UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

PROFESSIONAL PAPER 656
PLATE 3

Major chemical constituents, in percent, of auger-hole samples from the eastern part of Kauai, Hawaii

[Samples with a laboratory number were analyzed by rapid methods described by Shapiro and Brannock (1956). Analysts: P. L. D. Elmore, S. D. Botts, I. H. Barlow, and Gillison Chloe. Samples without a laboratory number were analyzed by X-ray fluorescence methods by R. M. Bromery]

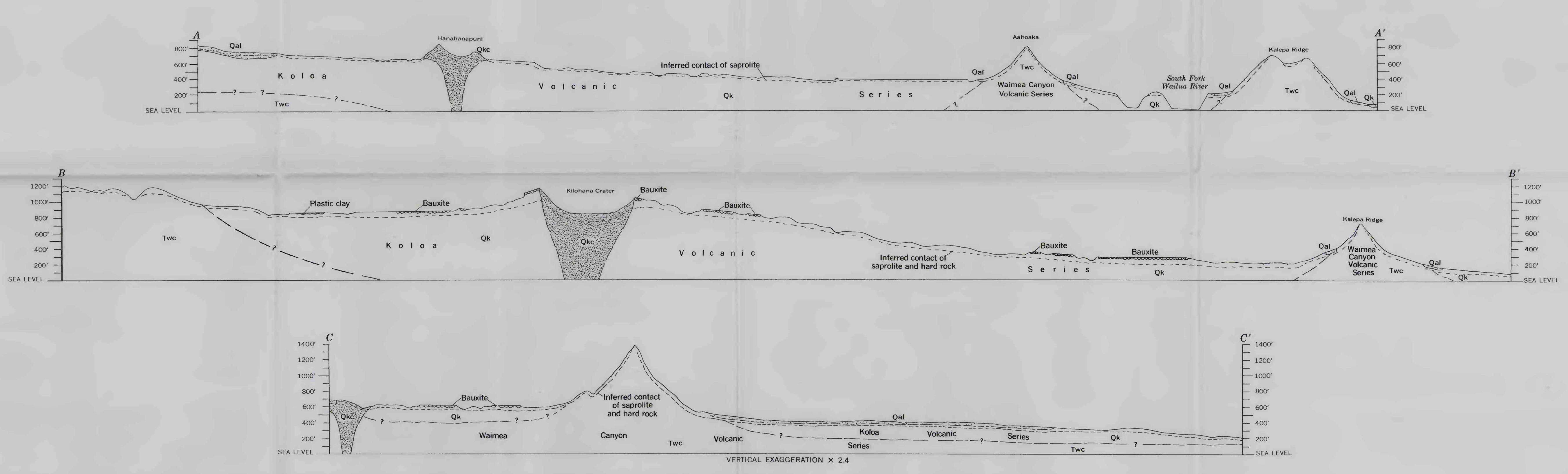
Auger hole	Sample depth interval (feet)	SiO_2	Al_2O_3	Fe_2O_3	FeO	TiO_2	Loss on ignition	Laboratory No.
