

GSA Data Repository Item # 8004

Title of article Lengths of Hawaiian lava flows

Author(s) Michael Malin

see Geology v. 8, p. 306 - 308

Contents 10 pages

Table and References - Hawaiian Laval Flows

Hawaiian Lava Flows p. 1 - 5

References 6 - 8

"Actual" Effusion Rate Figure 9

Flow Volume Figure 10

Hawaiian Lava Flows

	Number	Year	Length (km)	Volume* (10 ⁶ M ³)	Duration (hours)	Effusion Rate (M ³ /sec)	Comments	Reached Sea	References
Kilauea	1	1840	10	62	38	450	Time of cessation uncertain. Duration 30-54 hours		1
	2	1920	10	63	330	53	Mauna Iki		2
	3	1955	1.3	0.82	28	8			3
	4	1955	5.0	27	100	75	Kii Flow		3
	5	1955	5.1	6.1	39	43	Kaueleu Flow	Yes	3
	6	1960	4	11	36.5	84		Yes	4
	7	1962	0.2	0.027	1	7.5			5
	8	1963	3	3.7	16.5	62	Oct. NNW Kalalua		6
	9	1963	0.8	0.87	19	12	Oct. 1/2 way Napau		6
	10	1965	5.5	4.4	25	49	March		7
	11	1965	1	0.41	44	2.6	March		7
	12	1965	1.2	0.83	22	10.5	March		7
	13	1965	0.5	0.55	4.5	34	December		8
	14	1968	2.2	1.7	25	20	Oct. Time of cessation uncertain. Dur.~20-30 hours		9
	15	1968	3.0	1.4	≤10	≥39	Oct. Duration uncertain		9
	16	1969	3.8	3.6	7	143	Feb. Vents A & C		10
	17	1969	3 (4.3)	2.8 (4)	7 (56)	110 (20)	Values reached during initial eruption. () are total values (not used)		10
	18	1969	2	1.10	8	38	Feb. Vent E - fed two flows (see 19)		10
	19	1969	1.2	0.56	8	19			10
	20	1969	2.2	1.1	10	31	Feb. Vent F		10

* Footnote: Volumes equal (measured area) X (average thickness), values rounded to nearest meter (thickness) and nearest 10⁴M² (area).

	Number	Year	Length (km)	Volume* (10 ⁶ M ³)	Duration (hours)	Effusion Rate (M ³ /sec)	Comments	Reached Sea	References
Kilauea	21	1969	1.6	4.5	34.2	37	Mauna Ulu: May 24-26		11,12
	22	1969	2.8	3.5	38	26	Mauna Ulu: May 27-28		12
	23	1969	11	4.0	21.5	52	Mauna Ulu: June 12-13		12
	24	1969	12.2	4.5	9.3	135	Mauna Ulu: June 25-26	Yes	12
	25	1969	8.8	4.0	8.5	131	Mauna Ulu: July 15		12
	26	1969	3.7	2.5	~120	6	Mauna Ulu: August 4-8 Cessation of source uncertain		12
	27	1969	1.7	0.8	4.5	50	Mauna Ulu: Aug. 22 (3.5x10 ⁶ M ³ into Alae Crater)		12
	28	1969	8.6	12	9	370	Mauna Ulu: Sept. 6-7		12
	29	1969	2.4	4	74	15	Mauna Ulu: Sept. 10-13		12
	30	1969	9.5	4.5	7.3	171	Mauna Ulu: Oct. 20 Vent fed 3 flows (see 31,32).		12
	31	1969	10.4	4.9	7.3	186			12
	32	1969	2.4	1.1	7.3	42			12
	33	1969	6.8	7.8	12	180	Mauna Ulu: Dec. 29- 30 Vent fed 2 flows (see 34).		12
	34	1969	2.8	3.2	12	74			12
	35	1970	7.5	1.8	16	31	Mauna Ulu: April 9		12
	36	1970	11.3	~30	~1200	~7	Mauna Ulu: Aug. 8 Sept. 26. 3 Tube fed flows. Volumes uncertain	Yes	12
	37	1970	11.2	~30	~1200	~7			
	38	1970	9.2	~30	~1200	~7	(15-40x10 ⁶ M ³) E.R-4-10M ³ /sec		12
	39	1970	12	~9	~600	4	Mauna Ulu: Oct. 1-26, Tube Flow	Yes	12
	40	1971	4	2	8	70	Summit: Sept. 24-25		13

