THE GEOECOLOGICAL CHALLENGES OF THE MODERN SPACE ROCKET ACTIVITY

Vertinsky P.A.

Usolje–Sibirskoe, Russia

Challenge Origin

As is generally known, at present the mass media are not passing by the catastrophic cataclysms, having become more frequent in the last decades, and having highlighted the blind forces of nature consequences. The ideolized mass media, having confronted sides during the «cold» war period, have not lost the smallest any natural calamity on the «enemy's» territory, but even all the countries' total reports up to the «space» age beginning have not contained such information, which is full of its content on the natural cataclysms, and which has also been the constant one just lately. So, for the first time, during the whole astronautics history, the cause – and – effect relation of the Space Vehicles launches with the natural cataclysms has been mentioned in the publications after S. Rybnikov [1]. Unfortunately, neither S. Rybnikov, nor anybody else to this global challenge has not returned anywhere, but only the fact of the cause – and – effect relation of the earthquakes and in 120 – 240 hours the minimum two additional cyclones in the Earth atmosphere appearance just after the Spacecraft launchings has been noted, but the earthquakes launching and the additional cyclones advent mechanism has not been explained in the above – mentioned S. Rybnikov's papers.

1. The Magnetodynamic Approach

After the substitution of the classical electrodynamics of the non – adequate position in the fundamental system of the solutions, that $div\,\bar{B} = 0$, (1) which is meant the sources absent of the magnetic field, for the principle, which is corresponding to the reality, that $div\,\bar{T} = \mu_o\,\mu i$ (2) it has been found to be possible not only to remove «the electromagnetic paradox», but and to solve many theoretical challenges of the electrodynamics and the practical tasks of the electrical engineering [2]. Thus, it is quite possible to hope for the analogous efficiency and at the consideration of some from the numerous aspects of the fundamental challenge of the stationary geomagnetism, among which its origin is quite presented, as the primary one, having taken into consideration the magneto-dynamic view efficiency of the fundamental challenges of the physics and at the solution of the other theoretical [3] and the engineering [4] challenges.

2. The Magnetodynamic Model of the Geomagnetism Nature

To the present time, the geophysics has already been stored the great information on the Earth magnetism, the large part of which has already been obtained during the latest investigations period of the cosmic space by means of the direct instrumental investigations with the help of the space vehicles, but to create the universally recognized theory on the Earth magnetism origin it has not been succeeded still [5].

The factors comparison, having accompanied to the Earth magnetism and to the planets magnetism of the Solar System, is being revealed, as the indispensable ones the simultaneous atmosphere presence and the planet's noticeable diurnal rotation around its axis. So, for example, the Venus, having possessed by the powerful atmosphere, but it has not at all the noticeable magnetic field at the rotational velocity around its axis only a single revolution for its one solar year. At the same time, the Mercury, having had the rather rarefied helium atmosphere, but, having rotated around its axis, with the velocity only three revolutions for its two solar years, has permitted the «Mariner-10» Spaceship (in 1974) to discover its magnetism. Thus, all the collected information on the Earth magnetism and the planets of the Solar System is

permitted just from the magnetodynamic positions [6] to suppose the two geomagnetism formation mechanisms: the annular electrical currents, owing to the diurnal rotation of the

electric charges of the atmosphere and the charges just in the Earth interior [7], which it is necessary to be considered in more details.
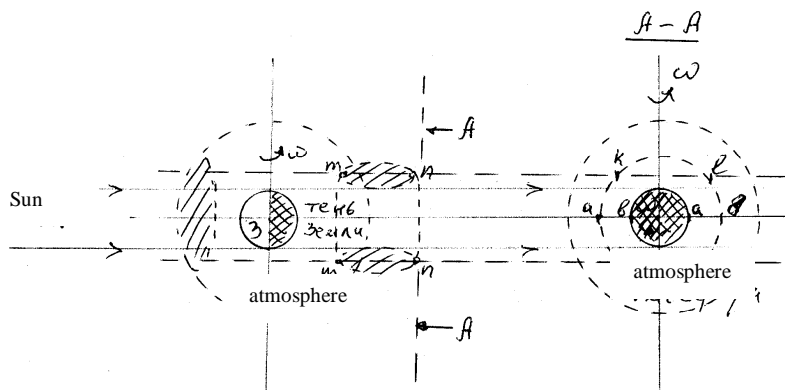

