

9/56 YEAR CYCLE: ALASKAN VOLCANIC ERUPTIONS

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Abstract: A 9/56 year cycle has been established for various phenomena – financial panics, earthquakes, volcanic eruptions and Atlantic hurricanes. This paper assessed a possible relationship between 9/56 year cycle and Alaskan volcanic eruptions. Correlates confirmed that these events fell preferentially in 9/56 year, 27/56 year and 9-18/56 year grid patterns. The findings offered further support for a strong 9/56 year effect in Alaskan seismology and volcanology.

Keywords: 9/56 year cycle, volcanoes, eruptions, Alaska.

Introduction

The 9/56 year cycle consists of a grid with intervals of 56 years on the vertical (called sequences) and multiples of 9 years on the horizontal (called subcycles). Events will cluster in these patterns with statistical significance, a finding that applied to financial panics (McMinn, 1986, 1993), earthquakes ([2011a](#), [2011b](#), [2014](#)) and Atlantic hurricanes ([2011c](#)). The beginnings of volcanic eruptions in Hawaii also exhibited this effect (McMinn, 2011d), as did world mega eruptions (McMinn, 2012). This paper examined the prospect of a 9/56 year cycle in the timing of Alaskan volcanic eruptions over recent centuries. Such events were found to cluster selectively in grids based on 9/56 years, 27/56 years and 9-18/56 years.

The database of the Alaska Volcano Observatory (AVO) was accessed to produce a listing of Alaskan volcanic eruptions since 1750 (see **Appendix 1**). All eruptions were included regardless of their intensity. Those entries considered to be ‘Questionable Eruptions’ were omitted, because of reliability issues. The listing also becomes increasingly spurious the further back in time one goes. Many early Alaskan events were unobserved or not recorded, due to low European population levels and the remoteness of many of the volcanoes. The study of Alaskan volcanoes improved during the 20th century and thus there has been a marked increase in the frequency of observed Alaskan eruptions. Despite such limitations, the AVO data was still used, because it was the best available option.

The 56 year sequences have been numbered in accordance with McMinn (1993), with 1817, 1873, 1929, 1985 being designated as Sequence 01; 1818, 1874, 1930, 1986 as Sequence 02 and so forth. [McMinn \(Appendix 2, 2002\)](#) gave the full numbering. Calendar years have been adopted in the tables, because the AVO data was presented in this manner.

The 9/56 Year Grid

Alaskan eruptions fall selectively in one sector of the complete 9/56 year grid as shown in **Table 1**. Of the 234 events listed by the AVO, some 98 fall in this arrangement, whereas about 76 could have been expected by chance (significant $p < .01$).

Table 1 9/56 YEAR CYCLE: ALASKAN VOLCANIC ERUPTIONS Calendar Years								
Sq 25	Sq 34	Sq 43	Sq 52	Sq 05	Sq 14	Sq 23	Sq 32	Sq 41
								1745
			1756	1765	1774	1783	1792 **	1801
1785	1794	1803	1812 **	1821	1830 **	1839	1848 *	1857
1841	1850	1859	1868	1877	1886 *	1895	1904 *	1913
1897	1906 ***	1915 *	1924 *	1933 *	1942 *	1951 ****	1960 **	1969 *

NB: Each asterisk represented an Alaskan volcano which experienced an eruptive event in a given year.
Source of Raw Data: Alaska Volcano Observatory.

Grid A in **Table 2** was displaced by 9 years relative to Grid B (ie: Grid A plus 9 years gave Grid B). Thus they may be combined to yield a pattern with 9 - 18 - 9 - 18 - 9 - 18..... year intervals on the horizontal and 56 year intervals on the vertical (denoted as a 9-18/56 year cycle). **Table 3** comprised 21% of the complete 9/56 year grid yet it accounted for 34% of all Alaskan eruptions (significant $p < 10^{-5}$).

