DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

TO ACCOMPANY MAP GQ-728

SHUTEYE PEAK QUADRANGLE, SIERRA NEVADA, CALIFORNIA

By
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DESCRIPTION OF MAP UNITS AND SUPPLEMENTAL DATA

DESCRIPTION OF MAP UNITS

Alluvial deposits

Valley fill and lake beds comprised of gravel, sand, silt, and peat. Areas so mapped are now largely occupied by upland meadows.

Talus

Rock debris, mapped only in small area in northwest corner of quadrangle where it obscures bedrock geologic relations.

Glacial deposits

Glacial till, mapped only where extensive or where it exhibits morainal form. Not differentiated as to age but deposits mapped are probably mostly of Wisconsin age.

Trachybasalt

Generally light-gray but locally dark-gray, fine-grained rock with abundant olivine phenocrysts. The basalt is distinctly alkalic, as is the trachybasalt described from Black Point just south of the quadrangle (Hamilton and Neuerburg, 1956), and is a member of the alkalic-calcic suite of late Cenozoic volcanic rocks in the central Sierra Nevada (Huber and Rinehart, 1966, 1967). K-feldspar (sanidine?) is abundant in the matrix of some samples (for example, No. SP-173-C in table of chemical analyses). Although the trachybasalt was more extensive prior to erosion, its present distribution is in part related to eruption from scattered local vents now visible as volcanic necks, the most conspicuous of which are the knob south of Squaw Dome and Brown Cone in the adjacent Kaiser Peak quadrangle. Trachybasalt of probably similar age has been dated by the potassium-argon method at 3.3 and 3.5 million years in the Devils Postpile quadrangle and 3.8 million years in the Kaiser Peak quadrangle (Dalrymple, 1964). In the Devils Postpile quadrangle the trachybasalt was included within the map unit designated as andesite of Deadman Pass (Huber and Rinehart, 1965; 1966; 1967).

Mount Givens Granodiorite

Medium- to coarse-grained hornblende-biotite granodiorite and quartz monzonite. The portion of the pluton of Mount Givens Granodiorite that lies within the Shuteye Peak quadrangle has a cyclic, semiconcentric zoning expressed by texture, composition, and specific gravity. The nonporphyritic phase is predominantly granodiorite with an average color index of 14. The porphyritic phase has a composition field straddling the granodiorite-quartz monzonite boundary, has an average color index of about 8, and is characterized by K-feldspar phenocrysts commonly as much as 2 cm long. In both phases the plagioclase is predominantly andesine. The K-feldspar shows occasional grid structure, and the plagioclase is commonly but not prominently zoned. The hornblende is characteristically euhedral. Sphene is an abundant accessory mineral. A third, more restricted, phase is a fine- to medium-grained aplitic rock exposed in the vicinity of Jackass Rock which constitutes the core of the concentric zonal structure. This phase has an average color index of 1.5 and the plagioclase is oligoclase. Mount Givens Granodiorite intrudes granodiorite of Beasore Meadow and quartz monzonite of Shuteye Peak. East of the Shuteye Peak quadrangle the age of the Mount Givens Granodiorite has been established at about 87 million years by the potassium-argon method (Kistler, Bateman, and Brannock, 1965).

Granodiorite of Whisky Ridge

Medium-grained hornblende-biotite granodiorite and quartz diorite with an average color index of 18. The body in the southern part of the quadrangle is zoned, with generally more mafic rock near its margins. The eastern, hook-shaped extension of this pluton is also relatively mafic, although quite variable. Plagioclase is commonly quite strongly zoned and is predominantly andesine and sodic labradorite. The rock is locally porphyritic with extremely poikilitic K-feldspar phenocrysts. Hornblende is typically euhedral. The rock is quite similar to the nonporphyritic phase of the Mount Givens Granodiorite, but is distinguished by a higher average color index and lesser content of sphene. Granodiorite of Whisky Ridge intrudes quartz monzonite of Shuteye Peak and granodiorite of Dinkey Creek. Relations between it and the Mount Givens Granodiorite are uncertain.

Granodiorite of Camino Creek

Fine- to medium-grained unit is extremely variable, with composition ranging from quartz diorite to quartz monzonite and an average composition of granodiorite. Color index ranges from 10 to 30. Plagioclase is predominantly andesine and sodic labradorite; mafic content is predominantly biotite with lesser hornblende. This unit commonly contains abundant inclusions of metamorphic rocks, locally in advanced stages of assimilation. Granodiorite of Camino Creek intrudes quartz monzonite of Shuteye Peak and granodiorite of Beasore Meadow.

