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Solar and Lunar eclipses in Northern Italy and variations in micro gravity: a possible Allais Effect?

*Valentino Straser[1], Mario Campion[2]
1(Department of Environmental and Science U.P.K.L., Brussels)
2(Retired, Italy)
Corresponding Author: *Valentino Straser

Abstract : *The abnormal behavior of the paraconical pendulum, observed by Maurice Allais during the solar eclipse of June 30, 1954 and October 2, 1959, have inspired subsequent studies in various parts of the world.In this research we are presented the data of changes in microgravity, measured both during eclipses, both during the transits of the Moon and Sun to Meridian, at the 45th parallel, in the area between Rovigo and Venezia, in Italy.The unusual behavior of the gravimeter consists, sometimes, that to the Sun and Moon transit to Meridian the variation of the earth's microgravity, which in some cases has reached 50 milligal, instead of decreasing, increases.The investigation was focused on the analysis of the centripetal accelerations of the Earth, of the one directed towards the Moon, the Sun, and planets like Jupiter, in accordance with the considerations expressed by RichelmoSassara.When the accelerations are to be on the same plane, then it can induce a state of elastic nature energy that could represent the cause of elasticity variations within the Earth, dependent on the density of the material, with consequent variations in the earth microgravity.*
Keywords: *Allais Effect, microgravity variations, Solar and Moon eclipse.*

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I. Introduction

The General Allais Effect (GAE) is an abnormal motion observed in a pendulum during various cycles.The anomaly is counterclockwise as the pendulum's location approaches the Sun or the Moon, or as the Moon or the Earth gets closer to a particular point in space, and clockwise when the opposite is the case.
The study"Gravitational anomaliesand the" Allaiseffect" found in Italy duringeclipses" presents the data collectedin northern Italy, near Rovigo, a small town located on the 45th parallel,andconducted by Dr.MarioCampion from 2010, who hascreated anewgravimeterconcept,accurateupto the eighthdecimal place.The measurescarried out24/7, have shownunusual behaviorduringtotal andpartial eclipsesandeven afterstrong earthquakes. These effects canbe relatedto the experiencedescribedby ProfessorMaurice Allaisduring theeclipsesobservedin 1954 and1959 [1][2][3][4] since Dr.Campion'sgravimeteris also made by apendulum technology.Before going on with the dataof this study, We'll recall whattheAllaisEffect implies, according the Martin Kokus hypotesis[5][6].

- In the Northern Hemisphere, a pendulum will rotate clockwise.
- At the very beginning of an eclipse, the pendulum's rotation will deviate counterclockwise.
- Then, it will return to a clockwise rotation.
- Can be observed on both solar and lunar eclipses.
- Can be measured on the side of the Earth which is opposite the eclipse.
- Can be measured with a torsion pendulum, a stationary pendulum and a torsion balance pointer simultaneously at sites 300km apart.
- A.E.Pugach [6]estimates that the angular acceleration of a body under the influence of the Allais Eclipse Effect (AEE) would be 4.4x10-4 deg/s.

II. Feedback

The phenomenon is still without a satisfactory explanation and is named after the Nobel Prize in Economics in 1988, Maurice Allais.It is a strange behavior of pendulum or gravimeters, subject to precession mechanisms during solar eclipses.The unusual behavior of Foucault's pendulum was observed by Allais during the solar eclipse of June 30, 1954 and October 2, 1959.The effects induced on the pendulum by the solar eclipse, with a precession movement of the oscillation plane, were observed in Paris using a paraconical pendulum.Over the last few years, the "paradox" discovered by Allais has attracted the attention of a growing number of scientists who, with different contributions, have proposed interpretative models based on both Newtonian mechanics and general gravity and quantum gravity [7][8][9][10][11]or on the interaction of multiple physical, geophysical and planetary effects and variables [5][9]. Confirmations of abnormal pendulum effects and gravimeters have been observed in various eclipses over the last 20 years.

