Validation of Predicted Dry Water Year 2012 in Northern California Using Real Time Precipitation Data (*Updated Title*)

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Emerging studies show that geophysical realizations, including hydrological conditions on earth, can be predicted reasonably well. This can be done by using a projected lunar orbital pathway (LOP) in tandem with the earth orbiting the sun that is analogous to those of historically known water years (Ejeta, 2012.) A water year runs from the beginning of October of the previous calendar year to the end of September of the current calendar year. This timeline for a water year was recommended by Loewe and Radok (1948) to avoid splitting the Southern Hemisphere summer wet season, or equivalently, the Northern Hemisphere winter wet season.

The fundamental physics behind the associations between LOPs and geophysical realizations is likely to be Newton's law of universal gravitation (Newton, 1687.) The effect of this gravitational force is evident in ocean dynamics, which is known to be reflected in tide level fluctuations. The association of LOPs and hydrological conditions on earth is a new finding born from the analyses of the paradoxical hydrological stationarity problem that was observed early on by this author in the course of studying the impact of climate change on California's water projects (Anderson, et al, 2007.)

The conceptions of the existence of gravitational forces between distant objects such as the earth, moon, and sun as well as establishing LOPs may sound daunting at first thought. However, actual observations of geophysical realizations indicate that nature may have its own ways of revealing itself. Figure 1 is a schematic depiction of the moon orbiting the earth in tandem with the earth orbiting the sun, which was established a long time ago by early scientists.

The idea of the existence of a gravitational force between the earth and moon follows observations of tide level fluctuations that are pronounced during new and full moon days. Establishing LOPs can be done readily by using apparent earth-moon-sun alignment records by the National Aeronautics and Space Administration (NASA, 2011.) I assume that if the moon was at node N_1 in month M_1 when a solar eclipse event E_1 occurred and was at node N_2 in month M_2 when a subsequent solar eclipse

event E_2 occurred, these nodal and time proxies can be used to establish a definite LOP during the water year in which these events occurred. There are, respectively, various recorded nodes and times of the year at which and when different solar eclipse events occur. The four recorded solar eclipse types are Total (T,) Annular (A,) Hybrid (H,) and Partial (P.) Two alignment events that are separated by one Saros cycle of about 18 years, 11 days, and 8 hours share very similar geometries. They occur at the same node with the moon at nearly the same distance from the earth and at the same time of year (NASA, 2011.)