GR-3	0.5–4	6.3	22.6	42.3		7.3		157541
	4–9		28.5					157542
	9–14		32.4					157543
	14–19	17.5	28.6	30.1		5.6		157544
	19–3			(not analyzed)				
GR-7	0–4	2.0	17.3	43.5		7.7		
	4–9	2.5	19.5	41.5		7.4		
	9–14	4.2	19.8	39.8		7.2		
	14–19	5.0	24.0	36.6		6.7		
	19–39			(not analyzed)				
GR-9	0.5–4	3.2	24.4	40.0		7.3		
	4–9	9.5	23.2	37.9		6.8		
	9–14	19.3	26.7	30.8		5.6		
	14–19	20.6	22.0	30.3		5.6		
	19–39			(not analyzed)				
GR-13	0.5–4	4.0	22.3	40.5		7.3		
	4–9	4.5	26.2	37.5		6.7		
	9–14			(not analyzed)				
	14–19	21.0	24.7	29.8		5.3		
	19–44			(not analyzed)				
GR-14	0.5–4	2.3	21.2	43.0		7.1		
	4–9	14.0	23.5	33.9		6.0		
	9–14	7.7	26.0	37.6		6.5		
	14–19	8.0	28.1	36.5		6.5		
	19–39			(not analyzed)				
GR-17	0.5–4	2.3	19.8	43.0		7.1		
	4–9	3.4	17.7	44.0		7.1		
	9–14	3.2	23.0	40.8		6.8		
	14–19	5.0	27.8	37.6		6.7		
	19–39			(not analyzed)				
GR-18	0.5–4	1.0	36.9	42.7		7.0		157533
	4–9		28.5					157534
	9–14		28.2					157535
	14–19	3.0	28.5	40.1		6.7		157536
	19–39			(not analyzed)				
GR-22	0.5–4	20.7	25.2	32.2		4.9		157537
	4–9		25.0					157538
	9–14		27.2					157539
	14–19	26.4	25.8	28.2		4.3		157540
	19–39							
Ho-4	1–4	.6	26.4	41.5		7.4		
	4–9	5.5	24.0	39.7		7.2		
	9–14	11.5	26.5	35.0		6.2		
	14–19	17.4	27.2	30.9		5.6		
	19–24	17.5	26.8	31.1		5.6		
	24–34	17.6	25.2	31.6		5.7		
	34–44	19.1	26.2	29.9		5.5		
	44–46			28.5		5.3		
	46–48			26.8		5.1		
	48–49.5			24.2		4.7		
	49.5–50	24.5	22.1	20.1		4.1		
	50			(hard rock)				
Ho-16	0.5–4	1.6	25.9	43.4		7.0		157475
	4–9		23.9					157476
	9–14		26.0					157477
	14–19	20.8	24.1	32.6		6.0		157478
	19–39			(not analyzed)				
Ho-26	0.5–4	1.0	25.5	42.4		7.2		157471
	4–9		27.1					157472
	9–14		24.3					157473
	14–19	20.6	24.2	32.8		6.2		157474
Ho-31	1–4	6.2	25.2	39.1		6.8		155306
	4–9	14.8	27.2	31.4		4.8		155307
	9–14	20.0	31.3	22.1		4.4		155308
	14–19	20.2	30.7	26.7		4.8		
	19–24	26.8	29.5	25.0		4.4		
	24–29	27.5	28.0	26.1		4.4		
Ki-6	1–2	7.7	20.3	44.8		4.5		
	2–4	16.8	22.8	33.7		4.7		
	4–9	14.8	25.2	32.1		4.7		
	9–14	18.0	24.6	28.7		4.5		
	14–19			(not analyzed)				
	19			(hard rock)				
Ki-8	0.5–4	10.5	21.6	30.9		5.4		
	4–8.5	13.5	19.0	33.1		4.9		
	8.5–14	15.0	25.6	30.7		4.5		
	14–19	19.5	29.3	27.7		4.4		
	19–24			(not analyzed)				
Ki-10	0.5–4	10.8	30.2	29.3	1.6	5.3	21.4	157917