Table 3											
9-18/56 YEAR CYCLE: ALASKAN VOLCANIC ERUPTIONS Post 1750											
Alaska Volcano Observatory											
Calendar Years											
Sq 25		Sq 34		Sq 52		Sq 05		Sq 23		Sq 32	
				1756	+ 9	1765	+ 18	1783	+ 9	1792 **	+ 18
1785	+ 9	1794	+ 18	1812 **	+ 9	1821	+ 18	1839	+ 9	1848 *	+ 18
1841	+ 9	1850	+ 18	1868	+ 9	1877	+ 18	1895	+ 9	1904 *	+ 18
1897	+ 9	1906 ***	+ 18	1924 *	+ 9	1933 *	+ 18	1951 **** ***	+ 9	1960 **	+ 18
1953 **** *	+ 9	1962 **	+ 18	1980 ***	+ 9	1989 ****	+ 18	2007 **	+ 9	2016	
2009 ***	+ 9	2018									
Continued.....											
Sq 50		Sq 03		Sq 21		Sq 30		Sq 48		Sq 01	
								1752	+ 9	1761	
1754	+ 9	1763	+ 18	1781	+ 9	1790	+ 18	1808	+ 9	1817 **	
1810	+ 9	1819	+ 18	1837	+ 9	1846 *	+ 18	1864	+ 9	1873 **	
1866	+ 9	1875	+ 18	1893 *	+ 9	1902 *	+ 18	1920	+ 9	1929 ****	
1922 ***	+ 9	1931 ***	+ 18	1949 **	+ 9	1958 **	+ 18	1976 ***	+ 9	1985 *	
1978 ***	+ 9	1987 **** **		2005 ***	+ 9	2014 ***					

Each asterisk represented an Alaskan volcano which experienced an eruptive event in a given year.
Source of Raw Data: Alaska Volcano Observatory.

Alaskan eruptions were least likely to occur in the 9/56 year grid presented in **Table 4**. Some 38 events appeared in this pattern, compared with an expected 59 (significant $p < .01$).

Table 4													
9/56 YEAR CYCLE: LOWEST FREQUENCY OF ALASKAN ERUPTIONS													
Calendar Years													
Sq 44	Sq 53	Sq 06	Sq 15	Sq 24	Sq 33	Sq 42	Sq 51	Sq 04	Sq 13	Sq 22	Sq 31	Sq 40	Sq 49
												1744	1753
						1746	1755	1764	1773	1782	1791 *	1800	1809
1748	1757	1766	1775	1784	1793	1802 *	1811	1820	1829	1838	1847	1856	1865 *
1804	1813	1822	1831	1840	1849	1858	1867 *	1876	1885	1894 *	1903 *	1912 **	1921
1860	1869	1878	1887 *	1896 *	1905	1914 **	1923	1932 **	1941	1950 ***	1959	1968	1977 **
1916	1925	1934	1943 *	1952 *	1961	1970	1979 *	1988 *	1997 ***	2006 ***			

1972 *	1981 **	1990 ***	1999	2008 ***	2017								
<p>The 56 year sequences are separated by an interval of 9 years. Each asterisk represented an Alaskan volcano which experienced an eruption during a given year. Source of Raw Data: Alaska Volcano Observatory.</p>													

In the 100 years to 1898, only one eruption took place between Sq 29 and Sq 43 of the complete 9/56 year grid (see **Appendix 2**). This was unusual because about 10 could have been expected by chance (significant $p < .01$).

Discussion and Conclusions

From the assessment, Alaskan eruptions were found to cluster within 9/56 year patterns. This favourable outcome contributed to the growing body of evidence supporting a 9/56 year effect in the timing of earthquakes and eruptions. Three key patterns applied to Alaskan volcanoes – a 9/56 year grid (see **Table 1**), the 27/56 year grids (see **Table 2**) and a 9-18/56 year grid (see **Table 3**). Various other arrangements were considered but significance could not be achieved. Alaskan episodes with the highest Volcano Explosivity Index (VEI) were also appraised for possible trends, but without success.

Curiously, 54/56 year and 9-45/56 year grids were very important in the timing of large Alaskan quakes ($M > 7.8$) (McMinn, 2014), whereas Alaskan volcanic eruptions were most likely to show up in 27/56 year and 9-18/56 year layouts. 27 was half of 54 and thus there may be some relationship between the timing of Alaskan earthquakes and volcanic eruptions. This hypothesis was examined in some detail, but supportive evidence was lacking. Various 56 year sequences (Sqs 21, 23, 25, 30, 32 & 34) were shared between the 9-18/56 year grid for Alaskan eruptions (see **Table 3**) and the 9-45/56 year grid for Alaskan earthquakes (see **Appendix 3**). Alas nothing more can be stated.

The patterns based on 56 years and multiples of 9 years are very interesting, but the correlates cannot explain how the 9/56 year effect functions in the timing of critical phenomena. Moon Sun tidal effects were strongly indicated (McMinn, 2011a), but how these forces triggered major earthquakes and eruptions remained the great unknown. Even so, there may be emerging a simple theory based on Moon-Sun tidal harmonics, which reduces the complexity of eruptive and seismic cycles to a few basic principles. Such a paradigm shift would offer the potential to make accurate forecasts of earthquakes and eruptions years in advance. Unfortunately, this is unlikely to be achieved anytime soon.