Granodiorite of Grizzly Creek

Medium-grained hornblende-biotite granodiorite. Color index variable within range 10-30. Unit is char-

acterized by abundant phenocrysts of quartz averaging about 5 mm and locally as much as 1 cm in maximum dimension. Plagioclase is andesine. Quartz diorite of Grizzly Creek intrudes quartz monzonite of Shuteye Peak.

Granodiorite of Beasore Meadow

Medium-grained hornblende-biotite granodiorite. Color index variable but generally in range 15-30 with a probable average of 20-25. Plagioclase is commonly zoned and is predominantly sodic labradorite and calcic andesine. Locally contains large swarms of abundant mafic inclusions. Granodiorite of Beasore Meadow intrudes quartz monzonite of Shuteye Peak.

Quartz monzonite of Shuteye Peak

Medium-grained light-colored quartz monzonite and minor granodiorite with average color index about 5. Generally equigranular but locally slightly porphyritic with equant K-feldspar phenocrysts as much as 1 cm in average length. Plagioclase is predominantly oligoclase and is commonly strongly zoned, sericitized, and generally ratty looking. K-feldspar commonly has grid structure. Mortar structure is not uncommon. Mafic minerals are biotite and lesser amounts of granular, fine-grained, opaque material (probably mostly magnetite). In the summit area of Chiquito Ridge, rocks of this unit exhibit spectacular exfoliation sheet jointing.

Biotite quartz monzonite and granodiorite

Medium-grained biotite quartz monzonite and granodiorite; color index averages about 8. Rock is locally porphyritic with K-feldspar phenocrysts about 1 cm in average length. Plagioclase is predominantly andesine. Sphene is an abundant accessory mineral; hornblende is minor. A finer grained phase occurs in the central part of the unit. This unit intrudes granodiorite of Dinkey Creek.

Granodiorite of Dinkey Creek

Hornblende-biotite granodiorite and quartz monzonite with average color index of about 10. Generally moderately to strongly porphyritic with tabular K-feldspar phenocrysts commonly as much as 2 cm in average length and rarely as much as 4 or 5 cm long. Plagioclase is predominantly calcic oligoclase and sodic andesine. The porphyritic rock, which predominates in this unit within the Shuteye Peak quadrangle and to the east on Kaiser Ridge, has been shown by mapping in the adjacent Kaiser Peak and Huntington Lake quadrangles (P. C. Bateman, oral commun., 1966) to grade laterally near Huntington Lake into medium-grained dark granodiorite more typical of the main mass of granodiorite of Dinkey Creek to the southeast in the Huntington Lake quadrangle. The granodiorite of Dinkey Creek is intruded by the Mount Givens Granodiorite in the Blackcap Mountain quadrangle (Bateman, 1965).

Granodiorite of Illilouette Creek

Medium-grained hornblende-biotite granodiorite with abundant sphene. Unit derives its name from a creek in the Merced Peak quadrangle adjacent to the north (Peck, 1964).

Fine-grained quartz monzonite

Fine-grained aplitic quartz monzonite occurs as a small mass and associated dikes at the north edge of the quadrangle. It is intrusive into the adjacent small mass of hornblende-biotite granodiorite.

Dark granodiorite and other mafic plutonic rocks

Unit includes various small bodies of mafic intrusive rock of uncertain ages relative to most of the other intrusive rocks. Dark medium-grained hornblende-biotite granodiorite north of Muglers Meadow and north of Iron Lakes; dark medium-grained hornblende-biotite granodiorite and quartz diorite on Kaiser Ridge; diorite and gabbro west of Little Shuteye Pass. Body north of Muglers Meadow is intruded by the Mount Givens Granodiorite.

Metatuff and metatuff breccia

Medium- to dark-gray crystal-lithic metatuff and metatuff breccia with generally well preserved primary textures. There exist all gradations from fine-grained massive metatuff to metatuff breccia with lithic fragments as much as one-half meter long; no fragments of nonvolcanic rock appear to be present. Bedding is generally obscure to absent. Rock is typically a quartz-feldspar-mica hornfels with amphibole locally abundant. Refractive index of fused glass beads indicates composition equivalent to rhyodacite.

Metarhyolite

Light-gray, rhyolitic crystal-lithic metatuff, metatuff breccia, and flow-banded metarhyolite. The rhyolitic and rhyodacitic metatuff and metatuff breccia are similar except for color and composition; and the rhyolitic breccia is generally not as coarse. Banding in the flow-banded metarhyolite is often intricately contorted and evidence of autobrecciation is common. Rock is a quartz-feldspar-mica hornfels; rhyolitic composition indicated by refractive index of fused glass beads.

