Possible Correlation Between Seismic Activity on Earth and Gravitational Perturbations of Objects of the Solar System

ABSTRACT

The article introduces a new hypothesis regarding a possible effect of gravitational waves on the Earth's seismic activity. The hypothesis assumes that gravitational waves are created as a result of changes in the motion of objects of the Solar System, which, under certain conditions imposed on the distance between planets, can then establish standing waves in the Earth's lithosphere. This in turn can influence earthquake activity. We present an analysis of seismic data and discuss to what extent it correlates with the possible formation of a standing gravitational wave.

INTRODUCTION

Our company has unfolded and, for the last 5 years, been exploiting a network of sensors monitoring the level of natural cosmic penetrating non-ionising radiation[1]. Live data from this monitoring process is available at our company website[2]. We are assuming that we are observing gravitational radiation, however in this article the physical nature of the observed radiation is not of great significance.

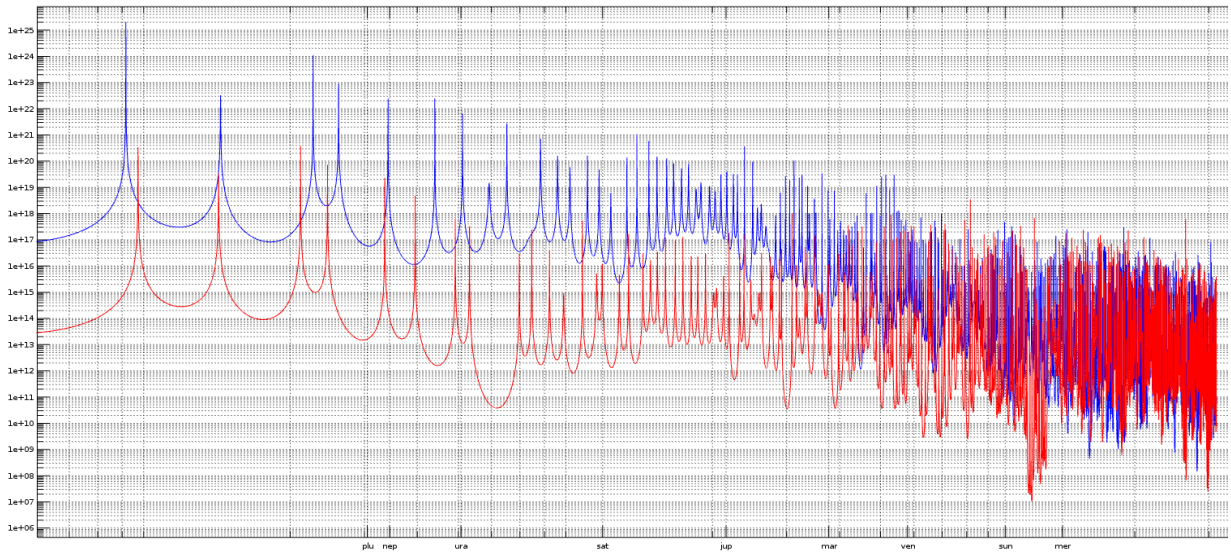

Fig.1

The signal spectrum of a directional sensor. The two channels shown are:

- Blue line for the component of the cosmic radiation
- Red line for the signal detected through the thickness of the Earth.

Horizontal axis: quadruple average values of distances to the planets at the time of observation.

Observations were conducted over 30 days. We can see that Saturn, Jupiter, Uranus and Neptune fall exactly on maxima. Right of Jupiter there are so many maxima that we cannot, at first glance, identify exact coincidences with any specific maximum. However, after a more detailed investigation similar results are obtained.

