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Title of article Petrologic evolution of the San Juan volcanic field, southwestern Colorado; Pb and Sr isotope evidence

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APPENDIX A--Locations and descriptions of analyzed samples (Table 2-4, 6)

Table 2

Sample No. 1. See Lipman, Steven, and Mehnert (1970, Table 2, no. 5).

2. Dark gray hornblende plagioclase rhyodacite. Collected just north of summit of Conejos Peak at about 43,140 m. elevation 37°17.5'N., 106°34'W.

3. Gray andesite, containing small tabular phenocrysts of plagioclase. Collected ridge north of Horseshoe Mountain at about 2,745 m elevation. 37°37'N., 106°24'W.

4. See Lipman (1968, Table 1, no. 11) and Lipman, Steven and Mehnert (1970, Table 2, no. 4).

5. Recollection of same locality as described by Lipman (1968, Table 1, no. 2).

6. See Lipman (1968, Table 1, no. 5) and Lipman, Steven, and Mehnert (1970, Table 2, no. 3).

7. Gray porphyritic biotite-hornblende-plagioclase rhyodacite. Location 37°48.5'N., 106°32.5'W.

8. See Lipman, Steven, and Mehnert (1970, Table 2, no. 7).

Table 3

9. See Lipman, Steven, and Mehnert (1970, Table 3, no. 1).

10. See Lipman (1975, Table 9, no. 7).

11. See Lipman (1975, Table 9, no. 6).

12. Light-gray plagioclase-biotite-augite rhyodacite. Collected along Park Creek road. 37°26'N., 106°37.5'W.

13. Same locality as described by Mehnert, Lipman and Steven (1973a, Table 1, no. 1).

14. Black glassy biotite-sanidine-quartz rhyolite. Collected from south summit of South Mountain at 3,802 m elevation. 37°25'N., 106°36'W.

15. See Steven, Mehnert, and Obradovich (1967, Table 2, no. 3).

16. See Steven, Mehnert, and Obradovich (1967, Table 2, no. 1).

17. Same locality as described by Ratté and Steven, 1967 (Table 2, no. 1).

18. Basal black vitrophyre of rhyolitic ash-flow sheet containing about 4 percent phenocrysts of plagioclase, sanidine, and biotite. First Fork section, at about 3,110 m elevation. 37°53'N., 106°54.5'W. Also see Ratté and Steven (1967, p. H21).

19. Approximately same locality as that described by Ratté and Steven (1967, Table 6, no. 3).

20. See Steven, Mehnert, and Obradovich (1967, Table 2, no. 6).

21. Approximately same locality as that reported by Armstrong (1969, Table 1).

22. Basal black vitrophyre of rhyolitic ash-flow sheet, containing about 3 percent phenocrysts of sanidine, plagioclase, and biotite. Cebolla Creek. Location 38°8'N., 107°3'N.

23. Basal black vitrophyre of biotite-augite-plagioclase-quartz latite lava flow. Collected 100 m northeast of unnamed lake 1.2 km northeast of Wildhorse Peak. 38°1.5'N., 107°33.5'W.

24. Dark gray andesitic lava flow, containing large tabular plagioclase phenocrysts and blocky augite phenocrysts. Collected along Engineer Pass road at about 3,750 m elevation. 37°58.5'N., 107°34'W.

25. Black basal vitrophyre of rhyolitic ash-flow sheet containing about 2 percent phenocrysts of sanidine, and plagioclase, and biotite. Collected in East Fork of Nellie Creek, at about 3,565 m elevation. 38°3.5'N., 107°23'W.

26. Pinkish gray fine-grained equibranular quartz monzonite. Collected at Marcella mine. 37°47.5'N., 107°39.5'W. See Varnes (1963, Pl. 1).