Metasedimentary rocks

Quartz-mica schist, quartzite, calc-silicate hornfels, and tactite. Light- to dark-gray quartz-mica schist and quartzite predominate in all areas of metasedimentary rock in the quadrangle except for the small masses in the vicinity of Fish Creek, where calc-silicate hornfels and tactite predominate. On Kaiser Ridge, white to buff quartzite locally shows conspicuous crossbedding. Tungsten mineralization is present locally in tactite in the Fish Creek area; the deposits have been described by Krauskopf (1953).

REFERENCES

Bateman, P. C., 1965, Geologic map of the Blackcap Mountain quadrangle, Fresno County, California: U.S. Geol. Survey Geol. Quad. Map GQ-428, scale 1:62,500.

Dalrymple, G. B., 1964, Cenozoic chronology of the Sierra Nevada, California: California Univ. Pubs. Geol. Sci., v. 47, 41 p.

Hamilton, W. B., and Neuerburg, G. J., 1956, Olivine-sanidine trachybasalt from the Sierra Nevada, California: Am. Mineralogist, v. 41, nos. 11-12, p. 851-873.

Huber, N. K., and Rinehart, C. D., 1965, Geologic map of the Devils Postpile quadrangle, Sierra Nevada, California: U.S. Geol. Survey Geol. Quad. Map GQ-437, scale 1:62,500.

Huber, N. K., and Rinehart, C. D., 1966, Some relationships between the refractive index of fused glass beads and the petrologic affinity of volcanic rock suites: Geol. Soc. America Bull., v. 77, no. 1, p. 101-110.

_____1967, Cenozoic volcanic rocks of the Devils Postpile quadrangle, eastern Sierra Nevada, California: U.S. Geol. Survey Prof. Paper 554-D, p. D1-D21.

Kistler, R. W., Bateman, P. C., and Brannock, W. W., 1965, Isotopic ages of minerals from granitic rocks of the central Sierra Nevada and Inyo Mountains, California: Geol. Soc. America Bull., v. 76, no. 2, p. 155-164.

Krauskopf, K. B., 1953, Tungsten deposits of Madera, Fresno, and Tulare Counties, California: California Div. Mines Spec. Rept. 35, 83 p.

Peck, D. L., 1964, Preliminary geologic map of the Merced Peak quadrangle, California: U.S. Geol. Survey Mineral Inv. Map MF-281, scale 1:48,000.

Shapiro, Leonard, and Brannock, W. W., 1956, Rapid analysis of silicate rocks: U.S. Geol. Survey Bull. 1036-C, p. 19-56.

Table 1.—*Chemical analyses of selected rock samples, Shuteye Peak quadrangle*

	Trachybasalt			Granodiorite of Whisky Ridge		Quartz monzonite of Shuteye Peak		Mount Givens Granodiorite			
								Nonporphyritic		Porphyritic	
Lab No.	M101 046W[1]	M101 047W[1]	M101 048W[1]	M101 049W[1]	M101 050W[1]	M101 051W[1]	M101 052W[1]	M101 053W[1]	162491[2]	M101 054W[1]	D100 433[3]
Field No.	SP-173-C	SP-302	SP-322	SP-552	SP-149	SP-457	SP-146	SP-445	SP-300	SP-115	SP-334
SiO_2	49.7	52.4	51.7	68.4	65.6	73.4	73.4	67.5	67.7	68.6	71.55
Al_2O_3	13.3	16.8	15.0	15.4	16.2	14.0	14.0	15.6	16.0	15.4	14.37
Fe_2O_3	3.0	5.5	3.5	1.0	1.4	.84	1.0	1.5	1.9	1.6	1.08
FeO	5.8	2.6	5.4	2.4	2.8	1.6	.84	2.2	1.6	1.9	1.15
MgO	8.5	5.6	8.1	1.1	2.0	.37	.50	1.4	1.0	1.1	.72
CaO	8.5	7.1	7.8	3.6	4.6	1.6	1.8	3.8	3.6	3.0	1.98
Na_2O	3.8	3.8	3.3	3.4	3.1	3.6	3.2	3.1	3.5	3.7	3.52
K_2O	3.6	2.4	2.1	2.9	3.0	3.8	4.0	3.5	3.2	3.5	4.52
H_2O-	.16	.57	.18	.08	.07	.10	.12	.06	.25	.06	.06
H_2O+	1.1	.73	.73	1.3	.74	.51	.58	.79	.54	.65	.38
TiO_2	1.5	1.4	1.2	.46	.61	.22	.24	.54	.47	.46	.32
P_2O_5	.88	.74	.50	.11	.12	.00	.06	.13	.16	.11	.08
MnO	.21	.27	.25	.10	.10	.08	.00	.13	.05	.13	.06
CO_2	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	.02
Total	100	100	100	100	100	100	100	100	100	100	99.81
Powder density by air pycnometer	2.98	2.88	2.97	2.72	2.74	2.68	2.66	2.72	2.73	2.68	2.67
Bulk density	2.80	2.59	2.75	2.64	2.70	2.57	2.55	2.43	n.d.	2.61	n.d.