While analysing the signal recorded by the sensors, we discovered that the signal spectrum contains maxima corresponding to multiples of the periods of propagation of a certain relativistic signal between the Earth and planets of the Solar System (Fig.1). In other words, it looked like we are detecting a certain type of radiation, that propagates at the speed of light and has resonant maxima with periods, that are multiples

of the propagation time between the Earth and the Sun and planets of the Solar System. Later we discovered signals that correspond to periods of propagation of radiation between the planets themselves, especially when they are close to each other as observed from Earth. The most probable hypothesis, as we presume, is that we detect gravitational radiation, produced by the change in distance and gravitational force between objects affected by gravitational interaction. According to modern scientific ideas, such radiation exists, but it is extremely weak. It is possible that this radiation is of a nature other than gravitational, however today no other carrier, that can be generated by planets and will propagate at a speed close to the speed of light, can be suggested.

Our sensors are using a patented technology that is described in detail and is based on well-founded physical principles. However, for the time being we are unable to prove persuasively and without any scientific doubt that we are detecting gravitational waves. Nevertheless, we assumed that perhaps the mysterious radiation detected by our sensors, may also manifest itself in other physical observations.

So let us consider the following hypothesis:
We will assume that occasionally, in the plane of the ecliptic of the Solar System, we observe a certain type of nonionising radiation that affects the Earth when the planet enters the beam of this radiation (Fig.2). If the period of this wave will fit exactly *N* times in the Earth's sidereal day, then a standing wave may be established on Earth. If we are looking for objective signs of the impact that a certain external force from space can have on Earth, then one of the best available options is currently the data from seismic monitoring.

We will further assume that the radiation emerging between planets is propagated mainly along the line connecting their centres of mass, in which case the Earth will enter the beam of this radiation when the planetsgenerators are aligned with Earth, or in astronomical terms, will be at points of planet conjunctions or close to them.

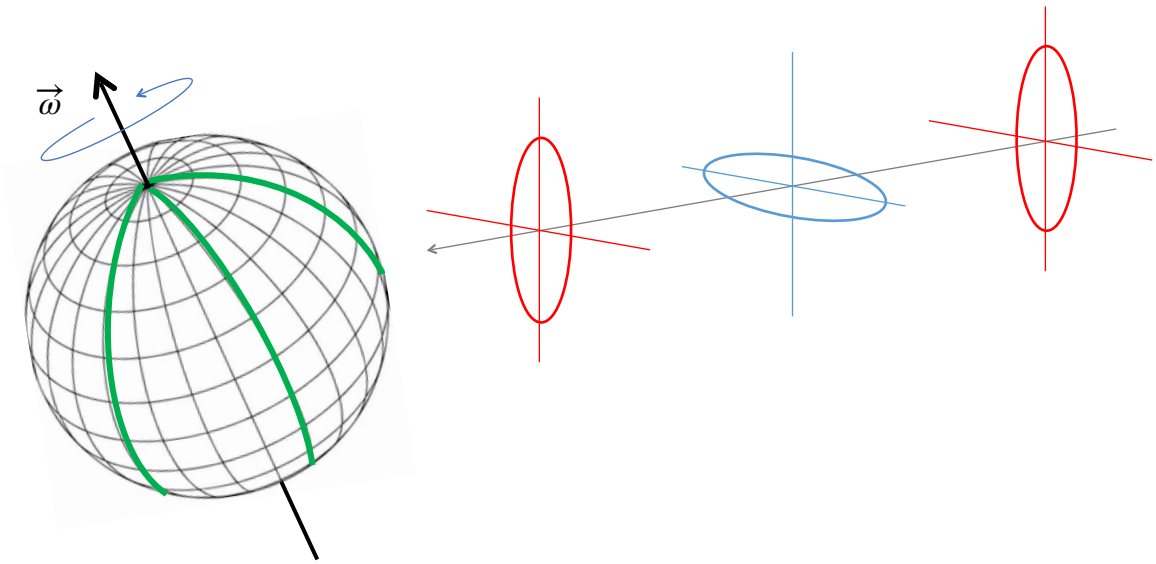

Fig.2

Uniting the two hypotheses we get the following.
Let us assume that the Earth passes close to the line that joins at least two planets of the Solar System, and that the distance between planets satisfies the condition

