

Lunar Orbital Trajectories for the 20th Century and First Two Decades of the 21st Century

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Each Lunar Orbital Trajectory (LOT) in Table 1 and Table 2 is a record of historical and projected trajectories of the moon as both the moon and earth mover around the sun during two consecutive water years. In North America, a water year runs from October 1st of the previous calendar year to September 30th of the current calendar year. Table 1 is prepared for use in North America. Table 2 is prepared for use in East Africa where the rainy season is during the June to August season.

According to the National Aeronautics and Space Administration (NASA, 2011), there are four types of solar eclipse events: Total (T), Annular (A), Hybrid (H), and Partial (P).

In a LOT, a month in which a particular solar eclipse event occurred is denoted by a number; 1 for January, 2 for February, ..., and 12 for December. Thus, an A1 designates an Annular solar eclipse event in January.

An A1-T7-P1-P6-P7 LOT designates a trajectory of Annular and Total solar eclipse events in January and July of the previous year, respectively, and Partial solar eclipse events in January, June, and July of the current year. It is assumed that two LOTs that are similar indicate similar movement of the moon around the earth and the earth and moon around the sun between the first and last events in the LOT.

Note that both 1964 and 2011 have similar LOTs. In 1964, one of the largest recorded earthquakes occurred in Alaska and in 2011, another large earthquake occurred in Japan. Two other years with similar LOTs are 1946 and 1982. In 1946, another earthquake also occurred in Japan and in 1982 in Yemen.

Emerging studies (Ejeta, 2011) show that, on average, the gap between historically recorded major earthquakes (Richter Magnitude scale ≥ 7.0) and solar eclipse events is only a few days. These studies also show that when the moon is at the same distance from the earth at the same time of year, similar hydrological conditions tend to occur on earth.

Given these mounting evidences, it appears imperative to exert concerted efforts around the world towards the predictability of earthquakes and other geophysical processes. The similarity of hydrological conditions for two water years with similar LOTs can be studied using historical precipitation data of the two years. NASA's data shows projected solar and lunar eclipse events out to the end of the 21st century and can be used to complete the projected LOTs.

Table 1. Solar Eclipse Trajectories (SETs) for the 20th century and first two decades of the 21st century (for use with October to March wet season in North America and elsewhere)