	Number	Year	Length (km)	Volume* (10 ⁶ M ³)	Duration (hours)	Effusion Rate (M ³ /sec)	Comments	Reached Sea	References
	41	1973	2.6	2.5	100	7	Mauna Ulu: Nov. 4-8		14
	42	1973	1.7	2.8	8	97	Mauna Ulu: Nov. 10-11		14
	43	1974	3	1.5	7	60	Summit: July 19-22		15
	44	1974	12	<15	6	695			16
Mauna Loa	45	1843	25.7	157	670	65			17
	46	1852	21.8	120	480	69			18
	47	1855	34	190	4400	12	6 month, many tubes ("reached 30 miles in 2 days" unconfirmed)		19
	48	1859	50 (50)	130 (540+)	180 (4400)	200 (34)	Initial values. Reached sea in 7½ days. () Are total values.	Yes	20
	49	1868	9.4	52	120	120	Three flows (see 50, 51).		21
	50	1868	15.3	50	120	115		Yes	21
	51	1868	15.0	65	120	150		Yes	21
	52	1880	17.2	91	96	260			22
	53	1881	48	118	6500	5	9 months, tube- fed		22
	54	1887	24	170	140	337		Yes	23
	55	1899	15.1	39	430	25	Three flows (see 56,57).		24
	56	1899	9.8	25	430	16			24
	57	1899	13.6	36	430	23			24
	58	1907	18.5	54	170	88	Two flows (see 59).		25
	59	1907	21.2	72	170	117			25
	60	1916	14.9	22	41	150			26
	61	1916	14.4	86	96	250			26
	62	1919	10.8	39	~10	~1000	Duration uncertain		27
	63	1919	16.9 (16.9)	30 (64)	27 (240)	308 (74)	Initial Values Reached Sea in 27 hours. () are total values	Yes	27

	Number	Year	Length (km)	Volume* ($10^6 M^3$)	Duration (hours)	Effusion Rate (M^3/sec)	Comments	Reached Sea	References
Mauna Loa	64	1926	8.8	67	29	640			28
	65	1926	19	121	94	360	Values include 10.6 km in 24 hr = $780M^3/sec$; 16.9 km in 52 hr = $574M^3/sec$	Yes	28
	66	1926	16.6	81	50	450			28
	67	1935	18	65	100	180			29
	68	1935	26.5	83	≤ 1500	≥ 15	Duration Uncertain		29
	69	1940	2.8	2.8	5	155	Three flows (see 70,71).		30
	70	1940	2	2	5	111			30
	71	1940	2.3	2.2	5	120			30
	72	1942	9.4	22	35	175			31
	73	1942	25	54	220	68	Other values include 20 km in 100 hr = $120M^3/sec$		31
	74	1949	11.5	12.2	36	94	Other values include 9.6 km in 24 hr = $118M^3/sec$		32
	75	1949	8.9	6.9	140	14	Other values include 6.4 km in 24 hr = $58M^3/sec$ 8.0 km in 48 hr = $36M^3/sec$ 8.8 km in 72 hr = $26M^3/sec$		32
	76	1950	9	9.3	5	520			33
	77	1950	23.3	44	12	1000	Multiple Channel: Reached Sea in 2.8 hr = $4000M^3/sec$	Yes	33
	78	1950	20.5	42	13	900		Yes	33
	79	1950	18.6	77	12	1800			33
	80	1950	20.5 (20.5)	61 (185)	16 (280)	1100 (183)	20.5 km in 16 hr = $1100M^3/sec$, () total values	Yes	33
	81	1950	10.1	14	88	44			33

	Number	Year	Length (km)	Volume* (10 ⁶ M ³)	Duration (hours)	Effusion Rate (M ³ /sec)	Comments	Reached Sea	References
Mauna Loa	82	1975	2.8	2.6	6	120	Three flows (see 83,84).		34
	83	1975	2.4	2.2	6	100			34
	84	1975	2	1.9	6	88			34
	85	1975	3.7	3.0	16	52	Three flows (see 86,87).		34
	86	1975	5.3	4.3	16	75			34
	87	1975	3.5	2.7	16	47			34

* Footnote: Volumes equal (measured area) X (average thickness), values rounded to nearest meter (thickness) and nearest 10⁴M² (area).