$$R = Z_D \bullet c \bullet Q \qquad (1)$$

where Z_D is the duration of the sidereal day on Earth, c is the speed of light in vacuum, Q is a rational fraction. At least for some values of Q we may observe a standing wave of a mysterious radiation. The antinode displacement lines in this standing wave will be predominantly directed along the meridians. Keeping at the back of our minds the hypothetical gravitational wave character of radiation, we can attempt to discover the standing wave from seismic monitoring data. The antinodes / maxima of the standing wave could cause tensions in the lithosphere and its consequent relief / relaxation in the form of an earthquake.

On 6 February 2023 in Turkey at 37E longitude a strong earthquake took place, that had an unusually long tail of aftershocks. The seismic tension did not relax, as it usually happens, over a few days or weeks. Aftershocks continued even in April, 2 months later. On 23 February, 17 days after the main strike in Turkey, there was a powerful earthquake, of magnitude greater than 7, in Tajikistan at a point exactly 36 degrees from the epicentre in Turkey, at a longitude 73E. And then a new series of earthquakes happened at longitude 145E, and it is interesting to note that

$$145 = 37 + 36 \bullet 3$$

Fig.3 below shows the longitude distribution of seismic energy released as a result of the earthquakes. The analysis covers a period from 15.01.2023 to 04.03.2023. We considered only seismic events with a magnitude greater than 4. The blue lines are the positions of the hypothetical antinode displacement lines of the standing wave of the tenth order (i.e., 10 periods of the wave pass for each rotation of the Earth). The seismic data comes from the official site of the US geological survey[3].

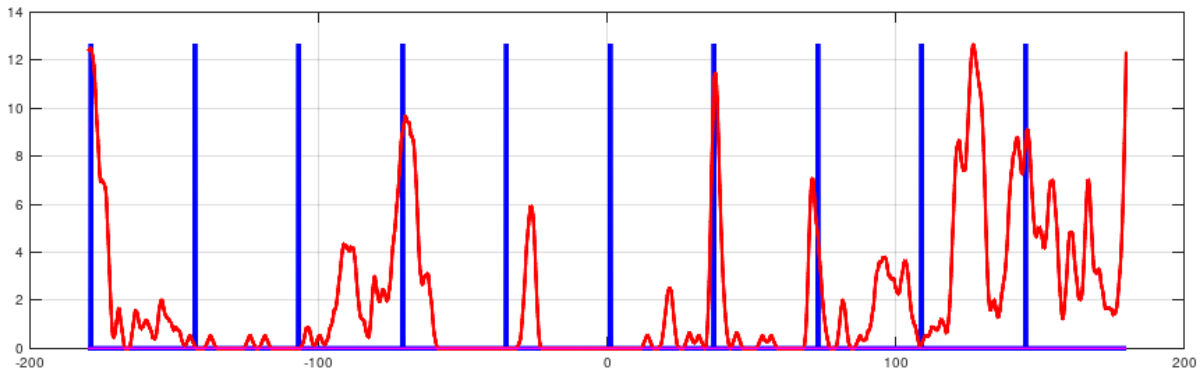

Fig.3

Five out of ten antinode displacement lines coincide with considerable maxima of released seismic energy. Strong earthquakes are concentrated along the boundaries of tectonic plates and along fault zones, while they are almost never observed along other longitudes (or antinode displacement lines), therefore 5 out of 10 direct coincidences seem like an interesting result. A standing wave of the 10th order corresponds to a period of

$$T = \frac{Z_D}{10} = 8616.4 \text{ sec}$$

with a wavelength equal to

$$\lambda = c \bullet T = 2.582 \text{ mln km}$$

Due to considerations outlined later, the most probable distances between planetsgenerators are

