Earth seismic synchronous pendulum

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Abstract. In science, there are some cases, where we cannot intervene making any analysis in order to monitor certain cause-and-effect relationship. Then we have to apply the approach of accumulation of already ascertained coincidences or observed phenomena, which could be somehow related to the problem, subject to our study. For instance, if the statement is that the earth axis makes 24-hour periodic vibrations (Figure 1) and that these vibrations are the cause of earthquakes, then we shall have to search for coincidences, relationships between earthquakes and the vibrations of the earth axis. We cannot stop the vibrations of the earth axis and see if earthquakes shall stop. Other visible phenomena due to the shake of the earth axis could be as follows: spiral movement of submarine streams in oceans, spiral movement of tectonic plates, the so called "Corkscrew theory", friction between tectonic plates. Two new relations between the tidal force of the Moon and earthquakes have been found in the researches bellow. A conclusion about a new theory of earthquake mechanism is derived from these relations.

Key words Earth,pendulum,axis,earthquakes.

The theory

Earth can be considered as a giant mathematical pendulum with length, equal to the mean earth radius, R = 6372 795.5 m. The period of any mathematical pendulum is determined by the following formula:

Fig. 1

Earth seismic synchronous pendulum

$$T = 2.\pi \sqrt{\frac{R}{g}} \qquad (1)$$

Where π = 3.1415, is Pythagoras number, R is the mean earth radius, R = 6372 795.5 m, g is the earth acceleration;
$g = 9.81\ m/s^2$. Substituting by these magnitudes in formula (1), for the period, we see it is T = 5063 seconds, T = 1.4066 hours, T = 1 hour 24 minutes and 23 seconds. This value of the period is to be understood as a theoretical period of vibration of the earth axis. If earth axis vibrated, it would vibrate by this period. The sense of this theoretical period consists of the fact that it is calculated before the body has begun to really vibrate.

Methods and data

The basic method of operating with the data is to find the average value of the time interval between two earthquakes. The average value is interesting because it is constant. This value shall be compared to the data obtained from the theory described above. In the first case, the mean value of the interval of time between two earthquakes has been calculated, without any preset conditions. It turns out that it is equal to 12.01 hours, or 12 h 06 min, Table 3 and Diagram 3. This case shall be commented in the conclusions. In the second case the mean interval of time between two earthquakes has been found, but under the condition that the earthquakes have happened in an interval from 0 to 4 hours. It is shown in Tables 1 and 2. The respective diagram is attached to each of the tables. In the interval from 0 to 4 hours, there is coincidence between the data from the theory and measuring. This coincidence shall be commented in the conclusions part. The data regarding the earthquakes on Earth have been taken from a catalogue of earthquakes published in internet. In this case, the data were taken from USGS American Catalogue of Earthquakes at http://earthquake.gov/earthquakes. In this case, the data concerning the earthquakes were selected from 1 January 1973 through 20 November 2011. In Table 1 and Table 2 bellow, at the respective randomly selected geographic coordinates, the total number of earthquakes found are shown, and how many of them have happened in an interval from 0 to 4 hours. With respect to those ones which happened within this interval, the average value between two earthquakes was calculated. In this case it is not important if two earthquakes happened in the same geographic place, or not. The interval from 0 to 4 hours between two earthquakes is relevant. The average interval is for them, which shall be compared with theoretical period of vibration of the earth axis calculated above.

Results

Table 1 Dependence of the period on the geographic place

№ / AXIS X /	GEOGRAPHIC COORDINATES / axis X /		NUMBER OF EARTHQUAKES		MEAN INTERVAL IN SECONDS / AXIS Y /	MAGNITUDE
	WIDTH	LENGTH	TOTAL	FROM 0 TO 4 H.		
1	from - 50 to 0	from 0 to 360	65530	40115	5069	from M3 to M10
2	from - 50 to 30	from 0 to 360	29143	13520	5121	from M3 to M10
3	from – 30 to 0	from 0 to 360	41987	18712	5441	from M3 to M10
4	from 0 to 42	from 0 to 29	38452	20773	4573	from M3 to M10
5	from 0 to 42	from 30 to 59	11462	3188	4290	from M3 to M10
6	from 0 to 42	from 60 to 89	15340	4346	4767	from M3 to M10
7	from 0 to 42	from 90 to 119	16802	8059	3211	from M3 to M10
8	from 0 to 42	from 120 to 180	61688	35580	4435	from M3 to M10
9	from 10 to 30	from 0 to 360	36664	18118	4975	from M3 to M10
10	from 30 to 50	from 10 to 50	51633	29777	4619	from M3 to M10
11	from 20 to 50	from 10 to 50	52025	30086	4621	from M3 to M10
12	from 30 to 60	from 0 to 360	54651	29950	4332	from M3 to M10
13	from -50 to 50	from 0 to 360	17816	4498	5312	from M5 to M10
T	Theoretical period from Formula (1). For reference.				5063	