References

1. Brigham, William T. (1909). The Volcanoes of Kilauea and Mauna Loa on the Island of Hawaii. Mem. Bernice P. Bishop Museum Vol. II, No. 4 (Bishop Museum Press, Honolulu H.I.) p. 50-54.
2. Jagger, T. A. (1919). Weekly Bulletin of the Hawaiian Volcano Observatory Vol. VII, No. 12, p. 183-199.

Jagger, T. A. (1919). Weekly Bulletin of the Hawaiian Volcano Observatory Vol. VIII, No. 1, p. 1-8.
3. Macdonald, G. P. and Eaton, J. P. (1964). Hawaiian volcanoes during 1955. U.S. Geological Survey Bulletin 1171, 170 pg.
4. Richter, D. H., Eaton, J. P., Murata, K. J., Ault, W. U. and Krivoy, H. L. (1970). Chronological narrative of the 1959-1960 Eruption of Kilauea Volcano, Hawaii. U.S. Geological Survey Prof. Paper 537-E, 73 pg.
5. Moore, J. G. and Krivoy, H. L. (1964). The 1962 flank eruption of Kilauea Volcano and structure of the east rift zone. Jour. Geophys. Res. 69 (10), 2033-2045.
6. Moore, J. G. and Koyanagi, R. Y. (1969). The October 1963 eruption of Kilauea Volcano Hawaii. U.S. Geological Survey Prof. Paper 614-C, 13 pg.
7. Wright, T. L., Kinoshita, W. T. and Peck, D. L. (1968). March 1965 eruption of Kilauea volcano and formation of Makaopuhi lava lake. Jour. Geophys. Res. 73 (10), 3181-3205
8. Fiske, R. S. and Koyanagi, R. Y. (1968). The December 1965 eruption of Kilauea Volcano, Hawaii. U.S. Geological Survey Prof. Paper 607, 21 pg.
9. Jackson, D. B., Swanson, D. A., Koyanagi, R. Y., and Wright, T. L. (1975). The August and October 1968 East Rift Eruptions of Kilauea Volcano, Hawaii. U.S. Geological Survey Prof. Paper 890, 33 pg.

Hawaiian Volcano Observatory Staff (1968). Hawaiian Volcano Observatory Monthly Report: 21 October to 20 November 1968.
10. Swanson, D. A., Jackson, D. B., Koyanagi, R. Y. and Wright, T. L. (1976). The February 1968 east rift eruption of Kilauea Volcano, Hawaii. U.S. Geological Survey Prof. Paper 891, 30 pg.
11. Hawaiian Volcano Observatory Staff (1969). Hawaiian Volcano Observatory Monthly Report: 21 July to 20 August 1969.
12. Swanson, D. A., Duffield, W. A., Jackson, D. B., and Peterson, D. W. (1979). Chronological Narrative of the 1969-71 Mauna Ulu Eruption of Kilauea Volcano, Hawaii. U.S. Geological Survey Prof. Paper 1056, 55 pg.
13. Hawaiian Volcano Observatory Staff (1971). Hawaiian Volcano Observatory Monthly Report: 21 September to 20 November 1971.

14. Hawaiian Volcano Observatory Staff (1973). Hawaiian Volcano Observatory Monthly Report: 21 October to 20 November 1973.

15. Hawaiian Volcano Observatory Staff (1974). Hawaiian Volcano Observatory Monthly Report: 21 June to 20 July 1974

Lockwood, J. P., Peterson, D. W., and Tilling, R. I. (1978). Hawaiian Volcano Observatory Summary 74: January to December 1974. Chronological Summary. U.S. Geological Survey, Menlo Park, CA.

Tilling, R. I., Holcomb, R. T., Lockwood, J. P. and Peterson, D. W. (1978). Recent eruptions of Hawaiian Volcanoes and evaluation (sic) of basaltic landforms (Abs). International Colloquium on Planetary Geology, Rome, Italy, 22-30 September, pg. 149-152.

16. Hawaiian Volcano Observatory Staff (1975). Hawaiian Volcano Observatory Monthly Report: 21 December 1974 to 20 January 1975.