$$R_1 = \frac{\lambda}{2} = 1.291 \text{ mln km} = 8.63 \text{ AU}$$

and

$$R_2 = \frac{\lambda}{4} = 0.645 \text{ mln km} = 4.31 \text{ AU}$$

In terms of equation (1) these will correspond accordingly to

$$Q = \frac{1}{2} \qquad \text{and} \qquad Q = \frac{1}{4}$$

Analysing the position of the planets over the same time period, the following alignments occurred: Venus and Saturn, Venus and Jupiter, Saturn and the Sun, Mercury and Saturn. The distance between Venus and Jupiter on 6 February (earthquake in Turkey) was 4.22 AU and on 23 February (earthquake in Tajikistan) was 4.33 AU, i.e., was extremely close to R_2 (Fig.4).

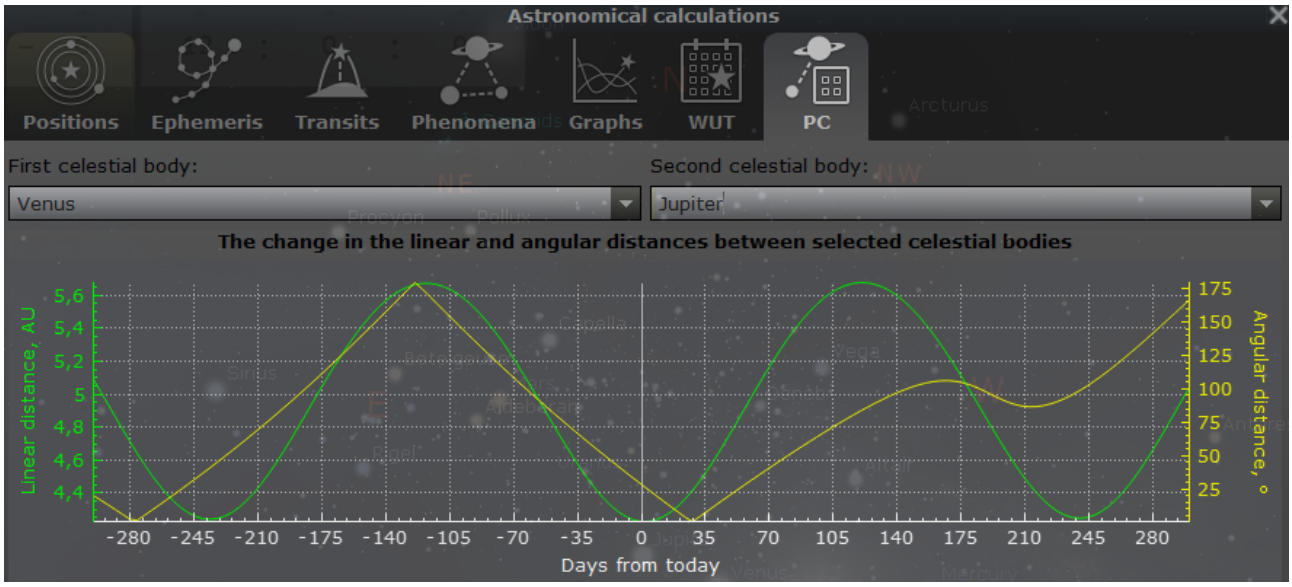

Fig.4
Linear and angular (as seen from Earth) distance between Jupiter and Venus on 6.02.2023
(day of the most powerful earthquake strike in Turkey)

As a careful hypothesis we may assume that the wave generated by the gravitational interaction of Venus and Jupiter propagated to Earth and produced a standing wave in the Earth's lithosphere, which led to a rise of seismic activity at the antinodes of the standing wave. If this is so, however, then there should be more examples of similar correlations. Undoubtedly there are multiple causes of earthquakes and the formation of standing waves is hypothetically only one of them.

To prove or disprove this hypothesis we calculated the position of all planets of the Solar System and the Sun for the last almost 25 years, starting from 01.01.2000 by using the ephemerides of the NASA JPL Horizons[4] project. We built a figure of all those moments in which the distance between planets corresponds to one of the periods of the standing wave and are also aligned as observed from Earth (conjunctions) (Fig.5).