Diagram 1

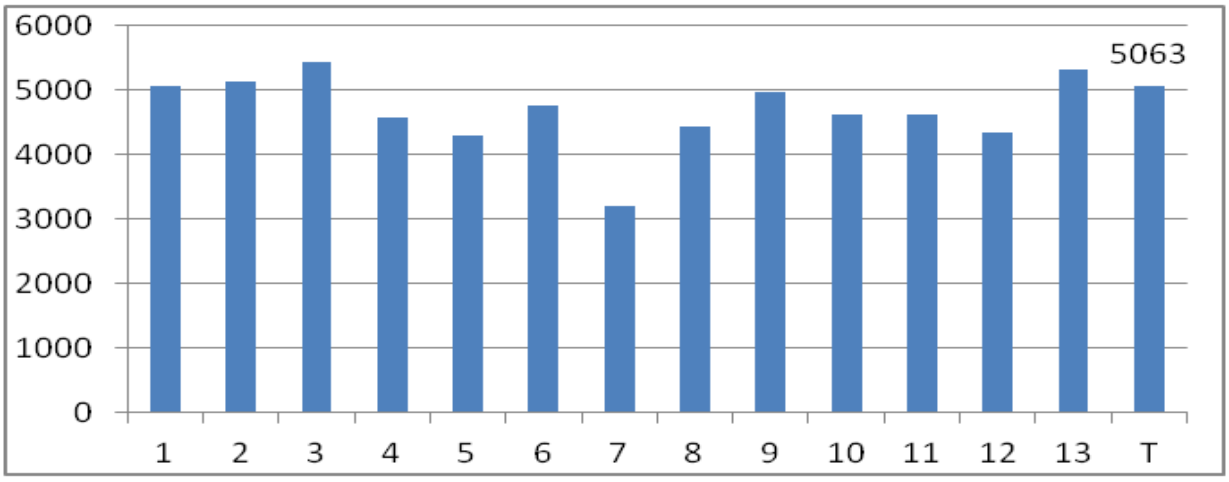


Table 2

Dependence of the period on the magnitude

№	GEOGRAPHIC COORDINATES		NUMBER OF EARTHQUAKES		MEAN INTERVAL IN SECONDS / axis Y /	MAGNITUDE / axis X /
	LENGTH	WIDTH	TOTAL	FROM 0 TO 4 H.		
1	from - 50 до 50	from 0 to 360	8110	1343	5468	M3
2	from - 50 до 50	from 0 to 360	6425	917	5951	M3.5
3	from - 50 до 50	from 0 to 360	7114	1018	6421	M4
4	from - 50 до 50	from 0 to 360	7543	910	6002	M4.5
5	from - 50 до 50	from 0 to 360	3572	259	5714	M5
6	from - 50 до 50	from 0 to 360	1153	35	6170	M5.5
7	from - 50 до 50	from 0 to 360	351	5	5060	M6
T	Theoretical period from Formula (1). For reference.				5063	