[1]Analyses by modification of the rapid method of Shapiro and Brannock (1956).
Analysts: P. L. D. Elmore, S. D. Botts, G. Chloe, Hezekiah Smith, Lowell Artis, Dennis Taylor, and J. L. Glenn.
[2]Analysis by the rapid method of Shapiro and Brannock (1956).
Analysts: P. L. D. Elmore, S. D. Botts, G. Chloe, Lowell Artis, and Hezekiah Smith.
[3]Standard chemical analysis by E. S. Daniels.

SP-173-C, from volcanic knob south of Squaw Dome, Sec. 20, T. 5 S., R. 25 E.
SP-302, from roadcut at west edge of Sec. 20, T. 6 S., R. 24 E.
SP-322, from knob on west edge of Sec. 25, T. 5 S., R. 24 E.
SP-552, from roadcut in southwest corner of Sec. 23, T. 7 S., R. 23 E.
SP-149, from roadcut just north of Central Camp, Sec. 5, T. 7 S., R. 23 E.
SP-457, from ridge in northeast corner of Sec. 17, T. 7 S., R. 23 E.
SP-146, from hillside exposure near center of Sec. 32, T. 5 S., R. 23 E.
SP-445, from knob in northeast corner of Sec. 8, T. 7 S., R. 24 E.
SP-300, from roadcut at Chiquito Creek, Sec. 20, T. 6 S., R. 24 E.
SP-115, from roadcut near north edge of Sec. 27, T. 5 S., R. 23 E.
SP-334, from top of westernmost of Fuller Buttes, Sec. 7, T. 6 S., R. 25 E.

Table 2.—*C. I. P. W. norms and modes of selected rock samples, Shuteye Peak quadrangle*

[For sample locations, see Chemical analyses.]

Field No.	SP-173-C	SP-302	SP-322	SP-552	SP-149	SP-457	SP-146	SP-445	SP-300	SP-115	SP-334
C. I. P. W. norms											
Q		1.6		27.2	22.3	33.2	35.0	25.4	26.2	25.5	28.6
or	21.3	14.2	12.4	17.1	17.7	22.5	23.6	20.7	19.0	20.7	26.8
ab	17.9	32.2	27.9	28.7	26.2	30.5	27.1	26.2	29.6	31.3	29.8
an	8.6 (An_{32})	21.7 (An_{40})	19.9 (An_{42})	16.8 (An_{37})	21.4 (An_{45})	7.6 (An_{20})	8.2 (An_{23})	17.7 (An_{40})	16.7 (An_{36})	13.8 (An_{31})	8.9 (An_{23})
ne	7.7										
di	22.0	6.5	12.1		.2						
hy		10.9	12.9	5.7	8.0	3.0	1.6	5.6	3.2	4.0	2.6
ap	2.1	1.8	1.2	.3	.3		.1	.3	.4	.3	.2
C				.5		1.2	1.4	.2	.7	.5	.5
mt	4.4	5.2	5.1	1.5	2.0	1.2	1.5	2.2	2.8	2.3	1.6
il	2.8	2.6	2.3	.9	1.2	.4	.5	1.0	.9	.9	.6
H		1.9									
cc	.1	.1	.1	.1	.1	.1	.1	.1		.1	
O	12.0		5.0								
Total	98.9	98.7	98.9	98.8	99.4	99.7	99.1	99.4	99.5	99.4	99.6
Modal analyses [Analysts: M. B. Norman and I. F. Palmer.] [1000 to 2000 point counts on a stained slab of at least 6 square inches area.]											
Quartz				31.8	23.2	35.8	35.1	25.4	26.9	24.8	26.3
K-feldspar				10.2	6.4	18.0	25.7	19.5	18.2	25.2	30.8
Plagioclase				46.3	49.9	40.2	34.5	42.0	44.5	39.2	38.0
Mafic minerals				11.7	20.5	6.0	4.7	13.1	10.4	10.0	4.9