Similarly, we processed the data from earthquakes for the same period and calculated for each date the correlation between the longitude distribution of earthquakes along the Earth's longitudes and the antinode displacement lines of the standing wave (Fig.6).

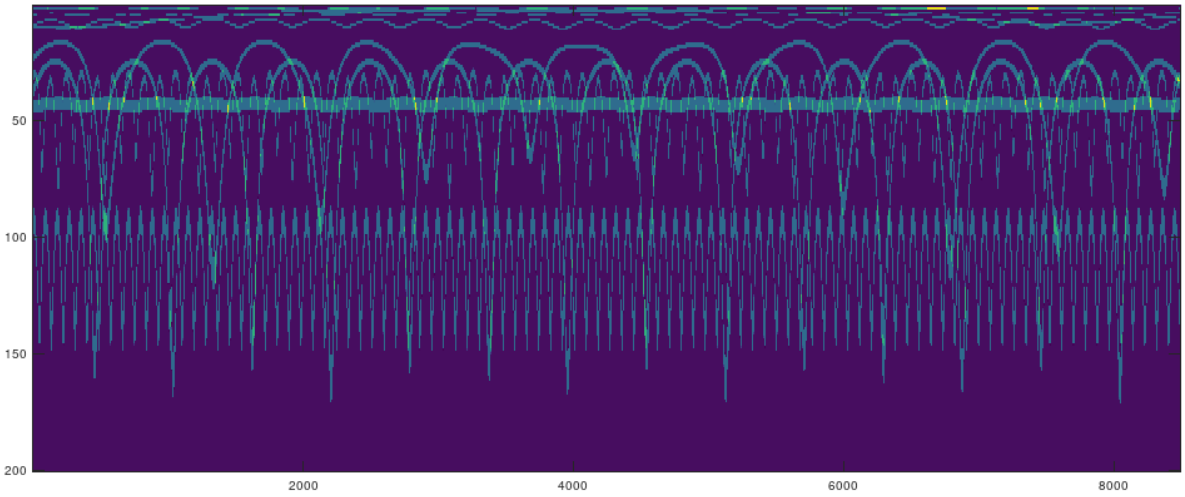

Fig.5

Conditions for the emergence of a standing wave

Horizontal axis: days from 01.01.2000 to 04.04.2023

Vertical axis: order of the standing wave (number of periods of the wave per Earth's rotation).

The brighter the point the more planets are involved in creating the standing wave of the given order at the given moment in time.