Figure 1   **Figure 2**

2-1. The Earth Magnetosphere

We shall present the described diagram Fig.1 and Fig.2, having permitted to see the electricity distribution in the electrified zones of the Earth ionosphere, in more details, here, not having reproduced the diagrams from the author's paper [8]. The side view on the Earth atmosphere with the electrified zone from the night–side around the Earth shadow has been shown in Fig.1, and the A – A side of the Fig.2 has been shown in Fig.2, that is the view at the Earth atmosphere just from the night–side. In these Fig.1 and Fig.2, they have been designated: E – the Earth, ω – the Earth rotation direction around its axis, m and n – the lower and upper limits of the electrified zone from the night–side, a and b –the internal and external limits of the electrified zone from the night–side, k and l – the external limits of the electrified zone from the night–side by the m–n cross–section. From these pictures in the Fig.1 and Fig.2 it is quite clear, that the electrified zone from the night–side of the Earth atmosphere is presented itself the ring around the Earth shadow cylinder, the sizes of which are quite able to be designated by the following quantities: the ring's width: h = m – n, the radial thickness of the ring's wall: s = a – b, the ring's wall thickness by the m – n cross–

section: y = k – l. As every cross–section displacement of this annular electrified zone relatively to the Earth rotation axis is defined by the linear velocity by: $V_i = \omega R_i$ (3), where R_i – the radius of the rotation of the given electrified zone cross–section, then it is quite possible to calculate the latitudinal current quantity of the given electrified zone cross–section: As for $I_i = \dfrac{dQ_i}{dt}$ (4), then for i annular electrified zone cross–section it is necessary to calculate the quantity of electricity $dQ_i = \rho \Delta z \Delta S_i$ (5), having rotated on the given latitude around the Earth rotation axis, where ρ - the electricity volume density in the electrified zone by the Δz thickness and the ΔS_i area i_cross–section, which is able to be expressed through the sizes above – accepted by us of the annular electrified zone from the Earth night – side atmosphere: $\Delta S_{ir} = \Delta S_{a\text{в}} = sh$ - for the radial cross–sections and $\Delta S_{ip} = \Delta S_{kl} = yh$ - for the peripheral annular zone cross–sections by m - n. Thus, the latitudinal ionospheric current quantity is able to be expressed just for every radial annular zone cross – section by a – b:

$$I_{ir} = \frac{d(\rho\Delta z\Delta S_{ir})}{dt} = \frac{d(\rho\Delta z sh)}{dt}$$ (6). And

the latitudinal ionospheric current quantity just for every peripheral annular zone cross – section is analogically expressed by:

$$I_{ip} = \frac{d(\rho\Delta z\Delta S_{ip})}{dt} = \frac{d(\rho\Delta z yh)}{dt}$$ (7). As it

is quite evidently from the Fig.1 and the Fig.2, that $2s$ – the two radial cross – sections (e.g. from the night – side and the morning – side of the Earth) of the ionosphere together, which are less every from y - the peripheral ionosphere cross – sections almost for the whole Earth diameter, then with due regard of the real sizes of the Earth magnetosphere, the quantity of electricity quantity by (5): $dQ_{iy} = \rho\Delta z\Delta S_{iy}$ of every sign of the peripheral zones $\Delta S_{ip} = \Delta S_{kl} = yh$ is exceeded the quantity of electricity quantity $dQ_{ir} = \rho\Delta z\Delta S_{ir}$ of the radial zones $\Delta S_{ir} = \Delta S_{ae} = sh$ by many times. Thus, it is quite clear just from our diagrams in the Fig.1 and the Fig.2, that the radial annular electrified zone cross – section s = a – b is always much less, than this zone peripheral cross – section y = k – l, therefore, the expressions (6) and (7) comparison will result in the unique and definite conclusion on the *«two – humped»[5] graphic dependence of the H (x, y) quantity – the magnetic intensity from the geomagnetic coordinates in the subtropical belts to understand of which it is quite impossible on the basis of the up-to-date geophysical presentations.*

