

# **Lunar Periodicity of the Neutron Radiation Burst and Seismic Activity on the Earth**

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## **Abstract**

In 1990-1991 years in seismically active region of Pamir the phenomenon of the increase of the intensity of neutron emission at the altitude of 4200m above sea level during new and full moon was discovered. The qualitatively new data showing that the neutron bursts are a result of the tidal forces acting in the Earth crust were obtained in 1997. It is known, on the other hand, that the tidal forces acting can be the trigger mechanism of display of seismic activity. The analysis of homogeneous global data on earthquakes for 1964-1992 has permitted to reveal fortnight lunar periodicity connected with phase of new and full moon for these data. Further study of neutron bursts and their correlation with seismic activity can result in the discovery of a new type of the precursors of seismic activity increase –neutron bursts caused by Sun-Moon-Earth gravitational connections.

## **Introduction**

The phenomenon of the correlation of the radiation splashes from the earth's crust of little energetic neutrons with periods of passing of maximum tidal waves in the earth's crust ( at new moon and full moon), which had been discovered by us by means of experiment, was explained at Volodichev, et al., 1996, 1997. The soul of the phenomenon is when the corner between the lines joining the Earth with the Sun and the Earth with the Moon is minimum, total gravitation influence on the Earth from these cosmic bodies is extremal, and deformations in the earth's crust became maximum. It leads to increasing of neutron concentration in the surface stratum of the earth's crust and the atmosphere because of two process: mechanoemission i. s. Liberation of different atomic and nuclear particles during cracking rocks of the earth's crust because of deformation, and strengthening stream of radioactive gases ( isotope of Radon), that leads to increasing stream of energetic alfa-particles entering the nuclear interaction with the elements of the earth's crust and the atmosphere with neutron flying.

## **The Role of the Tidal Waves**

The active role of the tidal waves, influencing the earth's crust, in formation of neutron splashes may be demonstrated by means of measuring carried out in 1997 at Pamir at region Dgerino at a height of 1100m above sea level 30 km to the North of Doushanbe. From the 16 till the 24 of July approximate curve passes through maximum value of the neutron counting rate every day. This value becomes the greatest one on the 20 of July at 05.37+- 03min UT. On that day at 03.20UT the Moon passed the phase of fool moon. Increasing of the neutron counting rate at maximum from the 16 till the 20 of July and subsequent slump till the 24 of July may be conditioned by concordant action of tidal forces of the Moon and the Sun, the sum of which reaches the greatest value on the day of fool moon and decreases on the following days, that perhaps demonstrates the sensitivity of the neutron radiation to relatively not big changes of the value of tidal forces. On the night (by local time) of the 21 – the 22 of July measuring of neutron were also conducted (Fig). From 17.22 till 19.09UT the 21 of July approximately 12 hours later after day splash on the 21 of July, manyimpulse splash of neutron radiation was registrated, which exceeded background value 100 times in its maximum. Maximum value of neutron splash at the day time on the 22 of July was also reached in

approximately 12 hours after the night splash. So one can see 12-hour periodicity of splashes of the 21 and the 22 of July, which conforms to the period of tidal waves.

### **Radioactive Gases are Possible Cause of Neutron Splashes**

In our works we supposed that one of cause of formation of neutron splashes on the days of new moon and full moon is growing of going out of radioactive gases. Measuring of stream of alfa – particles at different regions of Pamir in July – August 1997, showed the the presensof streamsof alfa – particles and their essential ( dozens times ) exceeding in comparison with the middle value in the earth's crust. The presens of significant streams of alfa-particles that are intermediate product on the way from radioactive gas to neutrons, testifies to increasing of going out of radioactive gases as possible cause of neutron splashes.

### **Lunar Periodicity of Seismic Activity on the Earth**

So long as significant neutron splashes are noticed at new moon and full moon, i. s. during increasing tidal deformation of the earth's crust, wondered to get positive data about twoweeks variation of seismic activity, which connected with moon phases. The catalogue of earthquakes with magnitude  $m \geq 4$  during 1964 – 1992 was analysed for definition of the correlation of seismic activity with time of phases of new moon and full moon ( Volodichev, et al.,1999 ). According to the results of analyses now we have a systematic search of series of earthquakes, and we call the serie multitude of earthquakes with epicentres on the area at some square degrees, following each other with frequency more or equal "n", where "n" is some quantity of earthquakes a day. The Global survey of seismic active fields of Earth showd, in 1964 – 1992 it was possible to observe 37 series with  $n \geq 30$  and magnitude  $m \geq 4$ . All series are concentrated in Pacific seismic ring. And 16 series are situated to the North  $40^\circ\text{N}$  or to the South  $10^\circ\text{S}$  and all of them were begun on the days of new moon or full moon or on the days that are away from them no more than 3 days. Other 21 series are situated between latitudes indicated above and their beginnings are distributed evenly during the days of synodic months.