Van Flandern observed an effect of solar eclipse on local acceleration of gravity on 9 March 1997 [12];
- Bucarest, solar eclipses on 11 August 1999 [13],
- Bucarest, on May 2003, [13];
- Panama and Colombia during the 2005 solar eclipses, Apr. 8, and in Portugal, Oct.15 [15];
- Bucharest on 26 March 2006 [8];
- Kiev, Ukraine, and Suceava, Romania in 2008 [14];
- Romania on 06 January 2011 [7].

Some Cyclicities And Natural Phenomena

The General Allais Effect has been observed with periods equal to the solar day, the lunar day, the sidereal month and half a year. These periods add constructively every 9.5 years.
- The solar day = 24 hours
- The lunar day = 24 hours 50 minutes
- The sidereal month = 27.32 days
- One half year = 182.625 days

There are also correlations with the solar activity cycle, with an increase in geophysical events at both maximum and minimum in certain regions. Many studies look for periods of maximum tidal stress; 8.84 or 18.6 years. Sometimes they find them quite often they find two peaks corresponding to the periods listed above [5]. The lunar and solar day are in phase every synodic month =29.54 days, but they add constructively (full and new moon, or twice a month) every 14.77 days.
- 235 half synodic months = 3,469.8 days
- 127 sidereal months = 3,469.9 days
- 19 half years = 3,469.9 days
- Every 9.5 years (3,469.9 days) these cycles are back in phase.
  What is observed in global samples are periods of 4.42, 9.3 and most strongly 9.5 years [5].

III. The Instruments And Methods Of Measure

Monitoring station

The gravimeter is located in the town of Rovigo, Italy—coordinates: Latitude +45.07 N.and Longitude -11.778 E (FIG.1).

Instrument

The instrumentcreatedby Dr.Campiondiffers significantlyfrom these threetypes: gravimeter withconstant length, with free-fall gravimeter and gravimeter withsensing elementelectromagneticbalance.

Analysis

The tool measures the average value of gravity in a defined time interval, by timing with extreme precision the time that the oscillator needs to perform 1,000 or 100 or 10 oscillations, then dividing the value by the number of oscillations itself.The variationsof the average periodareinverselyproportionalto the variations ofgravity**g**, in the range within which the instrumentcarried outthe measurement, as resulting from the formulaof the simple pendulum.Considering the100measures,the starting intervalbegins to be perceivable, but in any case it will only take up about thirty percent ofthe overall interval.Considering the 10measures,the measuring intervalis reducedto ten percent, and in any casemuch widerthanother measuring systemsof**g**.To complete the descriptionof the device, consider that it is controlledby a computer 27/7which manages the operating cycle automatically.

IV. Gravimetric Bouguer Anomalies In The Studied Area

The deep structures, underlying the Po Valley, in the Rovigo area, where is positioned the gravimeter, do not show positive or negative values of Bouguer gravity anomalies [16][17].The density of the underlying structures, therefore, do not seem to affect the quality of the measurements performed with the fixed location of the monitoring station. In fact, a positive gravimetric anomaly, reveals that the average density of the rocks in the subsoil, at that point, is greater than theoretically predicted, on the contrary, a negative anomaly indicates that in the subsurface rocks are lighter than the theoretical value. The gravimetric map of the Bouguer anomalies, positive or negative, expressed in milligal[16]shows a great anomaly coincident with the edge of the Apennines, which helped to identify the discontinuity between the continental crust and the Moho, between 30 and 40 Depth km.The crustal area data Po and those alpine adjacent, allow to hypothesize that there are deep crustal blocks, low-cut at their base and the involvement of the level of the Moho in complex phenomena nesting.The area Po structures show the presence of a magnetic basement [18], metamorphic-crystalline nature, at variable depths: between 5-10 km in the northern area and dipping towards the south up to a depth of 14- 15 km, below the Northern Apennine.

V. Data

The variations of gravity during eclipses were obtained in the town of Rovigo, Italy-coordinates: Latitude and Longitude -11 778 +45.07 N. E. In this study are presented three cases:

1) Eclipse of the Sun, August 11, 1999, where a decrease in severity is observed, consistent with the Newtonian hypothesis (Fig.2.);
2) Total Moon Eclipse, at full Moon, of December 21, 2010, with an increase in severity, associative with the Allais Effect (Fig.3.);
3) Sun Eclipse of January 4, 2011, with an increase in severity, associative with the Allais Effect (Fig.4).