17. Brigham, W. T. (1909). op. cit., 63-65.

18. Coan, T. (1852). On the eruption of Mauna Loa, Hawaii, February 1852. Am. Jour. Sci. and Arts 2nd Series XIV (40-42), 219-224.

Brigham, W. T. (1909). op. cit., 65-68.

19. Coan, T. (1856). On the eruption at Hawaii. Am. Jour. Sci. and Arts 2nd Series XXII (65), 240-243.

Brigham, W. T. (1909). op. cit., 68-74.

20. Dana, J. D. (1859). Eruption of Mauna Loa, Hawaii. Am. Jour. Sci. and Arts 2nd Series XXVII (81), 410-415.

Haskell, R. C. (1859). On a visit to the recent eruption of Mauna Loa, Hawaii. Am. Jour. Sci. and Arts 2nd Series XXVIII, 66-71.

Brigham, W. T. (1909). op cit., 75-80.

Alexander, W. D. (1933). Mauna Loa's greatest eruption. Mid-Pacific Magazine XLV (4), 317-328.

21. Coan, T. (1868). The greatest volcano in the World. Harper's New Monthly Magazine 37 (220), 553-559.

Hitchcock, C. H. (186?). The Hawaiian Earthquake of 1868. Seism. Soc. Am. Bull. 2 (3), 181-192.

Brigham, W. T. (1869). Eruption of the Hawaiian volcanoes, 1868. Boston Soc. Nat. Hist. Mem. 1 (3), 564-587.

Brigham, W. T. (1909). op. cit., 102-117.

22. Brigham, W. T. (1909). ibid., 146-155; 171.

23. Brigham, W. T. (1909). ibid., 165-170.

24. Brigham, W. T. (1909). ibid., 196-199.

25. Brigham, W. T. (1909). ibid., 206-209.
26. Wood, H. O. (1916). Weekly Bulletin of the Hawaiian Volcano Observatory IV (5), 34-37.
Jagger, T. A. (1916). Weekly Bulletin of the Hawaiian Volcano Observatory IV (6), 39-43.
Jagger, T. A. (1917). Lava flow from Mauna Loa, 1916. Am. Jour. Sci. 4th Series 43, 255-288.
Jagger, T. A. (1947). Origin and Development of Craters. Geo. Soc. Am. Mem. 21, p. 104.
27. Jagger, T. A. (1919). Weekly Bulletin of the Hawaiian Volcano Observatory VII (10), 127-159.
28. Finch, R. H. (1926). The Volcano Letter No. 68 (15 April 1926), 1 pp.
Jagger, T. A. (1926). The Volcano Letter No. 69 (22 April 1926), 1 pp.
Jagger, T. A. (1926). The Volcano Letter No. 70 (29 April 1926), 1 pp.
Jagger, T. A. (1926). The Volcano Letter No. 71 (13 May 1926), 1 pp.
Jagger, T. A. (1947). op. cit., 171-173.
29. Jagger, T. A. (1935). Hawaiian Volcano Observatory Report for November, 1935. The Volcano Letter No. 429, 1-6.
Jagger, T. A. (1935). Hawaiian Volcano Observatory Report for December, 1935 The Volcano Letter No. 430, 1-8.
Jagger, T. A. (1936). Hawaiian Volcano Observatory Report for January, 1936 The Volcano Letter No. 431, 1-8.
30. Macdonald, G. A. (1954). Activity of Hawaiian Volcanoes during 1940-1950. Bull. Volcan. Ser. II, Tome XV, 120-179.
31. Macdonald, G. A. (1943). The 1942 Eruption of Mauna Loa, Hawaii. Am. Jour. Sci. 241 (4), 241-256.
Macdonald, G. A. (1954). loc. cit.
32. Macdonald, G. A. and Orr, J. B. (1950). The 1949 Summit eruption of Mauna Loa. U.S. Geological Survey Bull. 974-A, 33 pg.
Finch, R. B. and Macdonald, G. A. (1951). Report of the Hawaiian Volcano Observatory for 1948 and 1949. U.S. Geological Survey Bull. 974-D, 103-133.
33. Finch, R. B. and Macdonald, G. A. (1953). Hawaiian volcanoes during 1950. U.S. Geological Survey Bull. 996-B, 89 pg.
34. Hawaiian Volcano Observatory Staff (1975). Hawaiian Volcano Observatory Monthly Report: 21 June to 21 July 1975.