	4–9	17.2	27.9	27.7	1.9	4.9	19.3	157918
	9–14	23.7	25.0	28.7	.28	4.5	16.1	157919
	14–19	25.0	25.5	27.3	.13	4.3	16.0	157920
	19–34			(not analyzed)				
Ki-11	0–4	3.6	29.5	34.0	2.4	5.4	22.8	157921
	4–9	12.4	27.8	32.2	1.4	5.3	19.6	157922
	9–14	19.4	27.0	28.1	1.4	4.5	17.6	157923
	14–19	22.4	26.1	26.3	1.5	4.4	17.3	157924
	19–30.5			(not analyzed)				
Ki-12	1–6	5.5	30.0	36.5		5.7		
	6–9	17.0	27.7	34.2		5.3		
	9–14	17.0	32.7	32.4		5.1		
	14–19	16.0	29.7	30.3		4.7		
	19–34			(not analyzed)				
Ki-28	1–4	9.8	17.6	28.8		6.8		
	4–8	16.0	25.8	29.1		5.9		
	8–14	21.0	31.8	27.0		5.3		
	14–19	25.7	26.5	29.2		4.8		
	19–39			(not analyzed)				
Ki-34	0–6	1.1	23.1	44.0	.17	10.3	18.3	157925
	6–9	1.8	18.5	41.8	6.6	12.3	15.8	157926
	9–14	4.3	22.5	38.3	4.4	10.5	16.3	157927
	14–19	17.4	20.2	32.8	2.7	9.1	13.9	157928
	19–29			(not analyzed)				
Ki-38	0–5	6.6	27.1	32.9	1.2	7.8	22.6	157929
	5–10	5.4	29.2	35.3	1.2	6.0	21.6	157930
	10–15	11.8	24.8	37.6	.85	5.0	18.1	157931
	15–20	10.4	28.7	33.0	1.2	4.9	19.5	157932
Ki-41	0.5–2	1.2	25.1	42.9		6.4		
	2–4	1.0	27.1	42.7		6.3		
	4–9	1.0	30.3	40.0		6.0		
	9–14	1.6	28.6	40.5		6.2		
	14–19	4.8	29.2	38.0		5.9		
	19–24	5.7	28.9	37.2		5.8		
	24–34	7.3	28.8	31.0		5.7		
	34–44	12.7	29.9	32.0		5.1		
Ki-43	0.5–2	3.2	19.5	43.0		7.8		
	2–4	3.2	20.2	43.8		7.3		
	4–9	3.2	25.3	41.4		6.5		
	9–14	4.2	27.7	39.9		6.1		
	14–19	7.0	25.8	40.0		5.8		
	19–39	[1]						
Ki-45	0–4	19.5	27.7	33.8		6.1		
	4–9	13.5	28.2	32.8		5.6		
	9–13	9.5	32.7	30.6		4.9		
	13–18	11.5	32.3	30.0		4.1		
	18–29	[1]						
Ki-46	1–4	10.7	24.7	37.6		5.3		
	4–9	15.5	25.7	36.4		4.7		
	9–14	9.2	28.7	36.9		4.7		
	14–21	[1]						
Ki-47	0–5	12.5	22.1	25.6		6.0		
	5–5.2	7.1	31.1	35.2		4.7		
	5.2			(hard rock)				
Ki-48	0–4	4.5	26.2	42.6		5.6		
	4–7	3.9	29.9	39.3		5.2		
	7–9	5.2	29.7	39.5		5.7		
	9–14	8.1	29.7	37.8		5.2		
	14–19	12.5	30.3	35.9		4.9		
	19–41	[1]						
Ki-49	1–2.5	.7	31.1	37.9		5.4		
	2.5–6	.5	28.2	41.4		6.2		
	6–9	.5	28.4	41.0		6.1		
	9–14	1.7	28.4	42.6		6.4		
	14–19	3.5	26.8	39.8		5.8		
	19–24	8.0	29.0	36.7		5.5		
	24–49	[1]						
Ki-51	0.5–2	1.2	21.3	44.4		6.9		
	2–4	2.0	22.2	43.9		6.8		
	4–9	4.0	30.5	37.8		5.7		
	9–14	7.0	28.9	36.8		5.5		
	14–19	9.0	31.2	33.9		5.0		
	19–24	17.2	29.1	30.8		4.6		
Ki-52	0–4	2.0	23.7	43.5		6.1		
	4–9	3.0	27.7	39.9		6.0		
	9–14	3.5	28.4	39.8		5.9		