VI. Discussion

The value of gravity is influenced by "tidal forces" at times it is very disturbed, and not entirely defined, especially during the alignment between Earth, Moon and Sun in their passage to the meridian.From the data it is deduced that the conditions of New Moon the Sun disturbs the motion of both the Moon and the Earth by introducing additional micro-accelerations that affect Earth's gravity.From thedaily analysisof the data, we infer thatduring thelunar monththere are twocritical moments, one closer to the new Moon (generally more pronounced) and one closer to the full Moon, in whichthe trend ofgravityrecorded by thegravimeteragrees withtide prediction on the Adriatic Sea, in Italy. The Figure 3shows the trendof the gravity onFebruary 2, 2011, the day before thenew Moon. The recordingwas carried out withthegravimeterseton 100measures with 4'intervals.Thetrend curve (black marker) of the average measured datamirrorsthetrend of the tides in the Adriatic Sea, themaximum corresponding to the passagesof the Sunand the Moonover the meridian.Comparing this trend with the graphs of tidal forces measured with other gravimeters, will show the amplification of tidal forces highlighted by this type of gravimeter: the variation between maximum and minimum of the tide, which comes up from the graph, is of 5.5 millionths of **g**.From measurements made during some Sun eclipse, it has been found that microgravity behaves abnormally and, in some cases, instead of diminishing due to the greater attraction, as is normally the case for tidal forces, increases with variations sometimes also remarkable.

Sun Eclipse, August 11, 1999

The first analysis of the data concerns the sun eclipse of August 11, 1999, detected at Rovigo station, with the oscillation of 72%. The maximum variation in gravity, between low and high tide conditions, found in the Adriatic Sea is about 0.4 milligal.As can be seen from the graph (Fig.2) The alignment effects have resulted in an accentuation of the variation of gravity, with a marked decrease during the eclipse and the consequent lowering of the final level.The variation, moreover, has the same sign as the tidal forces. As deduced from the chart, the alignment of the three asterisks can dramatically accentuate the micro-gravitational variations. In any case, it should be noted that these changes in microgravity may be more or less important, depending on where the measurement and characteristics of the detector are performed, which in this particular case is a precision pendulum, then bound to soil characteristics.

Total lunar eclipse, the moon, the 21 December 2010

The second case considered in the present study concerns the total lunar eclipse, the full moon, on 21 Dec 2010. In this case, the graph indicates a strong variation of gravity which in the graph corresponds to about 50 milligal.The gravity begins to rise in the late afternoon of the 20th, initially modestly, to undergo almost suddenly a sudden leap. From that moment on, microgravity suddenly rises to the maximum near the eclipse.Under Full Moon, gravity should decrease, while in this circumstance it behaves in the opposite way. The graph (Fig.3) also shows another detail, namely that severity remains at a higher level without returning to usual values, as is usually the case.

Sun Eclipse, January 4, 2011

The third case investigated concerns the Sun eclipse of January 4, 2011. It was a very low eclipse on the horizon, which was visible for almost two hours, then clouded by clouds.From the graph (Fig.4), obtained directly from the 330 measurements carried out over the course of the day, it can be noted that the variation of microgravity instead of following the tide of the Adriatic Sea tides, as usual, shows a noticeable decrease in the period and hence, a sharp increase in severity.From the graphs, in fact, it is noted that in the interval between the Sun Moon Earth alignment and the second alignment, with the transition to the Moon Meridian, gravity has increased dramatically.If we exclude a potential electromagnetic effect, in any case not relevant to the measurement, being the oscillator used for the experiment consisting of an INVAR steel rod, this is a relatively strong gravitational variation, referring to the tidal forces of the Adriatic Sea.The trend of gravity, in this specific case, can be associated to a Allais Effect. If one excludes the magnetic effect or a systematic error that occurs during the eclipse, it has to attribute the effect to a relatively strong gravitational variation, if it refers to tidal forces.