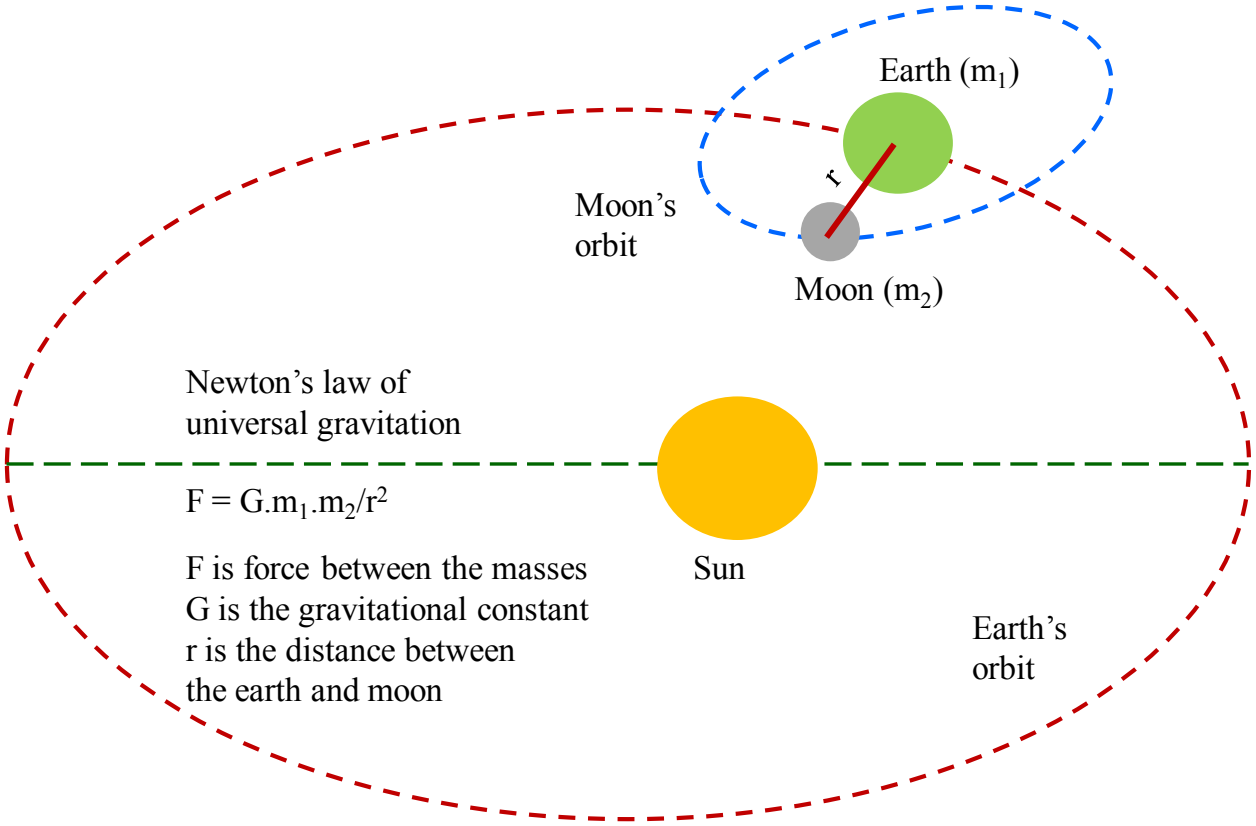

Figure 1. Schematic depiction of the moon and earth's orbits (not to scale)

We can also assume that the transient movements of the moon between two nodes N_1 and N_2 during two water years that are separated by one Saros cycle are similar. It follows then that if we are able to identify similar solar eclipse events during two different water years, we will be able to establish LOPs during those water years and screen out the ones with similar LOPs.

Table 1 shows the data used to establish similar LOPs for water year 2012 and five others in the 20th century. Using these alignment records and the LOPs thereof, we

can analyze the precipitation records at Davis, California; this gauging station has one of the longest continuous records of daily precipitation data in Northern California.

Table 1. Similar solar eclipse events during water year 2012 and five others in the 20th century

	Observed Alignments	
Water Year	Partial Eclipse	Annular Eclipse
1921	11/10/1920	4/08/1921
1939	11/21/1938	4/19/1939
1957	12/02/1956	4/30/1957
1976	11/03/1975	4/29/1976
1994	11/13/1993	5/10/1994
2012	11/25/2011	5/20/2012

The earth-moon-sun alignment data in Table 1 shows that during each of the identified water years, there were Partial solar eclipse events in the fall season of the water year followed by Annular solar eclipse events in the spring season of the same water year. It should be noted here that the assumption is that transient pathways between the same nodes at which Partial eclipses occurred in the fall season followed by Annular eclipses in the spring season are similar. It is also assumed that the similarity of the pathways stays put for the entire water year of 2012 and the aligned timelines for the identified water years during the 20th century. Using water year 2012 (October 1, 2011, to September 30, 2012) as a reference, the alignments of the timelines of the other water years with respect to water year 2012 are made by taking the same number of days before and after their fall season Partial eclipse dates. For example, for water year 1994, 55 days before and 310 days after the November 13, 1993, Partial eclipse date give us an aligned timeline for water year 1994 that spans from September 19, 1993, to September 19, 1994 (since water year 2012 is a leap year, the total number of days in the aligned water year 1994 is also 366.)

Figure 2 shows the cumulative precipitation at Davis, California, for the five water years in the 20th century that were identified to have similar LOPs as that of water year 2012. Daily precipitation data for Davis for water year 2012 was obtained from the University of California at Davis' Statewide Integrated Pest Management program database (the initial study used the precipitation data at the Sacramento International Airport, which is a nearby gauging station to the Davis station, a surrogate data.)