	14–19	4.3	28.8	38.1		5.5		
	19–24	4.5	28.3	39.2		5.9		
	24–29	18.3	27.6	37.2		5.5		
Ki-53	0–1	2.0	3.2	58.7		5.2		
	1–4	6.2	27.5	39.5		5.6		
	4–9	8.7	28.8	36.3		5.4		
	9–14	12.2	29.0	34.6		5.2		
	14–34	[1]						
Ki-54	0–1.5	2.5	16.2	46.5		6.5		
	1.5–2.5	3.0	25.4	42.1		6.2		
	2.5–4	3.5	26.7	41.4		6.2		
	4–9	2.0	32.3	37.4		5.1		
	9–14	1.5	32.6	37.4		5.3		
	14–19	4.5	28.9	38.8		5.9		
	19–24	7.7	29.6	36.8		5.5		
	24–39	[1]						
Ki-55	0.3–4	8.4	25.5	39.5		6.1		
	4–7	3.1	34.3	34.5		5.5		
	7–9	5.7	29.2	37.6		5.8		
	9–14	10.8	28.7	35.9		5.4		
	14–24	[1]						
Ki-56	0–2	1.7	25.9	42.7		6.4		
	2–4	.7	32.6	36.8		5.5		
	4–5.5	.7	29.6	40.1		6.2		
	5.5–7	.7	31.2	38.6		6.0		
	7–9	.8	31.0	39.4		6.0		
	9–14	2.4	26.6	42.1		6.6		
	14–19	4.2	26.6	40.8		6.3		
	19–49			(not analyzed)				
Ki-57	0–2	5.5	20.6	42.3		4.7		
	2–4	3.6	26.2	41.8		5.9		
	4–9	6.2	26.7	39.6		6.0		
	9–14	11.9	29.2	34.7		5.4		
	14–29	[1]						
Ki-58	0–1	2.3	8.8	48.4		6.1		
	1–4	1.7	24.0	42.5		6.6		
	4–9	3.7	24.8	41.4		6.5		
	9–14	4.1	26.6	40.3		6.2		
	14–19	8.8	29.0	35.6		6.3		
	19–44	[1]						
Ki-59	1–4	.7	27.3	41.6		6.4		
	4–9	1.2	29.1	40.3		6.1		
	9–14	3.0	26.7	41.2		6.5		
	14–19	9.0	29.1	37.0		5.5		
	19–54	[1]						
Ki-60	0.1–4	3.8	22.8	43.0		6.6		
	4–9	6.0	26.6	39.8		6.0		
	9–14	6.2	27.9	38.8		5.9		
	14–19	7.0	25.6	40.0		6.1		
	19–39	[1]						
Ki-61	0.9–6	10.5	26.9	34.9		5.7		
	6			(hard gravel)				
Ki-62	1–4	2.3	31.7	36.7		5.0		
	4–5	8.0	16.7	44.8		6.3		
	5–44	[1]						
Ki-63	1–4	1.5	25.7	42.3		6.4		
	4–7.5	3.7	25.6	41.0		6.3		
	7.5–9	1.5	30.1	38.3		5.9		
	9–14	2.9	30.8	37.1		5.7		
	14–19	7.4	25.8	38.7		6.0		
	19–54	[1]						
Ki-65	1–4	7.8	26.3	34.8		7.4		
	4–9	6.5	30.7	33.9		6.1		
	9–14	8.5	26.8	33.8		5.9		
	19–38	[1]						
Ki-66	1–6	14.5	28.6	32.5		5.4		
	6–14	14.2	30.5	31.3		5.5		
	14–19	[1]						
Ki-68	1–2.5	4.4	23.6	43.2		6.0		
	2.5–7	7.3	28.3	37.6		5.6		
	7–14	9.5	29.5	33.7		5.0		
	14–44	[1]						
Ki-69	1.5–4	1.7	24.0	44.1		6.6		
	4–9	2.8	25.3	43.0		6.5		
	9–14	2.9	27.7	40.6		6.1		
	14–19	5.2	27.9	39.1		5.9		
	19–24	6.5	29.2	37.3		5.6		
	24–39	[1]						
Ki-70	1–4	3.5	19.7	44.7		6.8		
	4–9	4.5	25.7	41.1		6.3		
	9–14	9.5	26.4	38.0		5.8		
	14–39	[1]						
Ki-71	1–3.5	5.2	23.1	42.3		6.1		
	3.5–9	5.2	26.5	39.8		5.8		
	9–14	9.2	30.3	35.0		5.3		
	14–29	[1]						
