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Title of article Chemical and Mineralogic Variations Within Four Dikes of
the Columbia River Basalt Group, Southeastern Columbia Plateau

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Tables A through K - Major element variations of dikes

Table A7. Major element variations across the west Dodge dike at station 267¹

Oxide	Meters from east contact ²								Maximum Difference ³	Glass ⁴
	0.0	0.6	1.5	2.1	3.4	4.6	6.4	8.2		
SiO ₂	51.41	51.07	50.86	51.03	51.22	50.80	51.04	51.14	-0.61	51.86
Al ₂ O ₃	15.76	15.35	15.11	15.28	15.45	15.23	15.53	15.48	-0.65	13.89
FeO	8.35	9.03	9.27	9.04	9.14	9.31	8.97	9.08	+0.96	11.72
Fe ₂ O ₃	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	---	---
CaO	10.58	10.40	10.50	10.55	10.47	10.56	10.52	10.62	-0.18	9.72
MgO	5.72	6.46	6.42	6.53	6.35	6.77	6.71	6.57	+1.05	5.37
TiO ₂	1.42	1.39	1.37	1.36	1.34	1.32	1.28	1.34	-0.14	1.78
Na ₂ O	3.13	2.82	3.04	2.86	2.92	2.94	2.87	2.60	-0.53	3.08
K ₂ O	1.04	0.96	0.90	0.82	0.61	0.57	0.61	0.66	-0.47	0.81
P ₂ O ₅	0.30	0.30	0.29	0.30	0.29	0.27	0.27	0.29	-0.03	0.36
MnO	0.28	0.23	0.24	0.22	0.21	0.22	0.21	0.21	-0.07	---

¹Analyses by the author using a Philips P.W. 1410 XRF spectrometer on glass beads using the method of Hooper and Atkins (1969) as modified by Hooper and other (1976). Presented in anhydrous form normalized to 100 weight percent. Fe₂O₃ assumed to be 2.00 percent.

²Dike is 15 meters thick here.

³Signs indicate oxide increased (+) or decreased (-) in weight percent inward from the chilled dike margin.

⁴Microprobe analysis of glass only at chilled margin of dike at this locality (Wright and others, 1980); total iron reported as FeO; MnO not determined.

Table B. Major element variations across the east Dodge dike at station 275¹.

Oxide	<u>Meters from east contact</u>									Maximum Difference ³
	0.0 ²	0.3	0.9	2.4	4.6	7.6	12.2	16.8	19.8	
SiO ₂	51.34	51.06	51.00	50.79	51.26	51.59	50.76	50.60	50.98	-0.74
Al ₂ O ₃	15.21	15.04	15.17	15.16	15.38	15.41	15.38	15.58	15.41	+0.37
FeO	9.49	9.81	9.69	9.46	9.15	9.64	9.49	9.25	9.29	-0.34
Fe ₂ O ₃	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	---
CaO	10.36	10.36	10.48	10.51	10.53	10.50	10.57	10.56	10.51	+0.21
MgO	6.25	6.11	6.22	6.38	6.77	6.37	6.69	6.41	6.60	+0.52
TiO ₂	1.40	1.48	1.46	1.41	1.33	1.41	1.37	1.33	1.36	+0.08
Na ₂ O	2.70	2.89	2.77	3.10	2.46	2.77	2.63	3.13	2.71	+0.43
K ₂ O	0.75	0.72	0.69	0.67	0.62	0.75	0.59	0.64	0.63	-0.16
P ₂ O ₅	0.30	0.31	0.31	0.30	0.28	0.31	0.29	0.29	0.29	-0.02
MnO	0.21	0.22	0.22	0.23	0.21	0.23	0.22	0.21	0.21	+0.02

¹See note 1, Table 10 , this report.

²Dike is 39.6 meters thick here.

³Signs indicate oxide increased (+) or decreased (-) in weight percent inward from chilled dike margin.

Table C. Major element variations across the east Dodge dike at station 321.

Oxide	Meters from east contact					Maximum Differences ³
	0.0	0.9	5.5	9.1	12.8	
SiO ₂	51.87	51.47	51.03	51.01	50.78	-1.09
Al ₂ O ₃	15.53	15.33	15.44	15.22	15.36	-0.31
FeO	8.52	9.60	8.91	9.19	8.78	+1.08
Fe ₂ O ₃	2.00	2.00	2.00	2.00	2.00	----
CaO	10.86	10.60	10.75	10.74	11.09	-0.26
MgO	5.57	6.08	6.54	6.61	6.58	+1.04
TiO ₂	1.48	1.43	1.34	1.35	1.32	-0.16
Na ₂ O	2.83	2.55	2.84	2.66	2.92	-0.28
K ₂ O	0.79	0.39	0.64	0.72	0.65	-0.40
P ₂ O ₅	0.33	0.31	0.29	0.29	0.29	-0.04
MnO	0.23	0.24	0.22	0.21	0.22	-0.02

¹See note 1, Table 10, this report.