VII. Mechanism Hypothesized

The phenomenon of variation of micro gravity during the Sun or Moon eclipses is not a cyclical phenomenon, but responds to a dynamic equilibrium that takes into account many variables in play.Although the studies concerning the anomalies that occur during eclipse are still few, data taken since the middle of the last century, indicate that there are no recurring cyclicities in changes in humidity and pressure and little is known about variations ionospheric.The pressure tends to increase due to the cooling of the air which, in turn, calls hot air from the adjacent areas by changing its values. Without the use of quantum physics [19] or general relativity [20], the model hypothesized in this study is based on classical physics and, in particular, observations made by prof. RichelmoSassara, recorded in unpublished notes.The triggering cause of variations in elasticity within the Earth, depending on the density of materials, would be caused by the centripetal acceleration of the Earth, along with the moon and solar acceleration and the planets, especially Jupiter. When the accelerations are on the same plane, then it is possible to induce an elastic energy at the mass-point which, in some cases, evolves into an earthquake. The energy discharged will be maximum on the Earth's crust, minimum on the atmosphere.Referring to the (Fig.5) it can be seen that the TL, TS and TC accelerations determine two solid angles T, a concave and a convex opposite the vertex. The direction of the TL vector toward the Moon turns around 29 days.The direction of the TS vector facing the Sun makes a round trip around 365 days, while the TS carrier directs a round trip every day. It may happen that the straight TC becomes a short time to compile TL and TS coplanar lines: At that moment, the perturbation inside the Earth can be triggered.If the TL acceleration suddenly missed, the mass m would be "fired" in the direction of TC, that is, within the Earth and opposite the Moon, with notable negligible speeds in the case of new and contemporary perigee. The greatest perturbation occurs, however, when equality occurs:

TC cosα=TC’

That is, when the centripetal acceleration component along the straight TC 'equals the TC' vector. As a result, the action of the TL vector is canceled and hence the mTL force, which maintained the mass balance m, fails.

Likewise, if Ts acceleration failed, there would be a tangential perturbation of the mass m.

The potential energy discharged into the perturbation is therefore proportional to the mass **m = dv** and therefore, at equal volume of volume, to the density of the material.

VIII. Conclusion

Remarks

The Total Solar Eclipse of August 21, 2017, which will reach the peak of Oregon, Idaho, Wyoming, Nebraska, Kansas, Missouri, Illinois, Kentucky, Tennessee, Georgia, North Carolina, South Carolina, will provide an opportunity to test the hypothesis advanced in this study.

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Figures

Fig.1. Index Map. (1) Monitoring area of Rovigo (Italy)

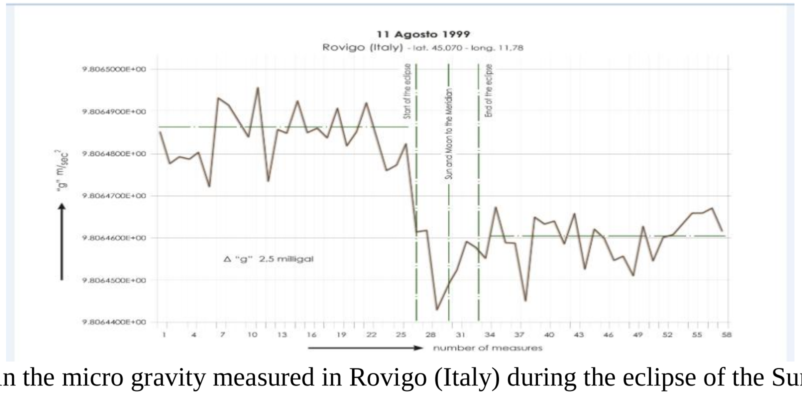

Fig.2. Changes in the micro gravity measured in Rovigo (Italy) during the eclipse of the Sun on August 11, 1999.

