

PHYSICS AND PHYSICIANS POSSIBLE COLLABORATION FOR CORRELATIONS DISCOVERY BETWEEN COSMIC WEATHER AND PATIENTS CONDITION

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Since old times a human being began to realize that his life was a part of nature. Variable phenomenon of nature impacts on his wellbeing and finally on his health. As far science researches go on this field, it becomes obvious that human health strongly confide in many external factors. There are many all-available external factors, which badly influence on the sick body. Among them science points out Sun's influence on wellbeing of humanity. As we know Sun is the nearest star and source of life for all creations on the planet.

Different processes go on the Sun accompanied more than significant changes of Earth magnetic fields and of course on the Earth as well. Powerful explosions take place on the Sun periodically (fig. 1). In results of huge amount of elementary particles with great and variable energy range throws out into the space (<http://creme96.nrl.navy.mil/20Jan05/>)[1]. These particles are basically charged. That's why such particle showers becoming magnetic fields carriers thus causing magnetic fields changes we were speaking about. The energy of these kind particles from Sun reaches up to 100 GeV.

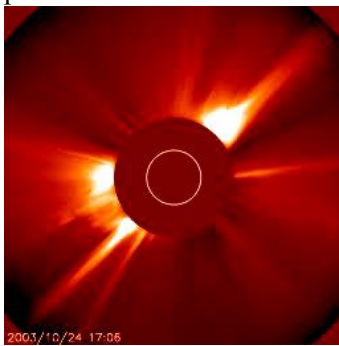


Fig. 1

Energy explosion
from the Sun

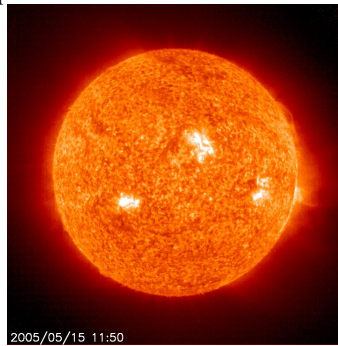


fig. 2

Black spots on the Sun



fig. 3

Aurora

Sun radiation intensity in eye visible range doesn't change in practice within billions of years. It makes available supporting life and its developments on the Earth.

We have to admit that the radiation intensity is not constant by the time in other energetic spectra ranges. It is known different intensity cycles and behavior of the Sun by the time. 11-year cycles intensity, dislocation of magnetic poles reverses in each 22 years, Sun's turning period around its axis in 27 Earth day etc.

First scientific researches were done by Galley, using selfmade devices, even he once damaged his eye getting Sun. Since Galley's time it is known 11-year Sun intensity cycles, unlike now-days. Now we have the 24-th cycles. Many year researches show that powerful explosions usually take place on the Sun often at the abatement 11-year cycles (Dorman -1975, Chilingaryan et al- 2003[2,3,4]. However big explosions are not exceptions in other time too.

Black spots appear on Sun limb before explosion. The black spots merge and explosion happens (fig. 2 bright spots on the Sun limb). Temperature on these spots is much more higher than in neighbour regions. When Sun limb is clear and there aren't any spots, we say the Sun is quiet. When many black spots appear on Sun limb and these spots join by moving, it means powerful explosions are expecting [2]. With explosions a great amount of energy and elementary particles are thrown to different directions (in speed up to 40000 km/s) and powerful magnetic field forms. As distance between the Earth and the Sun is about $150 \cdot 10^6$ km, so X-rays, γ -quanta and the most energetic particles, which speed compares with light speed, cross the Sun- Earth distance within 8 minutes after explosions. X-rays and γ -quanta are mainly absorbed by the Earth atmosphere and only a little part reaches to the ground. The Earth magnetic field also shifts charged particle flow coming to it. However depending on geographical width on the

Earth it goes on differently. For example, many low energetic particles even fall in the polar-regions and particles with high energy are only on equator. Aurora is result of amount charged particles falling near the Earth polar-regions (fig. 3).

In recent decades a lot of scientific centre are studying so called “cosmic weather”. A valuable contribution to these studies also give special scientific pilot-free satellites SOHO, GOES etc, which regularly observe the Sun. One of GOES results are given in fig. 4 for different energy protons during explosion on 28 October in 2003. The protons rows with sharp rising speed after explosion is clearly seen. Now-days satellites availability isn't powerful because of big financial expenses. Scientific installation on satellites do register X-rays, γ -quanta and low energy particles (p, e, π etc.).

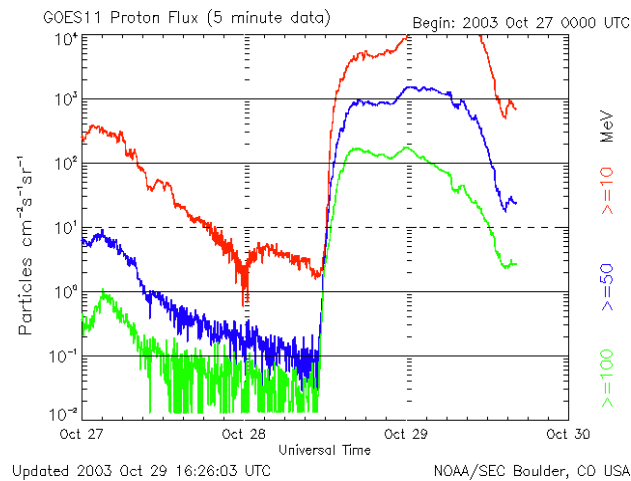


fig. 4

Different energy protons 5-minutes data by GOES 11 at the end of October 2003.

