UNITED STATES DEPARTMENT OF THE INTERIOR

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BULK DENSITY AND MAGNETIZATION MEASUREMENTS OF SAMPLES FROM THE COSO RANGE, CALIFORNIA

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The U.S. Geological Survey began studies of the gravity and magnetic fields near the Coso Range, California, in 1975, to aid in the interpretation of the geologic environment of the Coso Hot Springs geothermal area. William F. Isherwood and Jerry H. Hassemer collected rock samples near gravity stations during June 1976 (Isherwood and Plouff, 1978), to provide rock density and magnetization data for interpretation of gravity and magnetic maps. Samples were collected within a distance of less than 25 m from 53 gravity stations. This set of samples was expanded by adding 87 samples that were collected by Wendell A. Duffield and Charles R. Bacon during geological investigations near the Coso Range.

Bulk densities of the rock samples were measured by standard techniques of weighing them in air and while suspended in water. Cylinders of rock one inch (2.54 cm) long and one inch in diameter were cored from 71 un-oriented samples for magnetization studies. Methods described by Doell and Cox (1965) were used to determine the remanent magnetization of the small cylinders (Table 1 and Plate 1). Magnetic susceptibilities were measured with a Model 3101 Bison Instruments Magnetic Susceptibility System. The values of magnetic susceptibility were converted to induced magnetization by multiplying them by 40 A/m (equivalent to 0.51 oersted), the magnetic intensity of the earth's field near the Coso Range.

REFERENCES

Doell, R. R. and Cox, A., 1965, Measurement of the remanent magnetization of igneous rocks: U.S. Geological Survey Bulletin 1203-A, 32 p.

Duffield, W. A. and Bacon, C. R., 1977, Preliminary geologic map of the Coso volcanic field and adjacent areas, Inyo County, California: U.S. Geological Survey Open-File Report 77-311, scale 1:50,000.

Isherwood, W. F. and Plouff, Donald, 1978, Principal facts for gravity observations in the Coso Hot Springs area, California: U.S. Geological Survey Open-File Report 78-298, 14 p.

Table 1. Densities and magnetizations of rock samples.
Q, the ratio of the remanent to the induced magnetization. See Duffield and Bacon (1977) for definitions of rock units. Field identification used for samples collected outside of mapped area.

sample name	latitude	longitude	density (g/cm^3)	magnetization remanent (A/m)	magnetization induced (A/m)	Q	geologic unit
CB 2	36° 9.95'	117°43.46'	2.77	9.3	1.3	7.	b
CB 3	36° 9.31'	117°44.03'	2.60	0.0	0.0	0.0	b
CB 4	36° 6.93'	117°43.58'	2.49	9.7	0.1	81.	Omf
CB 6	36° 7.39'	117°40.15'	2.78				b
CB 7	36° 7.22'	117°38.55'	2.59				b
CB 13	36° 5.17'	117°39.13'	2.70	0.4	1.2	0.3	b
CB 31	35°59.24'	117°38.52'	2.34	19.5	0.2	121.	Dd
CB 32	35°59.96'	117°32.86'	2.72	18.1	0.5	35.	b
CB 36	36° 2.61'	117°38.80'	3.13				b
CB 38	36° 4.00'	117°46.41'	2.74	1.6	1.3	1.2	b
CB 42	35°56.74'	117°48.91'	2.14	0.0	0.0	0.0	bcr
CB 50	36° 7.51'	117°46.72'	2.62				Omf
CB 51	36° 8.05'	117°45.23'	2.73				Omf
CB 53	36° 9.45'	117°47.34'	2.55				Omf
CB 56	36° 6.85'	117°52.02'	2.36	0.9	0.0	24.	dH
CB 61	36°10.46'	117°45.51'	2.71				Omf
CB 65	36° 9.91'	117°40.61'	2.72	0.0	0.0	0.0	b
CB 66	36° 8.99'	117°39.02'	3.10	0.0	0.0	0.0	b
CB 96	35°55.80'	117°17.67'	2.32				basalt
CB 97	35°53.83'	117°17.26'	2.34				basalt
CB109	36° 3.98'	117°53.13'	2.60				b
CB110	36° 5.24'	117°54.83'	2.39	1.3	0.1	19.	dH
CB111	36° 5.83'	117°54.78'	2.04	0.2	0.2	2.	dH
CB113	36° 7.02'	117°56.67'	2.41	2.3	0.5	5.	dh
CB125	36°55.75'	117°47.62'	1.75	22.5	0.4	51.	bwap
CB126	35°56.28'	117°48.17'	2.63	0.0	0.0	0.0	b
CB127	35°59.84'	117°49.00'	2.02	0.3	0.0	7.	r
CB147	35°47.84'	117°25.05'	2.55	0.8	0.2	4.	basement
CB155	35°57.73'	117°21.63'	2.64		0.5		basalt
CB160	36° 5.48'	117°24.56'	2.68	0.0	0.0	0.0	basement
CB161	36° 6.50'	117°26.13'	2.56				basement
CB162	36° 8.69'	117°25.28'	2.65				basement
CB168	35°53.08'	117°49.21'	2.42	9.5	0.7	14.	bcr
CB170	35°57.75'	117°50.55'	1.63	0.0	0.0	0.0	r
CB180	36° 3.19'	117°32.23'	2.59				basement
CB183	36°11.66'	117°30.18'	2.73	0.0	0.0	0.0	basement
CB194	36°14.64'	117°41.86'	2.67	22.6	1.2	36.	b
CB198	36° 6.28'	117°52.47'	2.25				c
CB199	36° 6.51'	117°53.52'	2.01	2.1	0.1	19.	dh-c
CB200	36° 7.79'	117°53.43'	2.51	2.0	0.2	11.	dh
CB206	36°12.41'	117°41.50'	2.56	15.4	1.0	16.	b
CB207	36°13.72'	117°42.22'	2.57	6.6	0.1	72.	b
CB221	36°11.42'	117°54.07'	2.36	3.2	0.2	14.	dh
CB222	36°10.72'	117°54.82'	2.06				dh
CB225	36° 9.24'	117°55.50'	2.03				c