Moreover, it is quite possible also to be concluded just from the reduced valuation of the ionospheric zones electricity quantity of the different latitudes, that the two – evening and morning – ionospheric electrical currents are being flowed by every latitude, that is, they have been divided by time, therefore, their general magnetic field is less than their algebraic sum, that, in its turn, it is additionally explained not only our conclusion on the «two – humped» graphic

dependence of the H (x, y) quantity – the magnetic intensity from the geomagnetic coordinates in the subtropical belts, but it is also explained the diurnal variations reasons of the magnetic field quantity just in the indicated latitudes belt [5].

2-2. The Earth Internal Geospheres

The seismological investigations have been permitted to make up the seismic anomalies maps for the different deep ones on our planet's levels by the longitudinal and the transverse seismic waves' methods in the last decades of the XX – th century. The fundamental works of the American seismologists at the head of Adam Dziewonski have been shown the seismic situation changes, having connected with the geosphere's deepness [9]. The differences in the geospheres' seismic behavior, having presented in the Fig.3, are being characterized the velocities differences of the seismic waves in the corresponding zones, in their turn, they are being reflected and these zones differences just in their physical properties, mineral composition, stresses distortion and so on. For the significances connection illustration of the seismic velocities in the mantle zones with the physical properties of the corresponding species, here, it is quite possible to mention a great number of the reliable facts just from the indicated fundamental work [9] and the others.

Now, having taken into consideration in connection with the above – mentioned and the other regularities of the structures normalization of the Earth mantel matter under the pressures influence on the different deep levels, it is quite possible to be concluded, that the positive (e.g. compression) and the negative (e.g. extension) electricity zones have been localized just in our planet interior on the different geospheres, in accordance with the seismic tomography conclusions. Thus, as the conclusion from all the above – listed circumstances just in the deep geospheres, here, it is quite reasonably possible to be concluded, that and all the electrified zones in its interior are constantly making the circular movements together with the

diurnal rotation of our planet, that is all the geospheres, independently from their radii, character and their anomalies intensities, are making the annular electrical currents systems of the different quantities and directions, which are usually defined by the specific values of the electricity quantity and the rotation trajectory radius of every electrified zone, every geosphere of all the Earth deep levels, having created the corresponding by

$$(2) \quad div\,\bar{T} = \mu_o\mu i \quad \text{the magnetic tension}$$

fields. Now, having combined this our conclusion with the one, which is above – mentioned by the 2.1 point on the latitudinal ionospheric electric currents, it is quite possible to be formulated our answer the question on the geomagnetism nature: the Earth magnetic field has been made, and it is being maintained just in the stationary state, owing to the both global annular electrical currents systems: the latitudinal one in the ionosphere and the geospheric one just in the planet interior.
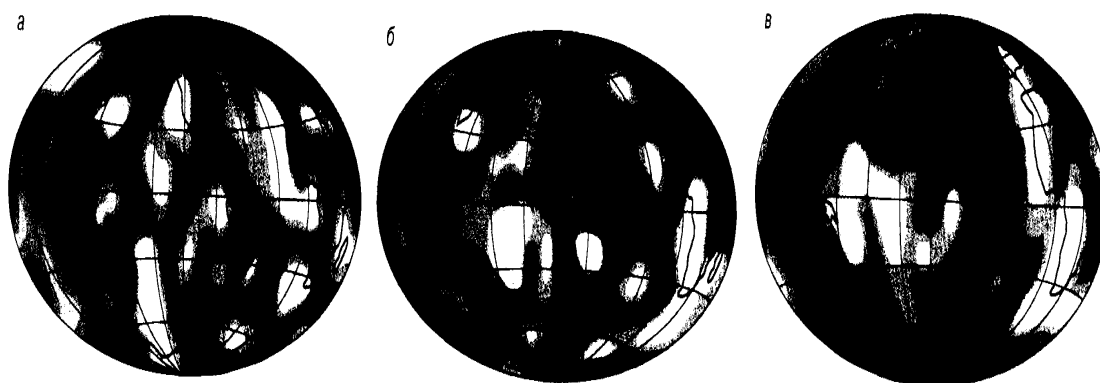

