I	2.80	2.80	2.80	0.9
T85 I G173	37	26.83	120	14.21	1 Q D	2.90	2.85	2.87	—
T85 I G174	37	26.83	120	14.20	M Y D I	2.93	2.87	2.89	0.1
T85 I G176	37	26.98	120	14.58	E P Q D	2.92	2.87	2.89	0.0
T85 I G177	37	26.79	120	14.71	E P Q D	2.83	2.76	2.79	0.0
T85 I G178	37	26.79	120	14.70	5 Q D	2.65	2.63	2.64	—
T85 I G179	37	26.61	120	14.49	E P Q D	2.86	2.82	2.84	0.0
T85 I G180	37	27.15	120	12.26	E P Q D	2.65	2.63	2.64	0.0
T85 I G184	37	27.31	120	11.80	1 Q M	2.63	2.60	2.61	0.0
T85 I G185	37	27.12	120	11.80	A M B A	3.16	3.13	3.14	0.0
T85 I G186	37	26.77	120	11.84	4 Q D	2.70	2.62	2.65	0.5
T85 I G210	37	26.03	120	14.78	5 S C	2.91	2.88	2.89	0.1
T85 I G211	37	29.26	120	13.81	A M S C	3.06	3.04	3.05	0.1
T85 I G212	37	28.97	120	13.63	M U S C	2.64	2.59	2.61	0.0
T85 I G213	37	29.70	120	13.63	5 S S	2.63	2.56	2.59	0.0
T85 I G214	37	28.73	120	12.98	A S C	2.86	2.80	2.82	0.3
T85 I G215	37	28.56	120	14.47	A S C	2.87	2.84	2.86	0.9
T85 I G220	37	27.50	120	14.59	M Y Q D	2.88	2.77	2.81	0.0
T85 I G221	37	27.80	120	13.65	A C S C	2.86	2.82	2.83	2.4
T85 I G223	37	28.24	120	13.72	A C S C	2.89	2.88	2.88	3.4
T85 I G224	37	28.01	120	13.91	E P U V	3.00	2.97	2.98	0.1
T85 I G225	37	28.14	120	12.07	A C S C	2.79	2.63	2.69	0.5
T85 I G229	—	—	—	—	M Y D I	3.09	3.07	3.08	0.1
T85 I G233	37	25.14	120	11.98	A M S C	2.89	2.85	2.86	0.5
T85 I G234	37	25.63	120	11.55	1 D B	2.97	2.93	2.95	0.1
T85 I G235	37	25.66	120	11.80	1 G B	3.07	2.96	3.00	1.6
T85 I G237	37	24.85	120	12.41	C S C	2.74	2.70	2.71	2.2
T85 I G238	37	24.00	120	11.82	C L S C	2.72	2.54	2.61	0.1
T85 I G240	37	24.23	120	12.38	- -	—	—	—	0.0
T85 I G241	37	24.64	120	13.13	G A T U	2.75	2.66	2.70	0.0
T85 I G243	37	23.82	120	13.47	C I S L	2.70	2.66	2.68	0.1
T85 I G244	37	23.90	120	14.13	C O S L	2.75	2.72	2.73	0.0
T85 I G246	37	28.81	120	14.17	C L A M	2.96	2.89	2.91	0.0
T85MF187	37	30.54	120	15.34	- -	—	—	—	0.1
T85MF188	37	30.58	120	15.33	C L Q D	2.92	2.79	2.83	0.0
T85MF190	37	30.90	120	15.45	C L Q D	2.64	2.65	2.58	0.6
T85MF191	37	30.73	120	15.58	5 Q D	2.66	2.69	2.62	0.1
T85MF192	37	30.66	120	16.33	2 Q D	2.69	2.60	2.64	0.7
T85MF193	37	30.39	120	16.17	5 Q D	2.69	2.62	2.64	1.3
T85MF194	37	30.58	120	16.09	1 Q D	2.64	2.55	2.58	0.4
T85MF195	37	29.89	120	15.88	A C V B	2.85	2.84	2.85	1.1
T85MF196	37	29.91	120	15.35	- -	2.67	2.63	2.63	0.1
T85MF197	37	29.90	120	15.12	C L S C	2.93	2.84	2.87	0.6
T85MF199	37	29.91	120	17.08	A C S C	2.83	2.81	2.82	0.0
T85MF200	37	30.69	120	17.25	C L S C	2.70	2.62	2.65	0.1
T85MF201	37	30.62	120	17.22	E P S C	2.70	0.00	0.00	0.0
T85MF204	37	29.89	120	17.43	C L S C	2.77	2.75	2.76	0.0
T85MF205	37	30.60	120	17.60	C L S L	2.61	2.54	2.57	0.0
T85MF206	37	30.96	120	17.91	D S L	2.54	2.42	2.46	0.0