### **Conclusion**

The results of analysis of earthquakes catalogue demonstrated that moon twoweekly modulation appeared exactly in the large series of earthquakes at the region of Pacific seismic ring on the latitudes to the North  $40^\circ\text{N}$  and to the South  $10^\circ\text{S}$ . Our analysis increases significantly the geography of the fields, where twoweekly moon periodicity is observed, and confirms that the phase of Moon can influence the time of the beginning of earthquakes then, when typical time of accumulation of energy before earthquakes is much more a month ( Allen, 1936 ). Deformation of the earth's crust, because of maximum tidal forces during the new moon and the full moon, can apparently be used as a trigger for liberation of earthquakes energy accumulated for a long time. Exactly on these days of synodic months splashes of neutron radiation are observed at seismic active regions, these splashes are bigger than background neutron streams in dozens times. It leads to supposition that neutron splashes can be used as precursors of seismic activity.

### **References**

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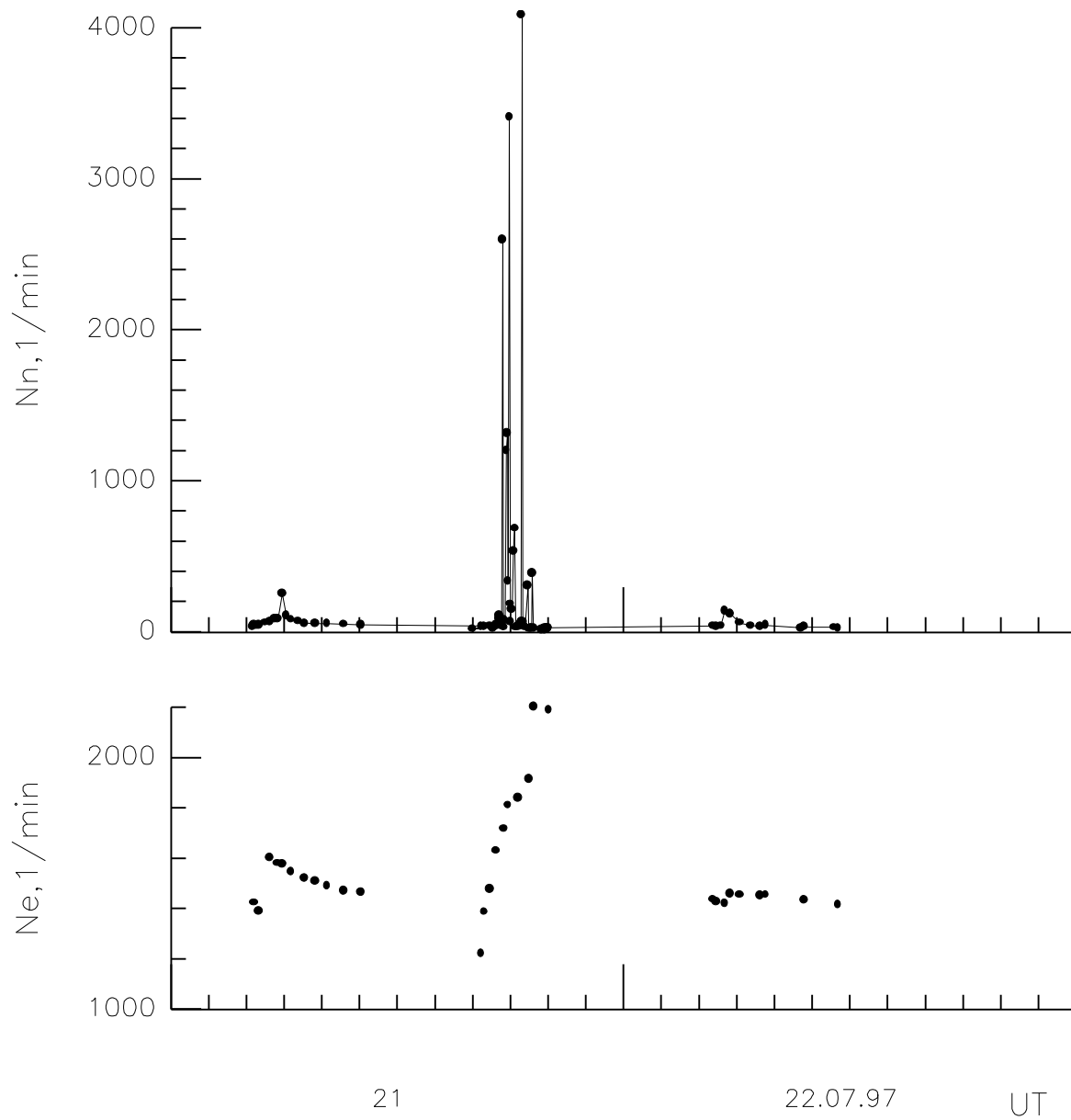


Fig. Counting rate of neutrons and electrons at Pamir, wich include the data of night measuring on Yuly 21, 1997