Figure 3. (Fig.5 by [9]). The velocity anomalies distribution examples in the Earth mantle by the seismic tomography results in the different depths: a – the 900 km deep level, b – 1,750 km, c – 2,600 km. The white and black areas on the positive are being corresponded to the seismic velocities changes from – 1,5 % up to +1,5 % with respect to the average values for the geosphere on the given deep level.

For all this, it is necessary to emphasize, that the electrified zones of the different signs in the ionosphere are constantly being displaced, concerning to the planet's surface in the opposite direction to the Earth rotation, and the geospheric electrified zones, having also had the different signs, are being moved along the general direction of the Earth rotation. As the magnetic fields directions of the electrical currents, having created by the negative and the positive electrical charges movement, are quite opposite, and the movements directions of the ionospheric and the latitudinal electrified zones are quite opposite too, then, having proceeded from the factual direction of the Earth magnetic field,

it is quite possible to note the primary contribution into our planet general magnetic field of the electrical currents at the expense of the latitudinal movements of the negatively electrified ionosphere zones and the positively electrified zones of the Earth geospheres. Our conclusions by 2 – 1 and 2 – 2 points have been confirmed and by the monitoring results of the meteorologists for the tornado formation just in the Northern America, under the surface of which the magnetic rocks in the form of the Cordilleras fundamental plates are being got nearer to the Earth surface, than in the other fields of the Earth spheroid, that is distinctly seen on the Fig.4 (the Fig.8 by [9]) and on the Fig.5(the Fig.21 by 9]):
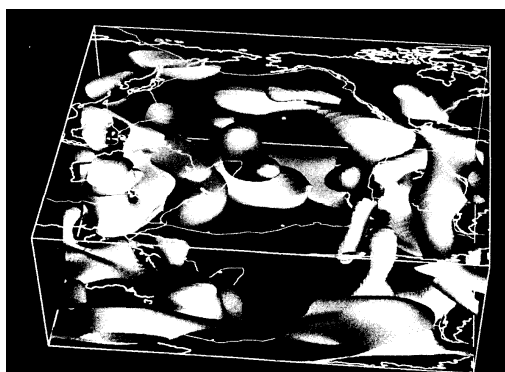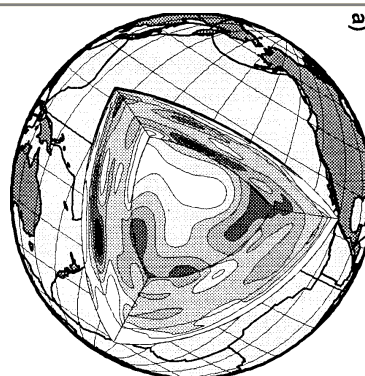
Figure 4 (Fig.8 by[9])   **Figure 5** (Fig.21 by [9])

In other words, the Earth magnet is being rotated eccentrically, having had the rotation radius in the Northern America more, than the radius of rotation, for example, in Tibet and in the other Earth spheroid regions. In result of the investigation of such eccentricity of the Earth magnet rotation, the electrical field by $E = k_1 \omega RB$ (8) [3], which has been created by the magnet rotation around its axis, at $R_{Cordilleras} \succ R_{Tibet}$ has more intensity nearby the Northern Cordilleras, than at Tibet, having directly had an impact upon the origin conditions and also the tornado spreading. Thus, the magnetodynamical view upon the geomagnetism challenge has been permitted by us, here, not only to formulate the whole decade of the principally new conclusions and the statements on the geomagnetism nature, but and to indicate to its fundamental properties, which it would be impossibly to be seen on the basis of the old perceptions, having based on the dogma on the magnetism and electricity separate nature. And the noted circumstance confirms the magnetodynamical approach competence at the geomagnetism challenges investigation.