Table 1. (contd.)

sample name	latitude	longitude	density (g/cm^3)	magnetization remanent (A/m)	magnetization induced (A/m)	Q	geologic unit
CB226	36° 7.34'	117°55.31'	2.38	9.2	0.3	37.	dh
CB228	36° 5.52'	117°53.62'	2.05	0.6	0.1	4.	c
CB229	36° 3.44'	117°59.64'	2.71	30.2	0.8	38.	b
CB245	35°47.91'	117°55.58'	3.02	42.6	1.3	32.	b
CB261	36°26.66'	117°37.33'	2.69				basement
CB263	36°29°80'	117°36.72'	2.92	1.5	0.8	2.	Omf
K 63	36° 1.12'	117°44.83'	2.41	0.0	0.1	0.0	Dd
KK 7	36° 4.69'	117°48.89'	1.90	0.0	0.0	0.0	r
8-195- 5	36° 7.99'	117°46.79'	2.68	1.3	0.1	12.	Omf
8-119-10	36° 1.02'	117°44.68'	2.74	25.8	1.4	18	Omf
9- 8- 5	36° 4.33'	117°49.24'	1.78				r
9- 11- 1	36°11.01'	117°48.22'	2.83	3.2	0.6	6.	mfp
13-108- 1	36°11.89'	117°44.32'	2.75	5.7	1.2	5.	bcp
13-111- 7	36° 7.89'	117°43.05'	2.63	83.2	0.4	230.	Omfp
13-113- 4	36° 3.42'	117°43.54	2.49	2.0	0.2	9.	dO
13-113-17	36° 3.05'	117°40.98'	2.66	0.4	0.1	6.	bpc
13-114- 2	36° 1.72'	117°40.50'	2.80	1.2	0.3	4.	bpc
13-123- 1	36° 0.94'	117°36.34'	2.57	4.1	0.1	39.	brc_1
13-123- 2	36° 0.95'	117°36.87'	2.58	1.3	0.2	7.	brc_1
I- 71- 1	35°52.25'	117°46.44'	2.73	16.2	1.0	16.	ba
I- 71- 2	35°49.85'	117°47.17'	2.55	56.9	0.1	428.	bcr
I- 84- 4	35°55.40'	117°47.90'	2.70	7.8	1.8	5.	bwa
I- 87- 1	35°54.08'	117°40.73'	2.48	3.3	0.2	18.	Omfp
I- 87- 2	35°53.96'	117°40.00'	2.47	7.0	0.8	9.	Omf
I-101- 4	35°59.02'	117°38.89'	2.62	11.4	0.1	107.	Od-Omf
I-102- 1	35°58.41'	117°41.34'	2.54	6.2	0.1	42.	Omf
I-104-15	35°57.61'	117°44.64'	2.50	7.7	0.7	10.	bcw
I-105- 6	35°58.46'	117°51.86'	2.71	0.9	1.0	0.8	brvp
I-105-19	35°57.60'	117°50.45'	1.79	0.1	0.0	5.	bVp
30 X	35°59.74'	117°48.57'	1.70	0.2	0.0	6.	r
2- 2	36° 8.30'	117°50.99'	2.41	0.0	0.1	0.3	b
8-124- 3	36°10.90'	117°39.52'	2.61	21.6	0.2	87.	basement
8-124- 4	36° 8.14'	117°38.90'	2.80	19.7	1.0	20.	b
8-126- 3	36° 5.95'	117°38.47'	2.61	63.2	0.8	75.	b
8-126- 4	36° 5.62'	117°40.26'	2.66	9.6	1.2	8.	b
8-192- 1	36°12.38'	117°46.80'	2.71	0.5	1.3	0.4	b
8-195- 6	36° 8.77'	117°47.30'	2.61	1.0	0.3	3.	b
9- 5- 6	36° 0.91'	117°47.20'	2.67	0.8	0.7	0.1	b
9- 5- 8	36° 0.17'	117°49.25'	2.63	0.3	0.0	0.6	b
9- 5- 9	35°58.95'	117°48.46'	2.89	0.1	0.0	0.0	b
9- 7-16	36° 2.52'	117°46.88'	2.59	0.0	0.0	0.0	b
9- 10- 4	36°10.01'	117°47.72'	2.61	0.0	0.3	0.0	b
13- 45- 2	36° 9.22'	117°53.52'	2.60	2.8	0.6	5.	b
13- 46- 1	36° 9.72'	117°52.69'	2.49	0.0	0.1	0.3	b
13- 46- 3	36°10.99'	117°51.09'	2.85	16.1	2.2	7.	b
13-110- 5	36° 8.28'	117°42.76'	2.66	1.3	0.1	23.	b
13-123- 3	36° 2.22'	117°36.02'	2.61	0.0	0.0	0.0	b