27. See Lipman, Fisher, Mehnert, Naeser, Luedke, and Steven (1976, Table 2, no. 9).

28. See Lipman, Fisher, Mehnert, Naeser, Luedke, and Steven (1976, Table 2, no. 13).

29. Same locality as described by Steven, Mehnert, and Obradovich, (1967, Table 2, no. 8).

30. See Mehnert, Lipman, and Steven (1973, no. 1).

31. See Lipman, Fisher, Mehnert, Naeser, Luedke, and Steven (1976, Table 2, no. 14).

Table 4

32. See Lipman (1969, Table 1, no. 4).

33. See Lipman (1975, Table 11, no. 11).

34. See Lipman (1975, Table 11, no. 13).

35. See Lipman (1975, Table 11, no. 19).

36. See Lipman (1969, Table 1, no. 3).

37. See Lipman (1969, Table 1, no. 2).

38. See Lipman (1969, Table 1, no. 7).

39. Separately collected sample from same locality as no. 38 above.

40. Same locality as described by Steven, Mehnert, and Obradovich (1967, Table 2, no. 8).

Table 6

1. Same as Table 2, no. 1.

2. Same as Table 2, no. 2.

3. Same as Table 2, no. 4.

4. Same as Table 2, no. 5.

5. Same as Table 2, no. 6.

6. Same as Table 2, no. 8.

7. Hornblende-biotite-plagioclase rhyolite lava flow collected from Cimarron Ridge, by R. G. Dickinson in 1967.

8. Same as Table 3, no. 9.

9. Same as Table 3, no. 10.

10. Same as Table 3, no. 11.

11. Same as Table 3, no. 12.

12. Same as Table 3, no. 13.

13. Same as Table 3, no. 14.

14. Different sample, from same part of unit, as Table 3, no. 15.

15. Same as Table 3, no. 17.

16. Red-brown densely welded devitrified Campbell Mountain unit of Bachelor Mountain Member, Carpenter Ridge Tuff, containing about 5 percent phenocrysts of sanidine, plagioclase, and biotite. Collected along Nelson Creek, near Midwest mine. 37°53'N., 106°56'W.

17. Same as Table 3, no. 18.

18. Same as Table 3, no. 19.

19. Basal black vitrophyre of rhyolitic ash-flow sheet, containing about 30 percent phenocrysts of plagioclase, sanidine, biotite. Collected along Srping Creek Road, near the lower Wright Ranch. 37°46.5'N., 107°7'W.

20. Same as Table 3, no. 20.

21. Same as Table 3, no. 21.

22. Same as Table 3, no. 22.

23. Same as Table 3, no. 25.

24. Different sample, same part of unit, as Table 3, no. 29.

25. Same as Table 3, no. 30.

26. Same as Table 3, no. 31.

27. Same as Table 4, no. 36.

28. Same as Table 4, no. 38.

29. Same as Table 4, no. 39.

30. Same as Table 4, no. 40.

31. Same as Table 4, no. 37.

32. See Lipman, Bunker, and Bush (1973, Table 2, no. 68).

33. See Lipman, Bunker, and Bush (1973, Table 2, no. 64).

34. See Lipman, Bunker, and Bush (1973, Table 2, no. 63).

35. See Lipman, Bunker, and Bush (1973, Table 2, no. 62).

36. See Lipman, Bunker, and Bush (1973, Table 2, no. 61).

37. See Lipman, Bunker, and Bush (1973, Table 2, no. 55).

38. Diabase dike of central cone, Los Mogotes volcano. Location 37°4.5'N., 106°10.5'W.

39. Light gray silicic rhyolite, containing about 15 percent phenocrysts of quartz, sodic sanidine, and sprase biotite. Collected at head of Beaver Creek at about 3,535 m elevation. 37°28'W., 106°37.5'N.

Appendix B.--Precambrian rocks of Colorado: Selected elemental contents and lead isotope ratios.

[Numbers in italics are by the silica-gel technique; all new isotope data normalized to absolute]

Sample Number	Unit Analyzed and Procedure	Field Number	Age (b.y.)	Concentrations (ppm) U	Th	Pb	Isotope Ratios (atomic) $^{206}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{208}Pb/^{204}Pb$	Data Source[1]
1	Idaho Springs Formation, composite[2]	HP1, HP2, HP13, 3M1, 10M1	~1.8							
	$HF-HClO_4$ dissolution			2.96	10.24	12.9	19.44	15.72	38.57	1
	$HF-HClO_4$ + borax fusion	do.	do.	3.13	11.08	14.6	--	--	[3]	4
	Hot 6N-HCl leach (3.95% of rock was dissolved)	do.	do.	14.74	79.9	28.4	28.42	16.74	49.86	4
2	Eolus Granite, $HF-HClO_4$ dissolution	72LD1W	~1.4	8.89	33.6	43.0	*25.40*	*16.21*	*41.87*	4
	do.	72LD1K[4]	do.	0.15	0.13	70.0	16.68 (16.64)	15.41 (15.41)	35.98 (35.97)	4
3	Granite from Uncompahgre, Unaweep Canyon	--	do.	--	--	22.05	20.04	15.55	36.36	2
4	Silver Plume granite	GSP1	do.	2.4	106	58.7	18.08	15.67	47.33	3

[1] Data source number, references: 1. Doe (1970), 2. Patterson (1953), 3. Peterman and others (1967), 4. This paper.

[2] Sample prepared by Carl E. Hedge: 1/3 sillimanitic mica-plagioclase-quartz schist (meta-shale), 1/3 biotite-quartz-plagioclase gneiss (meta-greywacke, 1/6 amphibolite (metabasalt), and 1/6 microcline gneiss (metadacite).

[3] The $^{208}Pb/^{204}Pb$ ratios were within 0.15 percent for the $HF-HClO_4$ and borax-fusion concentration analyses, so the isotopic compositions were not determined.

[4] The whole rock-feldspar isochron age is 1.46 b.y.; calculated initial isotopic ratios given in parentheses.