<i>Water Year</i>	<i>Solar Eclipse Trajectory (SET)</i>	<i>Water Year</i>	<i>Solar Eclipse Trajectory (SET)</i>	<i>Water Year</i>	<i>Solar Eclipse Trajectory (SET)</i>
1903	A11-P4-P5-P10-A3-T9	1943	P3-P8-P9-T2-A8	1983	P1-P6-P7-P12-T6
1904	P10-A3-T9-A3-T9	1944	T2-A8-T1-A7	1984	P12-T6-A12-A5
1905	A3-T9-A3-T8	1945	T1-A7-A1-T7	1985	A12-A5-T11-P5
1906	T9-A3-T8-P2-P7-P8	1946	A1-T7-P1-P5-P6	1986	T11-P5-T11-P4
1907	P2-P7-P8-T1-A7	1947	P1-P5-P6-P11-T5	1987	T11-P4-H10-H3-A9
1908	T1-A7-T1-A6	1948	P11-T5-A11-A5	1988	H10-H3-A9-T3-A9
1909	T1-A6-H12-H6	1949	A11-A5-T11-P4	1989	T3-A9-P3-P8
1910	H12-H6-P12-T5	1950	T11-P4-P10-A3-T9	1990	P3-P8-A1-T7
1911	P12-T5-P11-T4	1951	P10-A3-T9-A3-A9	1991	A1-T7-A1-T7
1912	P11-T4-A10-H4	1952	A3-A9-T2-A8	1992	A1-T7-A1-T6
1913	A10-H4-T10-P4-P8-P9	1953	T2-A8-P2-P7-P8	1993	A1-T6-P12-P5
1914	T10-P4-P8-P9-A2-T8	1954	P2-P7-P8-A1-T6	1994	P12-P5-P11-A5
1915	A2-T8-A2-A8	1955	A1-T6-A12-T6	1995	P11-A5-T11-A4
1916	A2-A8-T2-A7	1956	A12-T6-A12-T6	1996	T11-A4-T10-P4
1917	T2-A7-P12-P1-P6-P7	1957	A12-T6-P12-A4	1997	T10-P4-P10-T3-P9
1918	P12-P1-P6-P7-A12-T6	1958	P12-A4-T10-A4	1998	P10-T3-P9-T2-A8
1919	A12-T6-A12-T5	1959	T10-A4-T10-A4	1999	T2-A8-A2-T8
1920	A12-T5-A11-P5	1960	T10-A4-T10-P3-P9	2000	A2-T8-P2-P7-P7
1921	A11-P5-P11-A4	1961	T10-P3-P9-T2-A8	2001	P2-P7-P7-P12-T6
1922	P11-A4-T10-A3-T9	1962	T2-A8-T2-A7	2002	P12-T6-A12-A6
1923	T10-A3-T9-A3-T9	1963	T2-A7-A1-T7	2003	A12-A6-T12-A5
1924	A3-T9-P3-P7-P8	1964	A1-T7-P1-P6-P7	2004	T12-A5-T11-P4
1925	P3-P7-P8-T1-A7	1965	P1-P6-P7-P12-T5	2005	T11-P4-P10-H4
1926	T1-A7-T1-A7	1966	P12-T5-A11-A5	2006	P10-H4-A10-T3-A9
1927	T1-A7-A1-T6	1967	A11-A5-T11-P5	2007	A10-T3-A9-P3-P9
1928	A1-T6-P12-T5-P6	1968	T11-P5-T11-P3-T9	2008	P3-P9-A2-T8
1929	P12-T5-P6-P11-T5	1969	T11-P3-T9-A3-A9	2009	A2-T8-A1-T7
1930	P11-T5-A11-H4	1970	A3-A9-T3-A8	2010	A1-T7-A1-T7
1931	A11-H4-T10-P4-P9	1971	T3-A8-P2-P7-P8	2011	A1-T7-P1-P6-P7
1932	T10-P4-P9-P10-A3-T8	1972	P2-P7-P8-A1-T7	2012	P1-P6-P7-P11-A5
1933	P10-A3-T8-A2-A8	1973	A1-T7-A1-T6	2013	P11-A5-T11-A5
1934	A2-A8-T2-A8	1974	A1-T6-A12-T6	2014	T11-A5-H11-A4
1935	T2-A8-P1-P2-P6-P7	1975	A12-T6-P12-P5	2015	H11-A4-P10-T3-P9
1936	P1-P2-P6-P7-A12-T6	1976	P12-P5-P11-A4	2016	P10-T3-P9-T3-A9
1937	A12-T6-A12-T6	1977	P11-A4-T10-A4	2017	T3-A9-A2-T8
1938	A12-T6-A12-T5	1978	T10-A4-T10-P4	2018	A2-T8-P2-P7-P8
1939	A12-T5-P11-A4	1979	T10-P4-P10-T2-A8	2019	P2-P7-P8-P1-T7
1940	P11-A4-T10-A4	1980	P10-T2-A8-T2-A8	2020	P1-T7-A12-A6
1941	T10-A4-T10-A3-T9	1981	T2-A8-A2-T7		
1942	A3-T9-P3-P8-P9	1982	A2-T7-P1-P6-P7		

Table 2. Solar Eclipse Trajectories (SETs) for the 20th century and first two decades of the 21st century (for use with June to August wet season in East Africa and elsewhere)