Diagram 2

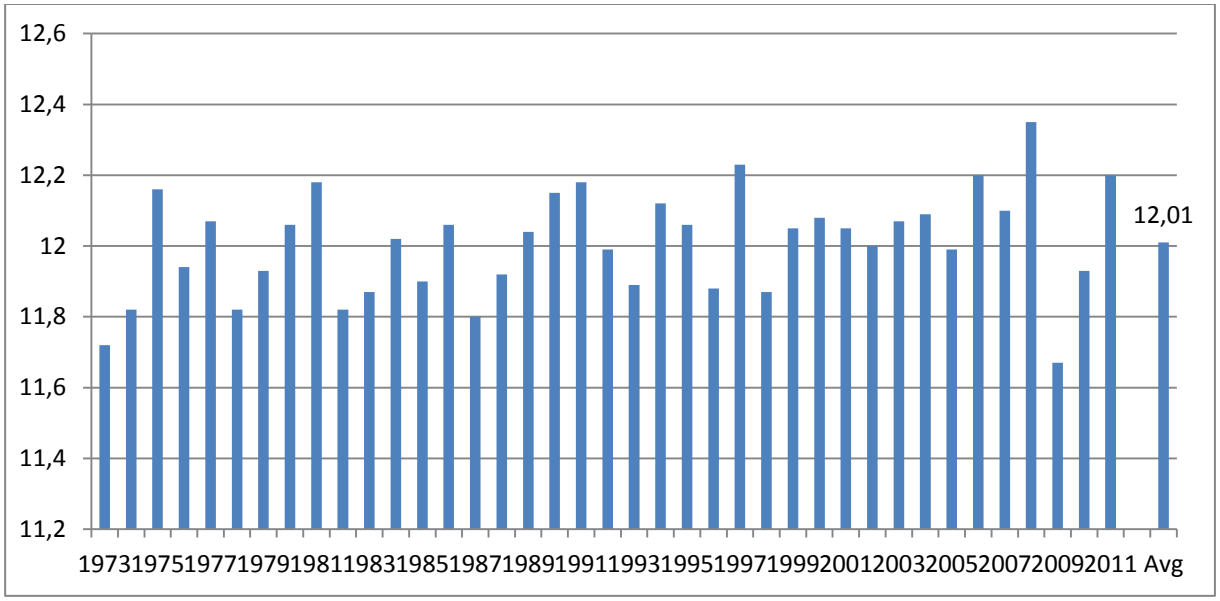
Table 3

Mean interval between two earthquakes under no conditions

Year	1973	1974	1975	1976	1977	1978	1979	1980	1981
Hours	11,72	11,82	12,16	11,94	12,07	11,82	11,93	12,06	12,18
Seconds	42178	42540	43764	42994	43463	42553	42959	43409	43834
Year	1982	1983	1984	1985	1986	1987	1988	1989	1990
Hours	11,82	11,87	12,02	11,90	12,06	11,80	11,92	12,04	12,15
Seconds	42539	42725	43287	42834	43425	42463	42919	43346	43746
Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Hours	12,18	11,99	11,89	12,12	12,06	11,88	12,23	11,87	12,05
Seconds	43862	43162	42791	43631	43427	42786	44022	42725	43371
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Hours	12,08	12,05	12,00	12,07	12,09	11,99	12,20	12,10	12,35
Seconds	43474	43383	43195	43453	43508	43161	43923	43575	44456
Year	2009	2010	2011	Average (Avg)					
Hours	11,67	11,93	12,20	12,01					
Seconds	42020	42931	43923	43225					

Diagram 3

Mean interval between two earthquakes: 12 h 06 min



Conclusions

In the part of Methods and Data it was mentioned about a calculation made, of the mean value between two earthquakes under no conditions, Table 3. The mean interval between two earthquakes was 12.01 hours, ± 6 minutes of error. This measurement coincides with the fact that at one and the same physical moment, both tidal forces exerted on Earth and caused by the gravitation of the Moon are at a distance of 12 hours from each other. These 12 hours express the relationship between earthquakes and Moon tidal forces exerted on Earth. We can read about Moon tidal forces in „Курс общей астрономии" ('General Astronomy Course'), 1983, by Bakulin, Kononovich and Moroz, page 99. On page 101 of the same textbook, it is stated that the elevation of the earth crust caused by the Moon tidal force can achieve several decimeters. The mean interval between between two earthquakes happened within the interval from 0 to 4 hours from all the 20 measurements in Tables 1 and 2 is exactly 5078 seconds, or 1 hour, 24 minutes and 38 seconds. In the theory above, the period of vibration of the earth axis was calculated. It is equal to 1 hour, 24 minutes and 23 seconds. The difference of 15 seconds is insignificant. Such a coincidence can happen only and exclusively if the earth axis makes 24-hour periodical vibrations with the theoretical period mentioned above, falling into synchronization with earthquake epicenters. The shake of the Earth has been rhythmically conveyed to earthquakes too. But it means that not only tectonic plates are the trigger of earthquakes. Provided that synchronization is absolute, then a stronger earthquake shall happen, as the points over the epicenter shall be longer under the impact of the Moon. The friction between the layers decreases and if a seismic stress is accumulated, earthquake occurs. Layers begin to move. This can be seen in line number 7 in Table 2. In this case the theoretical period and the interval between two earthquakes almost coincide, i.e. the synchronization is absolute. This is revealed on Diagram 2. As an example we can refer to the earthquake of the town of Pernik on May 22nd, 2012. The main shock occurred at 03:00 a.m., and 1 hour and 30 minutes later, the second shock came, i.e. at 04:30 a.m., and its magnitude was 4.5. The difference in synchronization was 6 minutes only. Where is the effect of the Moon in this case? That very day, the Moon was at its superior culmination with respect to the latitude of Sofia. At that very moment, the tidal force of the Moon would make only one movement on earth crust, which should be synchronized with the shake of earth axis. Reference: 'Astronomical Calendar', 2012, published by the Bulgarian Academy of Sciences. Therefore, for full synchronization, the Moon has to be at its superior culmination and then we shall observe two intensive shocks at an interval of 1 hour, 24 minutes and 23 seconds averagely.
A new picture of earthquake mechanism theory appears:
Tectonic plates only prepare earthquakes, accumulating seismic stress, but the earthquake does not happen yet.
The Moon elevates the layers on both sides the Earth by the tidal forces between the tectonic plates and, at the right moment, falls into synchronization with the shake of the earth axis.
Swaying, the earth axis retains for a longer time the points submitted to Moon gravitation and then all the earthquakes happen.
The more intensive earthquakes occur in the presence of full synchronization and superior culmination of the Moon with respect to the corresponding geographical coordinates.
Any other earthquakes occur in the presence of partial synchronization. Reference: Diagram 2**.**

References

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- Bakulin, Kononovich, Moroz „Курс общей астрономии" ('General Astronomy Course'), 1983,
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