²Dike is 17.0 meters thick here.

³Signs indicate oxide increased (+) or decreased (-) in weight percent inward from chilled dike margin.

Table D. Major element variations across the Wenaha dike at station 312¹

Oxide	Meters from east contact ²								Maximum Difference ³	Glass ⁴
	0.0	0.2	1.6	3.5	4.9	5.8	6.1	6.7		
SiO ₂	51.08	50.23	50.14	50.17	50.29	50.20	50.55	50.54	-0.94	51.07
Al ₂ O ₃	13.94	14.00	13.65	13.73	13.71	13.74	13.98	13.95	-0.30	12.30
FeO	12.98	12.82	13.14	13.15	13.20	13.06	13.03	12.83	+0.67	15.26
Fe ₂ O ₃	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	---	---
CaO	8.32	8.64	8.59	8.56	8.65	8.56	8.43	8.79	-0.36	6.30
MgO	3.89	4.39	4.32	4.41	4.36	4.39	4.24	3.92	+0.52	3.97
TiO ₂	3.53	3.49	3.47	3.46	3.50	3.43	3.46	3.59	-0.16	3.82
Na ₂ O ₃	2.23	2.37	2.59	2.34	2.11	2.30	2.16	2.34	+0.36	2.50
K ₂ O	1.24	1.34	1.41	1.48	1.50	1.62	1.46	1.34	+0.38	1.61
P ₂ O ₅	0.56	0.47	0.47	0.47	0.47	0.47	0.46	0.50	-0.10	0.54
MnO	0.24	0.24	0.22	0.23	0.23	0.24	0.23	0.21	+0.03	---

¹See note 1, Table 10 this report

²Dike is 6.7 meters thick here

³Signs indicate oxide increased (+) or decreased (-) in weight percent inward from the chilled dike margin.

⁴Microprobe analysis of glass only at chilled margins (mean of 2) of dike at this locality (Wright and others, 1980); total iron reported as FeO; MnO not determined.

Table E. Major element variations across the Wenaha dike at station 104¹

Oxide	Meters from east contact, station 104 ²			Maximum Difference ³
	0.0	3.1	9.1	
SiO ₂	50.00	49.98	49.05	-0.95
Al ₂ O ₃	13.67	13.74	13.70	+0.07
FeO	12.61	13.20	13.02	+0.59
Fe ₂ O ₃	2.00	2.00	2.00	-----
CaO	8.58	8.47	8.77	+0.19
MgO	4.47	4.44	4.65	+0.18
TiO ₂	3.47	3.46	3.37	-0.10
Na ₂ O	2.96	2.74	3.40	+0.44
K ₂ O	1.54	1.28	1.39	-0.26
P ₂ O ₅	0.46	0.46	0.43	-0.03
MnO	0.23	0.23	0.23	0.00

¹See note 1, Table 10 this report.

²Dike is 18.3 meters thick at station

³Signs indicate oxide increased (+) or decreased (-) in weight percent inward from the chilled dike margin.

Table F . Major element variations across the Fairview Bar dike¹

Oxide	Meters from west contact ²			Maximum Difference ³	Glass ⁴
	0.0	0.8	1.0		
SiO ₂	48.90	47.72	46.65	-2.25	48.60
Al ₂ O ₃	15.61	15.44	15.59	-0.17	14.54
FeO	9.86	10.58	10.56	+0.72	13.12
Fe ₂ O ₃	2.00	2.00	2.00	---	---
CaO	11.52	11.08	10.51	-1.01	11.33
MgO	6.96	7.79	8.25	+1.29	7.01
TiO ₂	2.20	2.11	2.08	-0.12	2.58
Na ₂ O ₃	2.29	2.45	1.93	-0.36	2.05
K ₂ O	0.12	0.28	1.89	+1.77	0.41
P ₂ O ₅	0.33	0.34	0.31	-0.02	0.52
MnO	0.22	0.21	0.22	-0.01	0.00

¹See note 1, Table 10 this report

²Dike is 3.0 meters thick here

³Signs indicate oxide increased (+) or decreased (-) in weight percent inward from chilled dike margin.

⁴Microprobe analysis of glass only at chilled margin of dike at this station (Wright and others, 1980); total iron reported as FeO.