Ki-72	2–4	.7	28.9	39.8		5.9		
	4–5.5	.7	28.8	39.7		5.9		
	5.5–7.5	.6	28.7	40.2		6.1		
	7.5–9	.7	17.6	40.2		6.1		
	9–14	.4	30.1	38.8		5.9		
	14–19	.4	30.1	38.8		5.9		
	19–24	1.2	28.1	40.6		6.4		
	24–38	[1]						
Ki-73	1–3	5.5	19.2	43.8		6.0		
	3–4	8.2	23.8	42.2		5.7		
	4–5	9.2	27.6	37.8		5.4		
	5–7	8.3	28.5	37.0		5.3		
	7–9	9.7	26.2	39.2		5.7		
	9–39	[1]						
Ki-78	0–2	7.0	18.3	38.6		7.8		
	2–4	3.7	19.5	42.7		7.6		
	4–9	6.3	27.0	37.2		7.0		
	9–39	[1]						
Ki-86	1–4	2.0	33.0	37.0		5.1		
	4–9	9.0	27.5	37.2		5.2		
	9–14	14.5	28.5	33.0		4.9		
	14–19	18.5	26.6	31.6		4.7		
	19–39			(not analyzed)				
Ki-93	0–4	7.5	23.8	40.2		5.3		
	4–9	10.0	22.2	40.8		5.2		
	9–39	[1]						
Ki-101	1–4	11.0	25.8	38.0		4.9		
	4–64	[1]						
Ki-102	1–4	14.3	21.0	31.7		5.0		
	4–59	[1]						
Ki-105	1–4	8.3	24.7	45.2		5.1		
	4–9	11.0	26.2	36.6		5.1		
	9–14	10.1	28.5	35.3		5.0		
	14–19	9.8	28.4	34.7		5.0		
	19–39	[1]						
Ki-108	0.5–4	10.5	19.6	39.3		7.5		
	4–44	[1]						
Ki-109	0.5–4	7.0	25.3	37.0		6.7		
	4–9	6.0	33.0	34.4		6.1		
	9–14	9.0	34.3	33.0		5.4		
	14–39	[1]						
Ki-112	4–9	7.6	30.2	30.0		6.5		
	9–11	8.5	30.2	31.0		6.1		
	11–39	[1]						
Ki-116	2–6	16.0	21.2	31.6		5.4		
	6–29	[1]						
Ki-117	0.5–3	19.1	27.7	29.4		4.3		
	3–44	[1]						
GF-1	1–5	2.5	23.0	38.3		9.1		
	5–10	4.7	25.5	33.4		7.4		
	10–15	6.7	26.5	36.3		9.0		
	15–20	10.2	22.2	31.6		7.7		
GF-2	1–10	28.5	34.2	2.0		5.2		
	10–18			(not analyzed)				
GF-4	0.1–1	34.9	29.0	2.8		11.0		
	1–4	29.0	39.7	1.6		6.3		
	4–9	31.2	40.5	1.6		5.6		
	9–14	33.2	39.0	2.0		5.6		
	14–19	30.0	38.5	2.7		5.0		
	19–29	34.0	37.3	2.6		4.9		
GF-8	0.5–2.5	1.2	25.8	46.2		5.6		
	2.5–3.5	1.0	23.7	45.3		6.8		
	3.5–4	.7	32.1	39.4		5.6		
	4–9	1.0	31.5	40.3		5.8		
	9–14	2.5	31.7	39.4		5.8		
	14–19	3.4	28.6	42.9		6.1		
	19–49			(not analyzed)				

Major chemical constituents, in percent, of auger-hole samples from the eastern part of Kauai, Hawaii—Continued

[Samples with a laboratory number were analyzed by rapid methods described by Shapiro and Brannock (1956). Analysts: P. L. D. Elmore, S. D. Botts, I. H. Barlow, and Gillison Chloe. Samples without a laboratory number were analyzed by X-ray fluorescence methods by R. M. Bromery]

Auger hole	Sample depth interval (feet)	SiO_2	Al_2O_3	Fe_2O_3	FeO	TiO_2	Loss on ignition	Laboratory No.
