Resurrect Newton and Provide Him Today's Supercomputers to Sort out the Myths and Realities of Climate

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Without today's multitude of research products in multitudes of scientific journals and voluminous books written by scientists, great thinkers who lived centuries ago came up with original observations and mathematical formula that explain geophysical realizations caused by naturally occurring processes.

From a curious observation in a cathedral at the age of twenty, Galileo Galilei discovered the Law of the Pendulum. This observation has been in use since to regulate clocks. He later made some of the earliest telescopes, which he used to study the surface of the moon, discover Jupiter's three moons, and rediscover that the earth moves around the sun. He was later accused and punished for this rediscovery by his contemporary believers (Bellis, 2011).

Sir Isaac Newton's work laid the foundations for most of classical mechanics (Newton, 1687). Of particular interest from Newton's works to this letter is the law of universal gravitation (see Figure 1). According to this law, the continuous movement of the earth around the sun is put in place mainly by the gravitational forces between the earth, moon, and sun.

This law is not an easy concept to fathom, as Newton himself wrote, mainly because of the difficulty in understanding how the vacuum between these celestial objects serves as a medium for the transfer of Newtonian mechanics from one object to another. However, the manifestations of the concept are in everyday life. While it has been clearly evident in tidal dynamics on a daily basis, which are amplified during new and full moon seasons, its manifestations in other geophysical processes, including precipitation (Ejeta, 2011a) and earthquake occurrences (Ejeta, 2011b), seem to be emerging

The complexity of the concept of universal gravitation appears to be explainable by the simplicity with which nature seems to express itself, as Alexander Pope wrote of Newton's discoveries: "Nature and nature's laws lay hid in night; God said, Let Newton be! and all was light".

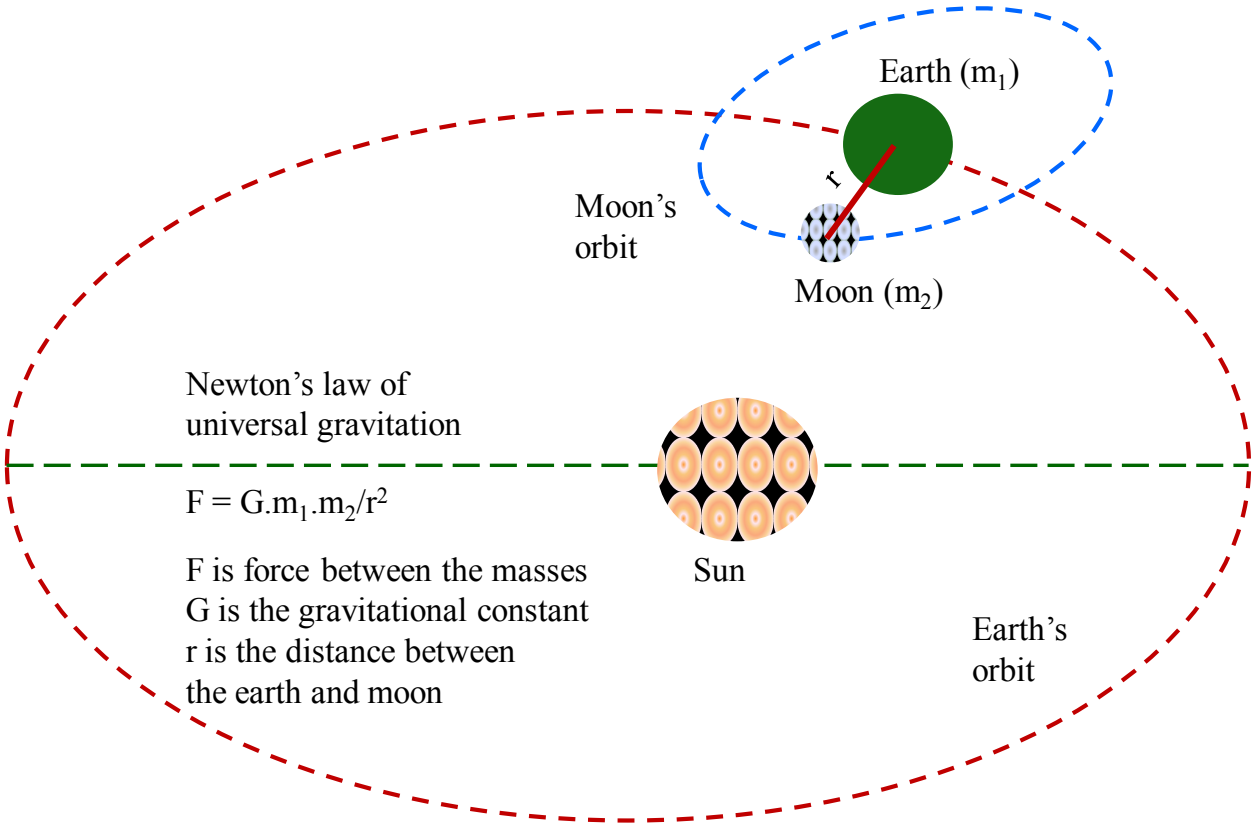

Figure 1. Schematic depiction of the movement of the moon around the earth as both of them move around the sun (not to scale)

To the extent that the concept of Newton's law of universal gravitation is understood well enough, the current June storm in Northern California, which may have been incorrectly characterized as rare, is likely to be explainable.