Table G. Modal variations across the west Dodge dike at station 267¹

Mineral	Meters from east contact							
	0.0	0.61	1.52	2.13	3.35	4.57	6.40	8.23
Plagioclase (total)	15.6	33.5	40.9	46.6	51.1	54.6	54.5	46.5
Phenocrysts	- -	1.4	0.3	4.4	10.4	9.8	19.7	4.7
Clinopyroxene ²	6.0	38.8	34.3	31.2	24.4	25.9	23.9	28.4
Glass	77.6	16.8	14.8	10.2	11.1	9.3	11.8	15.2
Opagues	1.0	8.3	7.0	8.5	5.6	6.1	4.9	5.2
Fresh Olivine	tr ³	2.0	2.2	2.2	3.4	2.7	2.6	1.6
Altered Olivine	- -	- -	- -	- -	2.1	0.5	1.6	1.6
Apatite	0.1	0.6	0.6	1.2	0.6	0.9	0.7	1.5
Mineraloids	- -	- -	- -	- -	1.7	- -	- -	- -
Other	- -	- -	0.2 ⁴	- -	- -	- -	- -	- -

¹ 1000 points per thin section, dike width is 15.0 meters here.
² Includes trace amounts of pigeonite
³ Trace amount
⁴ carbonate

Table H. Modal variations across the east Dodge dike at station 275¹

Mineral	Meters from east contact								
	0.0	0.3	0.9	2.4	4.6	7.6	12.2	16.8	19.8
Plagioclase (total)	13.1	39.1	43.0	49.3	50.7	39.5	48.0	48.9	50.2
Phenocrysts	0.2	0.9	1.8	1.1	3.5	1.6	1.6	4.1	4.5
Clinopyroxene	2.1	30.8	28.5	26.6	25.8	33.4	26.6	27.1	27.7
Glass	84.3 ₂	13.4	17.2	11.7	13.4	12.8	14.4	10.0	9.7
Opagues	- -	8.1 ₄	6.0	5.2 ₄	4.5	7.8	5.1	5.0 ₄	5.1
Fresh Olivine	0.5	2.1	2.7	3.0	2.6	2.9	2.6	5.2	5.4
Altered Olivine	- -	3.9	1.4	1.9	1.8	2.6	2.3	2.5	0.9
Apatite	- -	1.2	1.0	0.9	1.1	1.0	2.3	1.3	0.9
Mineraloids	- -	1 ₃ ⁴	0.2	1.4	- -	- -	- -	- -	- -
Other	- -	tr	- -	- -	- -	- -	- -	- -	- -

¹²1000 points per thin section, dike width is 39.6 meters here.³Too fine to count separately from glass⁴Trace amount of carbonate

Trace amounts of small phenocrysts

Table 1. Modal variations across the Wenaha dike at station 312¹

Mineral	Meters from east contact							
	0.0	0.2	1.6	3.5	4.9	5.8	6.1	6.7
Plagioclase	9.1	4.4	25.6	23.7	31.3	28.7	6.0	7.5
Clinopyroxene	4.4	0.9	22.7	21.5	26.4	22.8	2.0	1.5
Glass	85.1	94.7	43.2	39.6	29.5	30.5	90.6	91.0
Opagues	1.4	- -	7.0	13.3	11.7	17.9	1.4	- -
Fresh Olivine	tr	- -	2.4	1.9	1.1	0.1	- -	- -
Apatite	- -	- -	0.1	- -	- -	- -	- -	- -

¹ 1000 points per thin section, dike width is 6.7 meters here.

Table J • Modal variations across the Fairview Bar dike¹

Mineral	Meters from west contact		
	0.0	0.8	1.0
Plagioclase (total)	21.1	49.8	32.5
Phenocrysts	0.5	tr	1.0
Clinopyroxene	1.9 ₂	31.6	17.3
Glass	63.2	6.2	3.0
Opagues	- -	4.5	6.0
Fresh Olivine	- -	1.5	- -
Altered Olivine	3.4	1.6	1.4
Apatite	- - ₃	0.4	- -
Mineraloids	10.4	4.4	25.9
Zeoites	- -	- -	13.9

¹
²1000 points per thin section, dike width is 3.0 meters here.
³Includes opaques
 Amygdales

Table K. Average grain size variations in the Wenaha dike, all stations¹

	Grain Sizes (mm)			
	Chilled margins		Dike interior	
	Mean	Range	Mean	Range
Phenocrysts				
plagioclase	1.18	1.00-1.35	1.36	1.00-2.00
clinopyroxene	--	--	1.18	1.00-1.60
Microphenocrysts				
plagioclase	0.60	0.06-0.99	0.66	0.10-0.99
clinopyroxene	0.37	0.08-0.99	0.53	0.15-0.99
olivine	--	--	0.57	0.29-0.80
orthopyroxene	0.39	0.09-0.60	--	---
Groundmass grains				
plagioclase	0.03	0.005-0.25	0.20	0.03-0.80
clinopyroxene	0.02	0.005-0.20	0.12	0.01-0.05
olivine	0.01	0.005-0.02	0.08	0.01-0.50

¹ten samples analyzed using an ocular micrometer to measure maximum diameters of a total of approximately 80 to 90 grains per thin section.