On the Earth high energy particles are only registered by big stationary installations. Different types of installation nets surround the Earth for observing the Sun regularly. Such nets include world-wide neutron monitors, scintillator telescopes etc. Among such kind of research centre are YerPhi scientific cosmic ray stations on mountain Aragats on 2000m and 32000m (fig. 5). Now about 10 independent scientific installations work in these stations and in Yerevan (Chilingaryan et al 2003)[3,4]. It's the only place all over the world, where so many installations are registering cosmic ray (CR). Different components are placed in one geographical point. It is a big prevelage in the Sun and cosmic ray researching, as different installations can control one another surely rising the reality of getting precise results. ON LINE regime information are always shown in CRD YerPhi internet site <http://crdlx5.yerphi.am>.

In fig. 5 Sun explosion view, coronal mass ejection, particles accelerating mechanism on shock waves and Earth magnetic field information are shown. Sun explosions cause big changes in Earth magnetic field. It is clearly shown in the picture.

We mentioned above, different energy particles shower fluxes after solar explosions attack Earth ionosphere. Quantity of high-energy particles in these showers is comparatively a few and they are harmless. But their speed is comparatively high and they reach the Earth the first. Middle and low energy particles shower coming after them are very harmful, as their quantity is too many. Also huge magnetic fields go with them. They damage satellite electronics, astronauts, navigation apparatus, high voltage electricity lines etc. These shower particles can make parasites current in high voltage long electricity lines making out of order the transformers. For information in 1989 Qvebek in Canada exploded fired electricity transformer. In recent decades, several cases of lost satellites because of mentioned explosions.

Earth magnetic field changes are qualified by indexes K_p and powerful explosions are allowed to $K_p > 7$.

Forbush effects take place due to Earth magnetic field and magnetic field interaction by

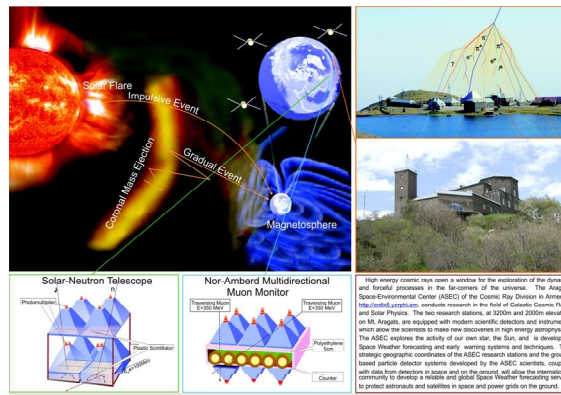


Fig. 5

In left upper corner – the Sun and the Earth schematic view, coronal mass ejection, Earth’s magnetic field deformation.

Right part – scientific station’s view on Aragats mountain.

Down part – 2 type of installation schematic view.

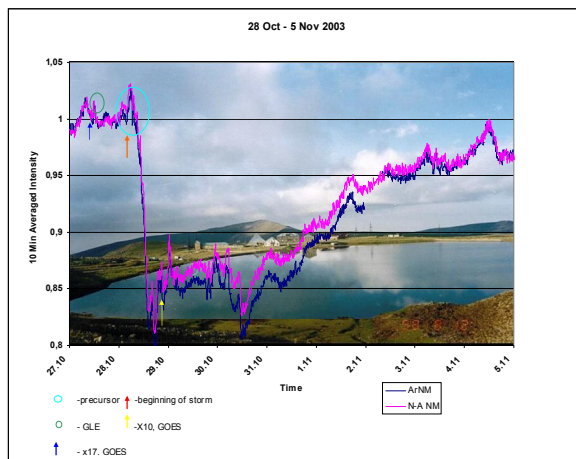


fig. 6

Cosmic ray intensity Forbush- decreasing in YerPhI installations result from 28.10.03 to 5.11.03.

particles derived from Sun explosion. Flux intensity within a few minutes or hours sharply decreases. Afterwards restoring process goes slowly forming magnetic field and intensity particles flux. If another explosion happens in Forbush decreasing time, it brings more intensive flux fall down. Good example explosions in 28.10.03 to 05.11.03. The results are registered by our installations viewed in fig. 6. Nearly 20% flux intensity decreasing is shown restoring process lasts few days. 20.01.05 explosion results are brought in fig. 7, according to our different installations. Intensity changes and also 4σ significance increasing given by different installations are shown. It is clear what kind of changes particles intensity flux had solar explosions.

All mentioned above and visual illustrations show solar explosions studying actuality.