TABLE 1.–*Physical property measurements of rock samples–Continued*

Station Name	Lat deg	Lat min	Lon deg	Lon min	Rock Type	D1 g/cm^3	D2 g/cm^3	D3 g/cm^3	Susceptibility 10^{-3} cgs units
T85MF208	37	30.66	120	18.80	MUSC	2.69	2.62	2.65	0.0
T86WR003	37	19.06	120	5.99	--	2.70	2.60	2.64	0.1
T86WR008	37	19.05	120	5.47	CIPH	2.71	2.58	2.63	0.0
T86WR012	37	19.27	120	5.13	CIPH	2.69	2.54	2.60	0.1
T86WR017	37	19.51	120	4.68	HFPH	2.72	2.70	2.71	0.0
T86WR022	37	19.30	120	6.52	--	2.67	2.58	2.61	0.1
T86WR023	37	19.33	120	6.43	UV	2.92	2.83	2.86	0.1
T86WR025	37	19.50	120	6.54	PH	2.61	2.48	2.53	0.0
T86WR027	37	19.78	120	6.44	D PH	2.64	2.46	2.53	0.0
T86WR028	37	19.92	120	6.57	--	2.96	2.96	2.96	0.0
T86WR029	37	19.85	120	6.82	--	—	—	—	0.1
T86WR029	37	19.85	120	6.82	--	2.99	2.97	2.98	0.1
T86WR033	37	19.21	120	6.90	--	2.94	2.93	2.93	0.0
T86WR039	37	19.09	120	3.95	--	2.90	2.83	2.85	0.1
T86WR041	37	18.95	120	4.23	COPH	2.72	2.67	2.69	0.1
T86WR042	37	18.87	120	4.11	--	2.74	2.64	2.68	0.1
T86WR043	37	18.80	120	4.21	CIPH	2.80	2.70	2.73	0.0
T86WR047	37	18.30	120	3.78	--	2.78	2.71	2.73	0.0
T86WR051	37	18.34	120	3.07	--	2.69	2.64	2.66	0.0
T86WR052	37	18.41	120	2.82	COPH	2.80	2.77	2.78	0.1
T86WR053	37	18.53	120	2.82	COPH	2.75	2.69	2.71	0.1
T86WR056	37	18.90	120	3.03	--	2.75	2.74	2.74	0.0
T86WR059	37	18.99	120	3.46	GAPH	2.78	2.68	2.72	0.1
T86WR060	37	18.89	120	3.64	--	2.74	2.65	2.68	0.0
T86WR061	37	18.51	120	3.56	--	2.73	2.68	2.70	0.0
T86WR065	37	17.72	120	3.26	GAPH	2.91	2.86	2.88	0.0
T86WR067	37	17.68	120	2.66	--	2.80	2.75	2.77	0.0
T86WR069	37	17.97	120	2.78	--	2.78	2.72	2.74	0.0
T86WR074	37	19.07	120	2.76	--	2.88	2.85	2.86	0.1
T86WR077	37	18.14	120	2.10	COPH	2.67	2.44	2.53	0.0

TABLE 2.—*Explanation of rock types*

First two digits Code	Rock modifier
1	Hornblende
2	Biotite-hornblende
3	Biotite-hornblende
4	Hornblende-biotite
5	Biotite
A	Amphibole
B	Biotite
C	Calcareous
D	Silty (dirty)
F	Fossiliferous
G	Gneissose
H	Hornblende
K	Orthoclase
M	Meta-
N	Plagioclase
O	Orthoclase
P	Prophyritic
Q	Quartz
S	Schistose
X	Xenolithic
?	Questionable
?	Questionable
A C	Actinolite
A M	Amygdaloidal
A N	Anorthosite
A O	Asbestos
A P	Aphanitic
A U	Augite
B A	Basaltic
B N	Banded
B U	Boudinage
C A	Cataclastic
C H	Chert or cherty
C L	Chlorite
C M	Chromite
C N	Crinkled
C P	Chalcopyrite
C R	Coarse-grained
C Y	Clayey
E P	Epidote
F A	Feathery
F B	Fibrous
F I	Fine-grained
F L	Flakey
F O	Foliated
F S	Fissile
G A	Garnet
G C	Glaucophane
G R	Graphite
G S	Glassey
H E	Hematite
H F	Hornfelsic
H Y	Hypersthene
I L	Ilmenite
K Y	Kyanite
L C	Leucocratic
L I	Limonite
L N	Lineated
L S	Limestone
M A	Magnetite
M F	Medium-grained
M I	Mica
M K	Microline
M U	Muscovite
M Y	Myloritic
N E	Needles
O P	Ophitic
P G	Pegmatite
P K	Poikilitic
P L	Platey
P R	Pyrrhotite
P X	Pyroxene
P Y	Pyrite
R D	Radiating
S E	Serpentine
S I	Sillimanite
S L	Slatey
S T	Staurolite
S U	Sugary
T A	Talc
T B	Tabular
T C	Tourmaline
V S	Vesicular
Z E	Zeolite
Z R	Zircon
A I	Andulusite
C I	Chiastolite
C O	Codierite

Second two digits Code	Rock type
A G	Agglomerite
A K	Arkose
A M	Amphibolite
A N	Andesite
A P	Aplite
A R	Argillite
B A	Basalt
B R	Breccia
C H	Chert
C O	Conglomerate
C S	Calcsilicate
D A	Dacite
D B	Diabase
D I	Diorite
D N	Dunite
D O	Dolomite
G A	Granulite
G B	Gabbro
G D	Granodiorite
G E	Greenstone
G N	Gneiss
G R	Granite
G S	Greenschist
G W	Graywacke
H B	Hornblende
L A	Lamprophyre
L S	Limestone
M B	Marble
M S	Mudstone
M Y	Mylorite
O B	Obsidian
P B	Pillow breccia
P G	Pegmatite
P H	Phyllite
P L	Pillow lava
Q D	Quartz diorite
Q M	Quartz monzonite
R H	Rhyolite
S C	Schist
S D	Syenodiorite
S H	Shale
S K	Skarn
S L	Slate
S S	Sandstone
S T	Siltstone
S Y	Syenite
T O	Tonalite
T U	Tuff
U P	Unclassified plutonic
U S	Unclassified sediment
U V	Unclassified volcanic
V B	Volcanic breccia
V C	Volcaniclastic