After studying the pattern of over a century of recorded precipitation data in California, as part of an involvement in studying the impact of climate change on California's water projects, I found signals of an association between the precipitation data and the transient movement of the moon around the earth as both move around the sun (Ejeta, 2011c).

This finding suggests that two water years that have similar geometries and timing for the rotation of the moon around the earth tend to have also similar hydrological conditions in California and possibly on earth. A water year runs from October 1st of the previous calendar year to September 30th of the current calendar year.

At first thought, finding the geometries and timing for the transient movement of the moon around the earth might sound daunting for those who are not astronomers.

However, nature has its own instructive ways. One of this ways is the occurrences of lunisolar alignments as observed by solar eclipse events that the National Aeronautics and Space Administration (NASA) has been recording and projecting (NASA, 2011).

NASA's records show the nodes in the space at which solar eclipse events occurred or will occur in the future. These nodes are categorized into Saros series that have recurrence intervals of approximately 18 years, 11 days, and 8 hours. NASA also keeps records of solar eclipse types and magnitudes. This datasets can be used cleverly to gage and characterize the movement of the moon around the earth as both of them move around the sun.

Using this novel idea, we can find that water year 1964 had one of the closest transient movements of the moon around the earth when compared to that of the current water year. To be specific, on January 14, 1964, there was a lunisolar alignment as observed in Partial solar eclipse of Saros series **150** and eclipse magnitude 0.559. On January 4, 2011, there was also a lunisolar alignment observed in Partial solar eclipse of Saros series **151** and eclipse magnitude 0.858. Similarly, on June 10, 1964, and June 1, 2011, there were lunisolar alignments observed in Partial solar eclipses of Saros series **117** and **118** and eclipse magnitudes of 0.754 and 0.601, respectively.

Based on the similarities of these sets of data, I assume that the transient movement of the moon around the earth between January 14, 1964, and June 10, 1964, as well as between January 4, 2011, and June 1, 2011, are very close and may have caused during these time windows comparable realizations of geophysical processes on earth, either in pattern or magnitude or both. An example of a pair of realizations of these processes that are likely associated (Ejeta, 2011d) are the 1) March 27, 1964, major Alaska earthquake that caused a disastrous tsunami in the coasts of the western U.S. and British Columbia, Canada, and 2) March 11, 2011, major earthquake and disastrous tsunami in Japan. Another example of a pair of comparable realizations is likely to explain the current June storm in Northern California.

Figure 2 shows a comparison of the precipitation data at the Sacramento International Airport, California, of several days around the June 10, 1964, and June 1, 2011, lunisolar alignments. The graphs illustrate that the rainfall patterns at this location during the two years are similar even though their magnitudes are different. In both

years, there were recorded precipitation data around the full moon and new moon days, which is consistent with tidal dynamics amplifications during these events.

As Newton's law of universal gravitation suggests, the force between these celestial objects, including earth, is greater in an inverse square proportion when the distance between them is smaller, which occurs when they are aligned or closely aligned.

While new and full moon days occur roughly twice a month, lunisolar alignments that lead to solar eclipse events generally occur about twice a year and result in four different eclipse types: Total, Annular, Hybrid, and Partial. The studies I have undertaken so far suggest that the similarities of the Saros series number to which each of these alignment types are associated with and the time of the year when they occur tend to show signals of similar geophysical processes on earth.