Chronomedicine and Chronobiology are known in Medicine and Biology for ages. Many scientists study these sciences. Such as France Halberg and his daughters [5]. Prof. N. L. Aslanyan and his colleges worked in this direction in Armenia. Solar activity influence on Earth biosphere at the beginning of 20-th century studied A.L. Chizhevsky, who is the creator in Heliobiology science[6]. Since then scientists do researches in terms of how magnetic storms effect on human being health. In resent years on COSPAR community conferences there are many articles about these problems [7]. Significantly suffer people who have got cardiologic diseases (<http://www.ural.orskinfo.ru/health.htm>) [6,7]. More probably such explosions effect on eye and other allergic diseases. It is known that patients feel bad just after solar explosions and in a day of beginning Earth magnetic storms [6]. The explanation is that X-rays, γ -quanta

and electrons reach to Earth atmosphere in about 8 minutes from beginning solar explosions then cause processes impacting on human's functions. Day after we got magnetic storm which is result of elementary particles carrying huge energy.

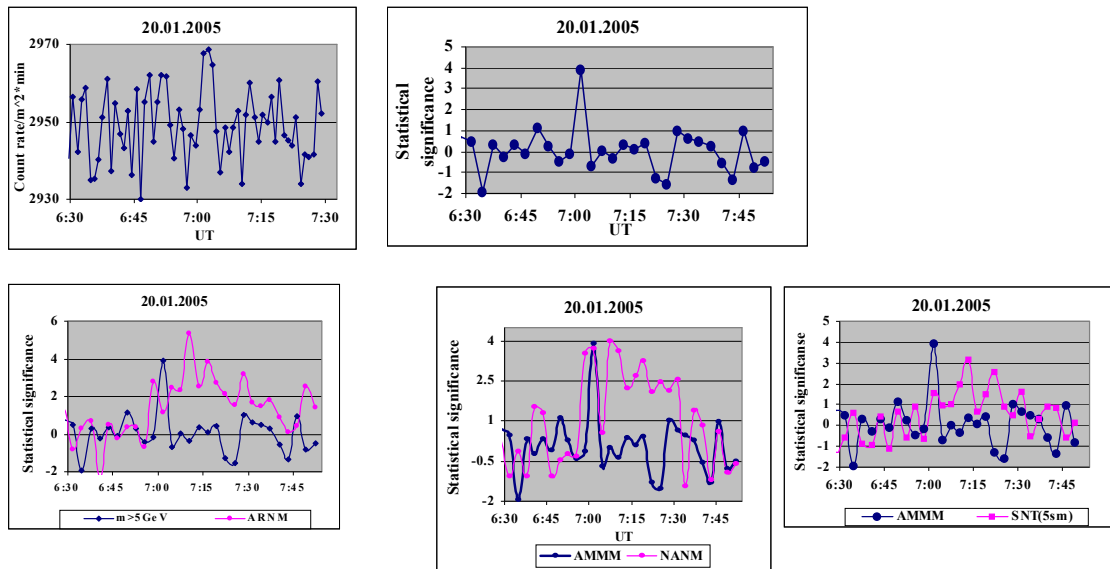


fig. 7

Current explosions in 20.01.05 results by YerPhI different installations.

Sick and healthy bodies react cosmic and geomagnetic phenomenon changes differently. With sick people (weak, tired) immunitet falls, psychic tension appears, biorithm slows down. With healthy people – immunal system is getting more active, feeling beter.

I'd like to admit that on these sites you can find data bases regarding solar explosions stored in 1976. (http://swoops.lanl.gov/cme_list.html & <http://umbra.nascom.nasa.gov/SEP/>)[8,9].

Summaraysing the issue, I do the following conclusions:

1. YerPhI scientific installations on Aragats mountain give much useful information about solar explosions.
2. Having archive data bases for several years, we can study correlations of these data bases and archive data bases according to patient cards with different health problems.
3. In future we can give solar explosions information to medical institutions, in order to be able to give patients recommendations in the shortest intervals.

REFERENCES

1. 2006SHINE Workshop, Zermatt, Utah, USA <http://creme96.nrl.navy.mil/20Jan05/>
2. Дорман Л.И., Вариации галактических космических лучей, Изд. МГУ, 1975.
3. Chilingarian A, Avakyan K. et al, Aragats Space-Enviromental Center: Status and SEP Forecasting Possibilites, Journal of Physics G: Nucl.Part. Phys., vol.29(2003), pp 939-952.
4. Chilingarian A.A, Babayan V. Kh. et al, Monitoring and forecasting of the geomagnetic and radiaton storms during the 23rd solar cycle: Aragats regional space weather center, Advances in Space Research, vol.31(2003), pp 861-865.
5. Асланян Н.Л., Мадоян С.Х. Достижения хронобиологии и хрономедицины, Ереван- 2002.
6. <http://www.ural.orskinfo.ru/health.htm>
7. IV UN/ESA/NASA/JAXA/BAS Workshop on First results from the International Heliophysical year 2007, in Caputher HELIOBIOLOGY, Sozopol, Bulgaria, June 2-6, 2008.
8. http://swoops.lanl.gov/cme_list.html
9. <http://umbra.nascom.nasa.gov/SEP/>