3. The Ecological Circumstances Geomagnetic Mechanisms of the Modern Space Rocket Activity

Here, having held the magnetodynamics conceptions and the definitions [2], it is quite possible to be observed, that the $\bar{T}\left(\bar{r}\right)$ vector – function of the magnetic fields tension of the ring currents, having created by the geospheric and ionospheric electrified zones movement in the process of the Earth diurnal rotation, has already been orientated normally to its currents, having appeared to be the magnetism «monopolies» by (2): $div\bar{T} = \mu_o \mu i$. As a result of this situation and on the basis of the principle by: $\bar{T} = -gradH(x, y, z)$(8), in reality, the magnetic field intensity $H(x, y, z)$ is the scalar quantity, and its lines of force – these are the equipotential lines, which in the three – dimensional space are being formed the complex equipotential surfaces in the magnetic tension fields. It goes without saying, on the basis of one of the main dynamics principles of the d'Alamber – Lagrange systems, having meant, that the active forces and the reactions forces of the various relations, having acted on every point of the system, are completely compensated by the inertia forces, that is: $\sum_{i=1}^{n}\left(F_i^a - m_i w_i\right)\delta r_i = 0$, (9), where δr_i – the vectors of the possible movements of the system points, it is necessary to note, that the indispensable condition of the stationary state of the geomagnetic

field is this dynamics requirement (9) carrying out. Let us imagine ourselves the circumterrestrial outer space, as in the Fig.6, where the regions of the ionosphere electrified zones of every polarity we'll designate by the white color, in order visually to imagine yourself the Circumterrestrial Outer Space with the active regions passing of the space vehicles launching trajectories
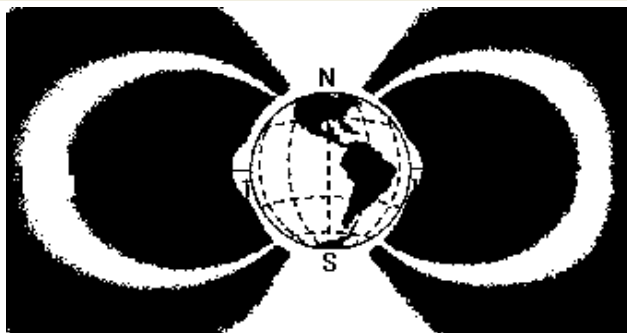

Figure 6. The Circumterrestrial Outer Space. just from the space launching cites (e.g. cosmodromes), having situated in the equatorial and the moderate latitudes.

Here, we'll remember, that all the national space launching cites (e.g. cosmodromes) [10]: Baikonur (e.g. 43° N.L., 80° E.L.), Kapustin Yar (e.g. 47° N.L., 32° E.L.), Plesetzk (e.g. 65° N.L., 40° E.L.), Svobodnii (e.g.50^oN.L., 126° E.L.), Canaveral (e.g. 28° N.L., 82^oW.L.), Vandenberg (e.g. 28^oN.L., 128° W.L.), Shuangentzy (e.g. 41^oN.L., 100° E.L.), Taiyuan (e.g. 38^oN.L, 112° E.L.), Sichan (e.g. 28^oN.L, 102° E.L.), Kagasimo(e.g. 45^oN.L.), Tanegasimo (e.g. 44^oN.L.), Shrikhariota (e.g. 13^oN.L., 80° E.L.), Cape York (e.g. 12° S.L.), Kuru (e.g. 5^oN.L.) and even the movable space launching cites (e.g. cosmodromes) floating «Odysseys» and also the flying «Ruslans» are usually and preferably being based quite nearby to the equatorial latitudes.