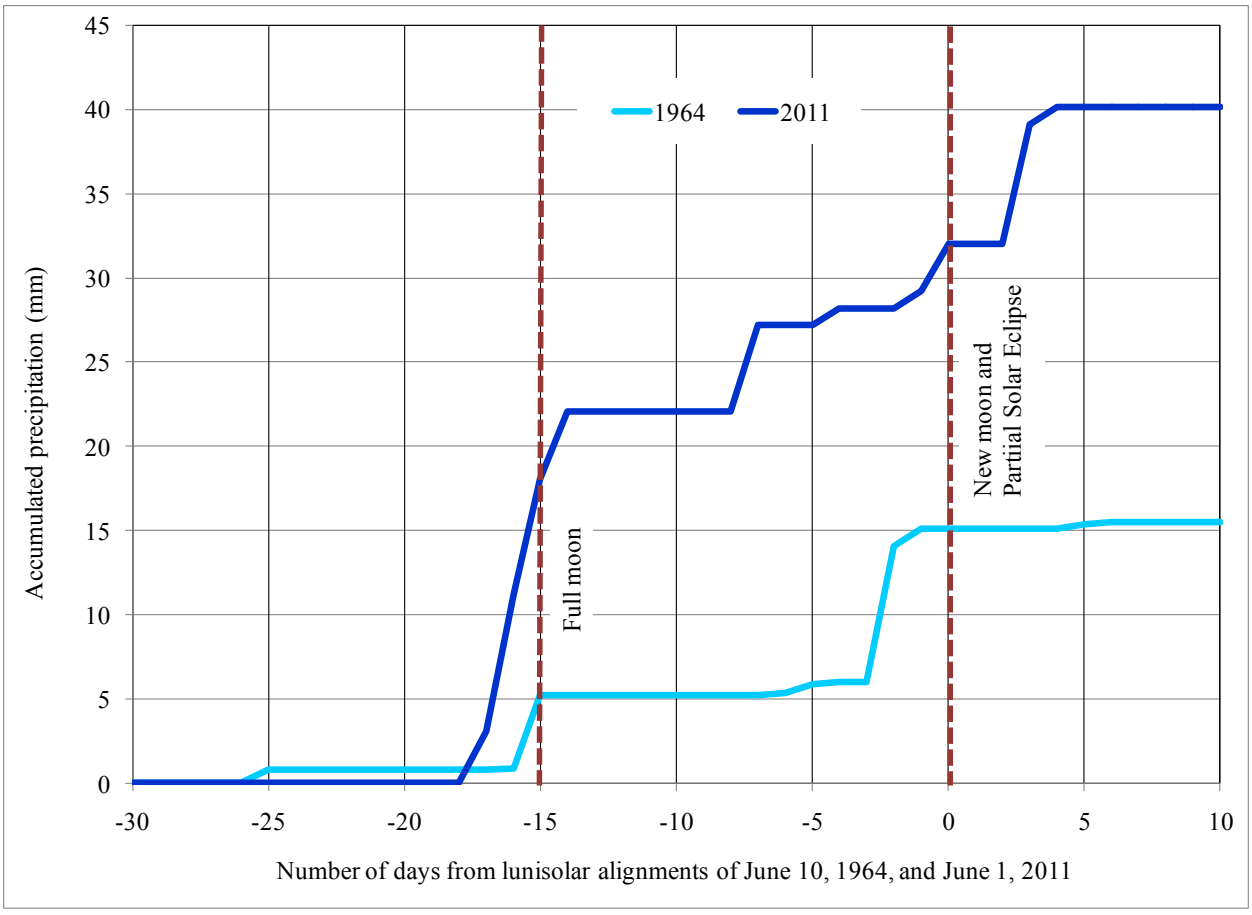

Figure 2. A comparison of accumulated precipitation at Sacramento International Airport around the June 10, 1964, and June 1, 2011, lunisolar alignments as observed in Partial solar eclipses

The limitation in this approach lies in not having identical alignments, which leave us with proximate alignments and the trajectories in between, such as those of January 14 and June 10 in 1964 and January 4 and June 1 in 2011. These alignments and trajectories constitute a parallel displacement of about 10 days as we moved from January to June during the two years. It should be noted again that each corresponding pair in this alignments resulted in Partial solar eclipse events at similar nodes and may be far from anecdotal signals and random realizations.

The similarities in the signals of geophysical processes on earth using this proxy appear promising to further characterize them, which may lead to sorting out the myths and realities of climate to establish a baseline from which any marginal shift may be studied. The lack of certainty about this baseline has been the source of confusion about the science of climate change. Nonetheless, Newton's law of universal gravitation may have embedded in it the mechanics behind the realizations of geophysical processes on earth that can be used to establish this baseline with a comfortable level of certainty.

With a treasure trove of long-term observed data and supercomputers that we have today, resurrecting a Newton's figure may lead us to establishing this baseline with ease. This could bring on the same page the believers and deniers of climate change. A roadway to establishing this baseline, which is incumbent upon the scientists, shouldn't be resisted, much less by the believers of climate change unless this group is a committed apocalyptic. For instance, the current June storm in Northern California is not unprecedented and should not be explained away by climate change for that would be a myth but any possibility of marginal change due to elevated Green House Gas (GHG) in the atmosphere may well have to be explained from an established baseline using a meaningfully characterized precedent.

As for this researcher, the important insight that has come out from the study of the impact of climate change on water projects is the possibility that in the near "future", we may well be able to predict with a comfortable level of certainty geophysical processes on earth, including wet and dry spells, on a multidecadal scale. And that is a good outcome for it will have uses for various applications. After all, future is a man's construction of a moment in the space.

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