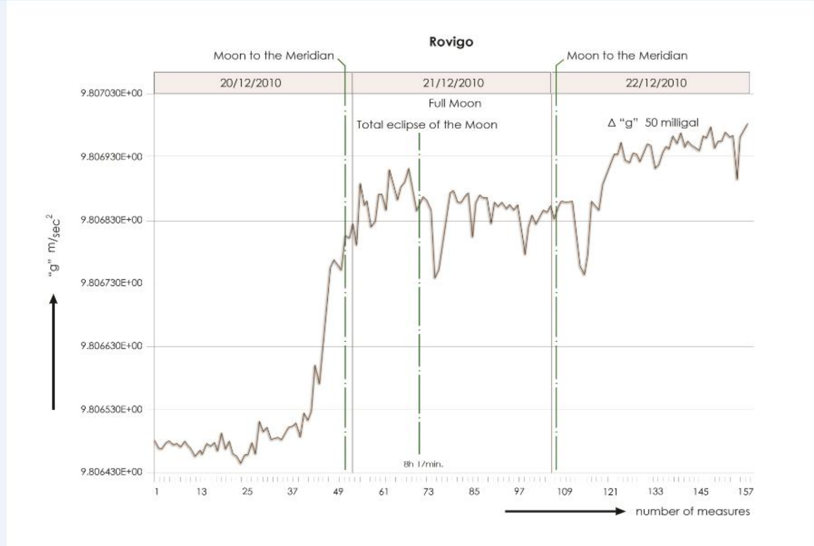

Fig.3. Changes in the micro gravity measured in Rovigo (Italy) during the eclipse of the Moon on December 21, 2010.

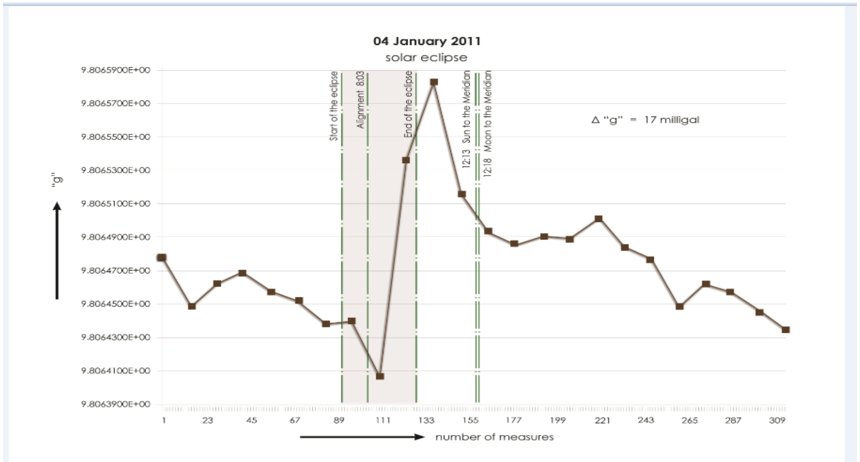

Fig.4. Variations of the micro gravity measured in Rovigo (Italy) during the eclipse of the Sun onJanuary 4, 2011.

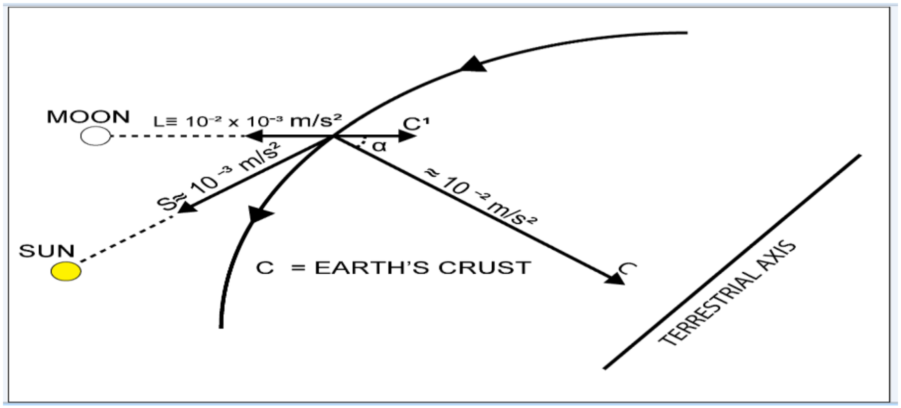

Fig.5. Direction of the accelerations vectors toward the Moon (TL), Sun (TS) and Center of the Earth (TC). (From RichelmoSassara, modified figure)

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