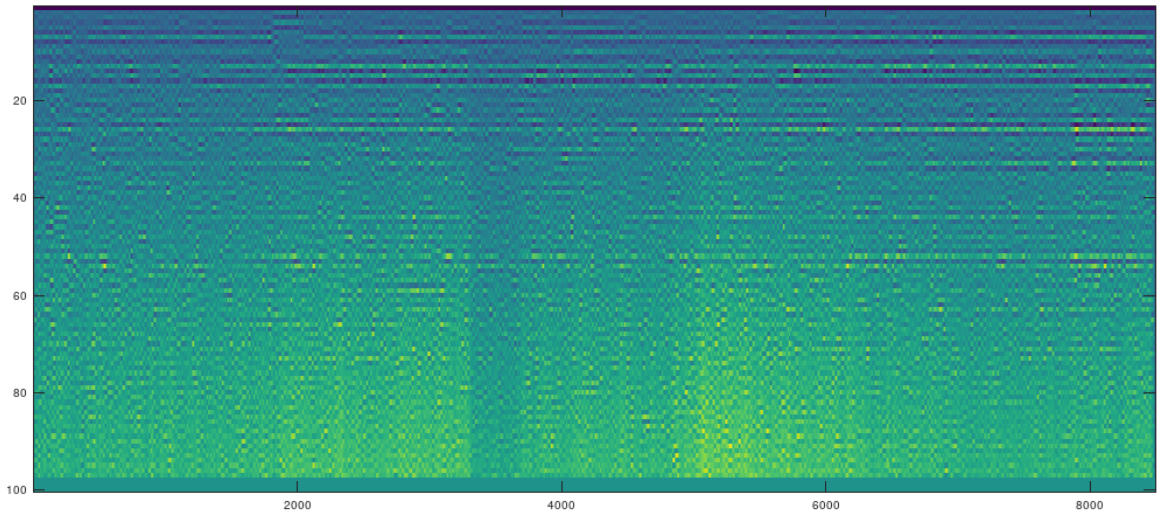

Fig.6

Horizontal axis: days starting from 01.01.2000

Vertical axis: order of the standing wave

The brighter the point on the graph the more antinode displacement lines of the standing wave coincide by longitude with bursts of seismic activity around the given date. We can see whole regions (horizontal segments) in which standing waves emerge.

If our hypothesis is correct, then the correlation of the map of planetary standing waves and map of earthquakes should exhibit a maximum near a zero shift.

From Fig.7 and Fig.8 it becomes evident that $Q = 1/4$ is responsible for the creation of the standing wave, while $Q = 1/2$ for its suppression. The explanation of this will be given in the next article. However, the correlations are quite significant, which allows us to carefully assume that the proposed hypothesis may be correct.