GF-9	0.7–4	2.0	23.7	43.3		7.4		
	4–9	2.5	24.5	43.0		7.4		
	9–14	1.2	27.0	41.8		7.2		
	14–19	3.5	31.5	40.3		6.8		
	19–49			(not analyzed)				
GF-14	0.5–4	11.2	22.2	41.1		6.2		157508
	4–9		28.3					157509
	9–14		30.3					157510
	14–19	18.8	27.1	31.0		4.1		157511
	19–39			(not analyzed)				
GF-21	0.5–4	27.4	33.3	14.2		6.9		157528
	4–9		29.3					157529
	9–14		26.5					157530
	14–19	23.9	25.9	28.5		6.6		157531
	19–24.5			(not analyzed)				
GF-30	1–5	25.3	29.0	22.2		5.0		
	9–38.5	[1]						
GF-33	0.7–4	2.8	23.0	45.1		8.0		157524
	4–9		24.9					157525
	9–14		24.7					157526
	14–20	20.4	28.0	28.8		5.2		157527
	20–24			(not analyzed)				
GF-36	0.4–4	3.2	26.0	43.6		7.5		
	4–9	3.5	34.0	40.3		6.8		
	9–14	5.7	35.2	38.8		6.4		
	14–19	8.2	33.0	37.4		6.0		
	19–39			(not analyzed)				
GF-37	0.5–4	4.3	23.9	41.6		6.4		157512
	4–9		27.0					157513
	9–14		28.6					157514
	14–19	21.3	25.8	31.5		4.8		157515
	19–39			(not analyzed)				
GF-39	0–4	1.5	26.0	43.0		6.8		
	4–9	1.5	27.5	40.0		6.4		
	9–14	1.5	25.5	40.6		6.3		
	14–19	6.5	25.0	37.8		5.8		
	19–39			(not analyzed)				
GF-40	1–4	8.5	23.5	36.0		5.9		
	4–21	[1]						
GF-44	0.5–4	1.6	25.0	43.0		6.3		
	4–9	2.7	27.0	42.0		6.2		
	9–14	3.2	32.5	41.1		6.1		
	14–19	5.2	32.7	39.7		5.9		
	19–24	7.2	33.5	37.9		5.6		
	24–34	10.0	33.5	35.8		5.3		
	34–39	[1]						
GF-46	0.9–4	8.3	29.5	39.6		6.2		
	4–9	8.7	36.0	36.6		5.6		
	14–49	[1]						
GF-48	0.5–4	5.7	23.5	41.4		6.4		
	4–9	9.5	23.5	38.2		5.8		
	9–39	[1]						
GF-49	1–4	5.5	27.2	41.8		6.5		
	4–9	7.5	30.5	39.1		5.9		
	9–39	[1]						
GF-51	0.8–4	5.0	22.5	42.7		6.5		
	4–9	7.0	21.5	36.8		5.4		
	9–39	[1]						
GF-56	0.9–4	5.4	24.5	41.2		5.8		157516
	4–9		26.9					157517
	9–14		25.7					157518
	14–19	21.0	25.7	31.4		4.8		157519
	19–24			(not analyzed)				
GF-60	0–4	4.2	20.2	42.5		6.0		
	4–9	8.5	21.5	39.4		5.9		
	9–14	10.0	25.5	37.2		5.4		
	14–39	[1]						
GF-61	0.7–4	3.0	18.5	40.9		6.3		
	4–9	2.0	22.5	39.6		5.9		
	9–14	4.5	25.0	38.8		5.7		
	14–19	10.3	29.0	35.0		5.1		
	19–24			(not analyzed)				
GF-67	0–4	5.5	22.2	43.0		6.2		
	4–9	9.2	24.0	37.2		5.5		
	9–14	10.0	29.5	34.8		5.4		
	19–24	[1]						
Kn-1	0.7–4	16.0	23.7	35.6		5.4		157499
	4–9		25.3					157500
	9–15		25.7					157501
	15–17	21.4	23.6	32.4		6.0		157502
	17			(hard rock)				
Kn-24	1–4	8.4	20.4	43.3		7.9		157503
	4–9		27.2					157504
	9–14		28.0					157505
	14–19	4.1	28.6	38.4		7.3		157506
	19–43			(not analyzed)				

[1] Sample contains more than 10 percent SiO_2 as determined by X-ray fluorescence or differential thermal analysis methods (Patterson, 1962, app. p. 86–218).



MAP AND SECTIONS SHOWING THE LOCATION OF FERRUGINOUS BAUXITE DEPOSITS IN THE EASTERN PART OF KAUAI, HAWAII