<i>Water Year</i>	<i>Solar Eclipse Trajectory (SET)</i>	<i>Water Year</i>	<i>Solar Eclipse Trajectory (SET)</i>	<i>Water Year</i>	<i>Solar Eclipse Trajectory (SET)</i>
1903	P4-P5-P10-A3-T9-P10-A3	1943	P8-P9-T2-A8-T2	1983	P6-P7-P12-T6-P12
1904	T9-A3-T9-A3	1944	A8-T1-A7-T1	1984	T6-A12-A5-A12
1905	T9-A3-T8-A3	1945	A7-A1-T7-A1	1985	A5-T11-P5-T11
1906	T8-P2-P7-P8-P2	1946	T7-P1-P5-P6-P1	1986	P5-T11-P4-T11
1907	P7-P8-T1-A7-T1	1947	P5-P6-P11-T5-P11	1987	P4-H10-H3-A9-H10-H3
1908	A7-T1-A6-T1	1948	T5-A11-A5-A11	1988	A9-T3-A9-T3
1909	A6-H12-H6-H12	1949	A5-T11-P4-T11	1989	A9-P3-P8-P3
1910	H6-P12-T5-P12	1950	P4-P10-A3-T9-P10-A3	1990	P8-A1-T7-A1
1911	T5-P11-T4-P11	1951	T9-A3-A9-A3	1991	T7-A1-T7-A1
1912	T4-A10-H4-A10	1952	A9-T2-A8-T2	1992	T7-A1-T6-A1
1913	H4-T10-P4-P8-P9-T10	1953	A8-P2-P7-P8-P2	1993	T6-P12-P5-P12
1914	P4-P8-P9-A2-T8-A2	1954	P7-P8-A1-T6-A1	1994	P5-P11-A5-P11
1915	T8-A2-A8-A2	1955	T6-A12-T6-A12	1995	A5-T11-A4-T11
1916	A8-T2-A7-T2	1956	T6-A12-T6-A12	1996	A4-T10-P4-T10
1917	A7-P12-P1-P6-P7-P12-P1	1957	T6-P12-A4-P12	1997	P4-P10-T3-P9-P10-T3
1918	P6-P7-A12-T6-A12	1958	A4-T10-A4-T10	1998	P9-T2-A8-T2
1919	T6-A12-T5-A12	1959	A4-T10-A4-T10	1999	A8-A2-T8-A2
1920	T5-A11-P5-A11	1960	A4-T10-P3-P9-T10-P3	2000	T8-P2-P7-P7-P2
1921	P5-P11-A4-P11	1961	P9-T2-A8-T2	2001	P7-P7-P12-T6-P12
1922	A4-T10-A3-T9-T10-A3	1962	A8-T2-A7-T2	2002	T6-A12-A6-A12
1923	T9-A3-T9-A3	1963	A7-A1-T7-A1	2003	A6-T12-A5-T12
1924	T9-P3-P7-P8-P3	1964	T7-P1-P6-P7-P1	2004	A5-T11-P4-T11
1925	P7-P8-T1-A7-T1	1965	P6-P7-P12-T5-P12	2005	P4-P10-H4-P10
1926	A7-T1-A7-T1	1966	T5-A11-A5-A11	2006	H4-A10-T3-A9-A10-T3
1927	A7-A1-T6-A1	1967	A5-T11-P5-T11	2007	A9-P3-P9-P3
1928	T6-P12-T5-P6-P12	1968	P5-T11-P3-T9-T11-P3	2008	P9-A2-T8-A2
1929	T5-P6-P11-T5-P11	1969	T9-A3-A9-A3	2009	T8-A1-T7-A1
1930	T5-A11-H4-A11	1970	A9-T3-A8-T3	2010	T7-A1-T7-A1
1931	H4-T10-P4-P9-T10	1971	A8-P2-P7-P8-P2	2011	T7-P1-P6-P7-P1
1932	P4-P9-P10-A3-T8-P10-A3	1972	P7-P8-A1-T7-A1	2012	P6-P7-P11-A5-P11
1933	T8-A2-A8-A2	1973	T7-A1-T6-A1	2013	A5-T11-A5-T11
1934	A8-T2-A8-T2	1974	T6-A12-T6-A12	2014	A5-H11-A4-H11
1935	A8-P1-P2-P6-P7-P1-P2	1975	T6-P12-P5-P12	2015	A4-P10-T3-P9-P10-T3
1936	P6-P7-A12-T6-A12	1976	P5-P11-A4-P11	2016	P9-T3-A9-T3
1937	T6-A12-T6-A12	1977	A4-T10-A4-T10	2017	A9-A2-T8-A2
1938	T6-A12-T5-A12	1978	A4-T10-P4-T10	2018	T8-P2-P7-P8-P2
1939	T5-P11-A4-P11	1979	P4-P10-T2-A8-P10-T2	2019	P7-P8-P1-T7-P1
1940	A4-T10-A4-T10	1980	A8-T2-A8-T2	2020	T7-A12-A6-T12
1941	A4-T10-A3-T9-A3	1981	A8-A2-T7-A2		
1942	T9-P3-P8-P9-T2	1982	T7-P1-P6-P7-P1		