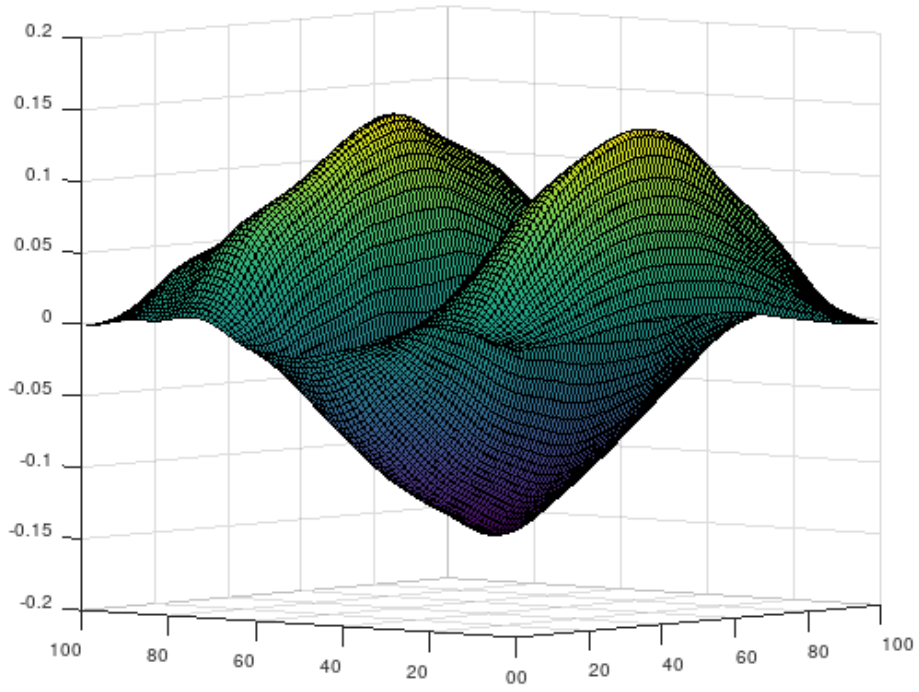

Fig.7
The correlation function for $Q = 1/2$

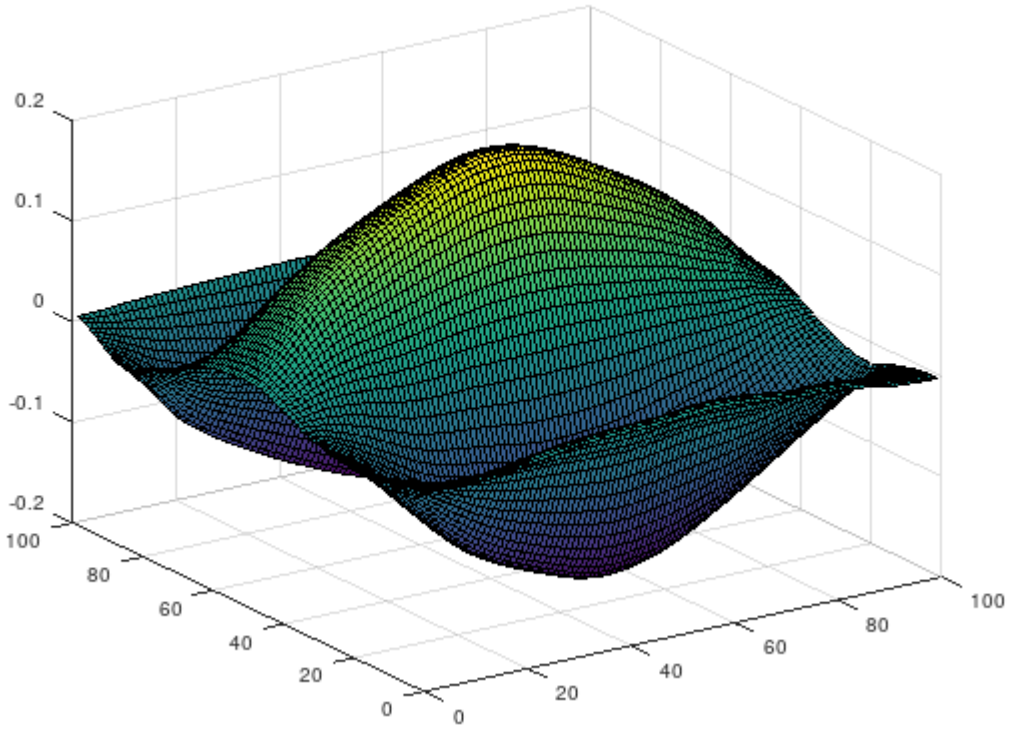

Fig.8
The correlation function for $Q = 1/4$

Based on the above we will take the risk and formulate our hypothesis, confirmed by several sets of computations, as follows:
The Sun and planets of the Solar System interact by gravitational forces. The variations of this force as a result of their orbital motion and external perturbations are transmitted, presumably, by gravitational waves which superpose. The waves with wavelength that are multiples of the distance between planets can either undergo constructive superposition resulting in resonant reinforcement or destructive superposition and subsequent suppression.

The waves propagate primarily along the lines that connect the planetary centres of mass. If there is a rotating object (for example a planet, and more specifically, Earth) in the direction of the wave propagation then a standing wave may be established in the region of that object. The axis of rotation of the object should not coincide with direction of propagation of radiation, while the period of the radiation wave and the rotational period of the object should satisfy the equation

$$T_{rot} \bullet Q = T_{gw} \tag{2}$$

where T_{rot} is the rotational period of the object, T_{gw} is the period of the radiation wave and Q is a rational fraction. If we assume that the radiation propagates with the speed of light, then we can obtain a condition for the distance between planets-generators

$$T_{rot} \bullet Q = \frac{R}{c} \tag{3}$$

where *R* is the distance between planets-generators and *c* is the speed of propagation of radiation (presumably equal to the speed of light in vacuum).

CONCLUSIONS

The reconstruction of the motion of objects of the Solar System for a period starting from 2020 by data from the NASA JPL Horizons project and the joint analysis with seismic activity data from USGS show that the proposed mechanism of formation of a standing gravitational wave, as a modulator of seismic activity, may turn out to be correct. Definitely it requires further rigorous analysis, however the form of the correlation function may provide evidence of the existence of a high probability of interconnection between these phenomena.

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