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10	19	28	37	46	55	08	17	26	35	44	53	06	15
					1759	1768	1777	1786 ***	1795 *	1804	1813	1766	1775
1770	1779	1788	1797	1806 *	1815	1824 ***	1833	1842 *	1851	1860	1869	1878	1887 *
1826 *	1835	1844 *	1853	1862	1871	1880 *	1889	1898 *	1907 ***	1916	1925	1934	1943 *
1882	1891 *	1900	1909 *	1918	1927	1936 *	1945 **	1954 *	1963 ***	1972 *	1981 **	1990 ***	1999
1938 **	1947	1956 *	1965	1974 *	1983 ***	1992 ****	2001 *	2010					
1994 **	2003	2012 *											
Continued.....													
Sq 24	Sq 33	Sq 42	Sq 51	Sq 04	Sq 13	Sq 22	Sq 31	Sq 40	Sq 49	Sq 02	Sq 11	Sq 20	Sq 29
				1764	1773	1782	1791 *	1800	1809	1818	1771	1780	1789
											1827 *	1836	1845
1784	1793	1802 *	1811	1820	1829	1838	1847	1856	1865 *	1874	1883 ****	1892 ****	1901 *
1840	1849	1858	1867 *	1876	1885	1894 *	1903 *	1912 **	1921	1930	1939 *	1948 *	1957
1896 *	1905	1914 **	1923	1932 **	1941	1950 ***	1959	1968	1977 **	1986 ****	1995 ***	2004 **	2013 ***
1952 *	1961	1970	1979 *	1988 *	1997 ***	2006 ***	2015						
2008 ***	2017												
Continued.....													
Sq 38	Sq 47	Sq 56	Sq 09	Sq 18	Sq 27	Sq 36	Sq 45	Sq 54	Sq 07	Sq 16	Sq 25	Sq 34	Sq 43
									1767 *	1776	1785	1794	1803
		1760	1769 *	1778	1787	1796 **	1805	1814	1823	1832	1841	1850	1859
1798	1807	1816	1825	1834	1843	1852 *	1861	1870	1879	1888	1897	1906 ***	1915 *
1854	1863	1872	1881	1890	1899 *	1908 *	1917 *	1926 **	1935 *	1944 ****	1953 ****	1962 **	1971 *
1910 *	1919	1928	1937 *	1946 **	1955 *	1964 **	1973 **	1982 **	1991 **	2000	2009 ***	2018	
1966 **	1975 **	1984 **	1993 **	2002 *	2011 *								
The 56 year sequences are separated by an interval of 9 years Each asterisk represented an Alaskan volcano which experienced an eruption during a given year. Eruptive events highlighted in blue occurred during the 100 years to 1898. Events in red happened from 1760 to 1798, as well as from 1899 to 2014. Source of Raw Data: Alaska Volcano Observatory.													

Appendix 3 9-45/56 YEAR CYCLE: MAJOR QUAKES IN ALASKA Post 1895 M ≥ 7.8 Year beginning March 1								
Sq 31		Sq 40		Sq 29		Sq 38		Sq 27
								1899 0904 1899 0910 1899 0910
				1901	+ 9	1910	+ 45	1955
1903 0602	+ 9	1912	+ 45	1957 0309	+ 9	1966	+ 45	2011
1959	+ 9	1968	+ 45	2013				
2015								
Continued.....								
	Sq 36		Sq 25		Sq 34		Sq 23	
							1895	+ 9
			1897	+ 9	1906 0817	+ 45	1951	+ 9
+ 9	1908	+ 45	1953	+ 9	1962	+ 45	2007	+ 9
+ 9	1964 0328 1965 0204	+ 45	2009	+ 9	2018			
+ 9	2020							
Continued.....								
Sq 32		Sq 21		Sq 30		Sq 19		Sq 28
						1891	+ 9	1900 1009
				1902 1201	+ 45	1947	+ 9	1956
1904 0827 1905 0214	+ 45	1949	+ 9	1958 0710	+ 45	2003 1117	+ 9	2012
1960	+ 45	2005	+ 9	2014				
2016								
Major Alaskan earthquakes $M \geq 8.1$ denoted in red , with lesser earthquakes $M \geq 7.8 \leq 8.0$ denoted in blue . The month and day given in parenthesis. Source of Raw Data: National Geophysical Data Center. Parameters Alaska. Post 1700. $M \geq 7.8$. Source: McMinn (2014).								