Table 1. (contd.)

sample name	latitude	longitude	density (g/cm^3)	magnetization remament (A/m)	magnetization induced (A/m)	Q	geologic unit
32- 1	36° 4.03'	117°47.46'	2.71	0.6	1.0	0.6	b
32- 2	36° 4.13'	117°47.58'	2.58	0.1	0.1	1.2	b
33- 1	36° 3.78'	117°52.78'	2.62	0.4	0.1	3.	b
I- 83-13	34°55.58'	117°53.84'	2.62	0.0	0.1	0.2	b
21- 1	36° 5.22'	117°52.82'	2.62				b
23- 1	36° 5.81'	117°50.24'	2.42				b
I-105-10	35°58.56'	117°51.28'	2.57				b
I-105-13	35°57.76'	117°48.95'	2.61				b
8-124- 1	36°10.65'	117°38.72'	2.62				basement
8-124- 2	36°10.46'	117°38.88'	3.04				basement
8-191- 1	36°14.00'	117°45.22'	2.71				bcf
8-191- 2	36°14.19'	117°45.31'	2.79				b-bcf
8-198- 2	36° 4.02'	117°45.14'	2.61				b
8-198- 3	36° 3.93'	117°45.10'	2.69				b
9- 5- 7	36° 0.06'	117°47.10'	2.81				b
9- 5-10	35°58.73'	117°49.67'	2.64				b
9- 5-11	36° 0.93'	117°50.52'	2.65				bsmp
9- 6-23	36° 2.48'	117°50.50'	2.66				b
9- 9- 1	36° 7.76'	117°48.01'	2.61				b
9- 11- 4	36°11.13'	117°47.76'	2.62				b
9- 11- 5	36°11.29'	117°47.04'	2.59				b
9- 12- 2	36°13.13'	117°49.11'	2.69				b
9- 82- 2	36° 6.08'	117°54.04'	2.61				c
9- 82- 4	36° 5.64'	117°54.48'	2.61				b
10- 2	36° 6.95'	117°51.62'	2.65				b
13- 2	36° 6.83'	117°49.99'	2.61				b
13- 45- 8	36° 8.98'	117°52.30'	2.62				b
13- 46- 5	36°11.10'	117°51.37'	2.62				b
13-110- 3	36° 8.80'	117°43.08'	2.69				b
13-110- 6	36° 8.61'	117°41.45'	2.62				b
13-110- 7	36° 9.06'	117°40.33'	2.69				b
13-123- 4	36° 0.48'	117°36.04'	2.78				b
9- 7-14	36° 3.25'	117°48.21'	2.61				b
9- 7-15	36° 3.25'	117°48.21'	2.77				b
19-2	36° 5.98'	117°47.99'	2.62				b
19-4	36° 5.92'	117°48.83'	2.60				b
20-1	36° 5.77'	117°47.79'	2.62				b
21-1	36° 5.22'	117°52.82'	2.62				b
23-1	36° 5.81'	117°50.24'	2.42				b
30-1	36° 4.35'	117°48.54'	2.59				rp
34-1	36° 8.89'	117°50.17'	2.62				b
34-3	36° 9.37'	117°49.87'	2.60				b
I- 81- 1	35°55.57'	117°54.80'	2.72				ls
I- 81- 2	35°55.38'	117°54.78'	2.73				ls
I- 81- 3	35°55.10'	117°54.83'	2.64				ls
I-105-10	35°58.56'	117°51.28'	2.57				b
I-105-13	35°57.76'	117°48.95'	2.61				b
13-108- 2	36°11.72'	117°42.91'	2.67				b