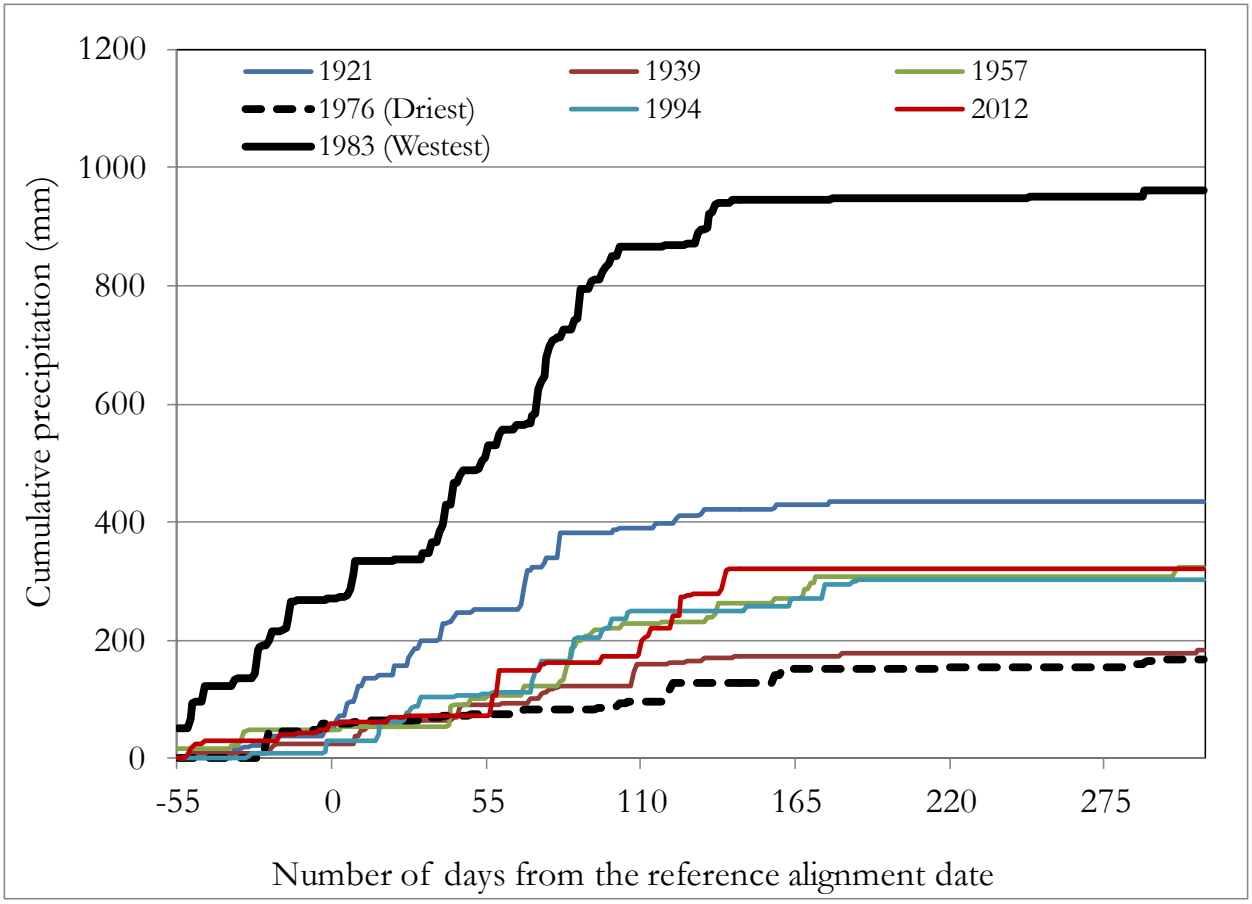

Figure 2. Cumulative precipitation at Davis, California, for five water years in the 20th century that were identified to have similar LOPs as that of water year 2012 and its water year 2012 cumulative precipitation data as of the date of this analysis. For each water year, the fall season Partial solar eclipse event is set to the alignment date. *As part of the validation exercise of the association of hydrological conditions on earth and LOPs, this graph was updated every Sunday until September 30, 2012, when water year 2012 ended.*

Several insights can be gained from the results shown in Figure 2. First, the total precipitation values for the identified water years in the 20th century are generally on the dry side. This suggests that a LOP that is characterized by a Partial solar eclipse event in the fall season that is followed by an Annular solar eclipse event in the spring season is generally associated with a dry hydrological condition in Northern California. Second, there are two pairs of water years in which the total precipitation values are nearly the same: 1939 and 1976 as well as 1957 and 1994. Third, these pairs of water years with nearly the same total precipitation values are about two Saros cycles apart. This suggests that in some cases two Saros cycles are better indicators of similar hydrological conditions in Northern California than one Saros cycle. Fourth,

there are discernible similarities in the timing of storm events during two water years with similar LOPs. Fifth, as of the day of reporting the results of this analysis, water year 2012 precipitation values fall on the dry side and closely follow those of water years 1957 and 1994; early on, it followed those of water years 1939 and 1976. This result indicates that this water turned out to be one of the driest in Northern California. Note that although precipitation of a single station was used for this purpose, the hydrological condition is widespread throughout California, a subject of further analysis.

These results, which are part of an ongoing investigation, have far reaching implications beyond the validation of the predictability of hydrological conditions on earth. They are likely to address convincingly the uncertainty in general circulation modeling, which doesn't appear to have put to rest scientifically the issue on climate change.

References

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Note: This analysis is published as part of an ongoing validation exercise of previous finding of the association of hydrological conditions on earth and lunar orbital pathways in tandem with the earth orbiting the sun. A disclaimer was made in the early stage of this validation exercise that any and all decisions that are based on the information provided in this report are at the sole discretion and responsibility of its users.