3-1. The Ionosphere Electricity Quantity Changes Just After the Space Vehicles Launching

In order to evaluate the ΔQ_i i electricity quantity change of the electrified zone, we'll schematically represent [6], as on the given – below Fig.7, where it has been designated: O – the space vehicle rocket carrier launching point on the Earth surface, O_1 – the space vehicle powered trajectory entrance point into the ionosphere from below, O_2 – the space vehicle powered trajectory exit point from the ionosphere from above, AB and CD – the ionized gas channel regions around the space vehicle powered trajectory at the entrance and the exit just from the ionosphere, correspondingly, A_1B_1 и C_1D_1 – the AB and CD regions normal projections on the Earth surface, A_2B_2 – the region shadow projection of the а–в ionosphere upper layer on the

Earth surface through the AB region in the ionosphere lower layer. The ionosphere layers electricity signs have been shown, in accordance with the mentioned paper diagram [6]. For the evaluation of the ΔQ_i i electricity quantity change of the electrified zone in the Fig.7, it is necessary to pay special attention to the channel cross–sectional area of the ionized gas around the space vehicle powered trajectory in the Earth ionosphere, which is being exceeded the jet stream cross–sectional area just from the space vehicle rocket carrier nozzles in many times, as the temperature and the pressure in the jet stream after its nozzles flow are being exceeded all these parameters in the ambient ionosphere for many orders. The ionosphere layers electricity signs have been shown, in accordance with the mentioned paper diagram [6].
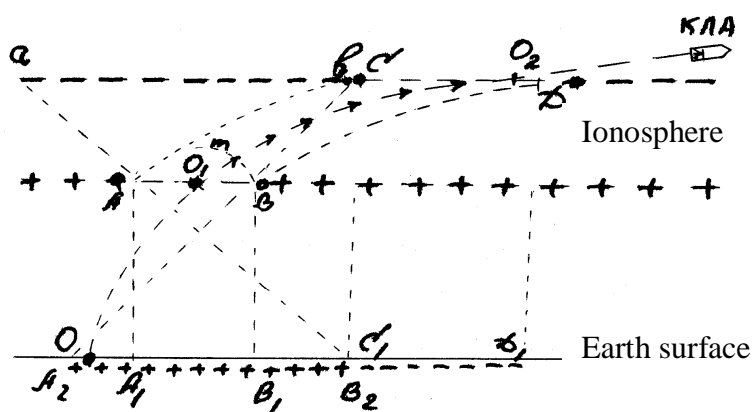
Ionosphere

Earth surface

Figure 7

For the evaluation of the ΔQ_i i electricity quantity change of the electrified zone on the Fig.7, it is necessary to pay special attention to the channel cross-sectional area of the ionized gas around the space vehicle powered trajectory in the Earth ionosphere, which is being exceeded the jet stream cross–sectional area just from the space vehicle rocket carrier nozzles in many times, as the temperature and the pressure in the jet stream after its nozzles flow are being exceeded all these parameters in the ambient ionosphere for many orders. This electricity quantity change is being resulted in the quantity change of the latitudinal ionospheric current on the MA at the charged particles number density, having had the 106 1/cm3 order, and their linear velocity of the diurnal rotation with the Earth, having had the 0,5 km/sec! We'll imagine ourselves in this light of the

forces change by $f_i = T\left(I_i \Delta l\right)$ (9) [6] in the Earth magnetosphere, and we'll remember, for example, as in the mountains the snow avalanches are being moved together from the loud shouting, having released its energy for the everything destruction along its way! The ionosphere monitoring results by the "GLONAS" system is the direct factual confirmation, having above – mentioned circumstance, as "The Poisk" (e.g. "The Research"), which is the academic newspaper reports on the 8-th page, having had the № 51, dated from 21.12. 2007, from this newspaper the conclusion and the Fig.1 have been scanned, and they have been cited below. So, at the «disturbances» amplitude exceeding for two and even three order, the coefficient of efficiency of which is not being exceeded the percent part, have been distinctly seen on the Fig.1:

– IF TO FOLLOW FOR ITS STATE, NO ONE SPACE VEHICLE, ROCKET, SATELLITE LAUNCHING WOULD BE LEFT NOTICEABLE.
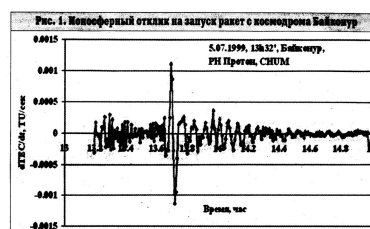
Especially, similar situations have permitted N.F. Reimers [11] to summarize the following: «… for the energy processes or having made the influence upon them, the «trigger» threshold or the trigger effect (for

example, at the induced earthquakes (!)) has been made up 10-6 – 10-8 times just from the observed energy situation standard…». The formation direction equality of the O1 – O2 curvilinear cylinder through the ionosphere

layer has been paid the special attention in the Fig.7: from bellow to the upward (e.g. the space vehicle launching) or from above to downward (e.g. the space vehicle landing), as the jet streams of the gas mantle from the carrier rocket nozzle at the space vehicle launching, or from the jet engines' nozzles of the space vehicle' breaking at the landing are being broken the ionosphere layer, in an equal degree, having changed only the electrified regions formation order on the Earth surface just under this cylinder's foundations.

This final conclusion has factually been confirmed at the every space vehicle voyage, having had the "SPACE SHUTTLE" type, the last of which «The Discovery» № 35 has been launched into the orbit to the Intercontinental Space Station (ICSS) on May, 31, 2008 from the Cape Canaveral, and it has been landed there on June, 14, 2008. Here, I want only to remind the weather report information just from the http://www. americanru. com/ Internet – site: after May, 12, 2008, the quietened earthquake in the province Sichuan (PRC) has suddenly been resumed on June, 03, 2008, having reached the corresponding magnitudes up to 7 – points one on June, 05, 2008. That has been testified on the Earth magnetosphere disturbances by the «The Discovery» № 35 launching, but the numerous weather report information on the unprecedented floods and inundations in the Missouri valley and also in the Eastern States of India just after the «The Discovery» № 35 landing have completely confirmed the two strong and powerful additional cyclones formation in the Earth atmosphere, that it is quite analogically to the hurricanes: «Catharina» in the USA on August, 31, 2008 and «The Butterfly» in Japan on September, 03, 2008.

Conclusions

1. It is quite to be concluded on the basis of the above – stated data, that the Earth planet with its magnetic field is being presented by itself the magnetodynamical machine in the stationary mode of operation, when all the electrical currents are being connected to each other on the various contours by the electromagmetic interactions forces.

2. Our evaluation of the ΔQ_i i electricity quantity change of the electrified zone by the Fig.5, in its turn, is meant, that at the magnetosphere disturbances just after the space vehicle launching, as a result of the changing for the ΔQ_i electricity quantity of the Q_i i ionosphere electrified zone, through which the space vehicle carrier rocket powered trajectory is being lied, having caused the quantity change of the corresponding ring current and the Earth internal electric field quantity, and, at once, it results in the electrical forces change among the geospherical electrified zones, in order to provide the expression carrying out (9), thus, having started up the earthquakes mechanism for the system dynamics fundamental state conducting

$$\sum_{i=1}^{n} \left(F_i^a - m_i w_i \right) \delta r_i = 0 .$$

3. Thus, the curvilinear cylindrical channel with the O_1O_2 axis, having had the length in several hundred or even thousand kilometres just after the space vehicle launching into the Earth ionosphere, depending on the specific conditions of the space vehicle launching, and this channel cross – section is also being calculated by the thousands square kilometers! It is also meant, that the ionosphere channel volume, in which the gas mantle ions recombination of the jet stream is being broken the electrical charges distribution uniformity for the considerably prolonged period of its restoration, owing to the photoionization and the light pressure, is being calculated by the millions of the cubic kilometers, by that, having provided the minimum two additional cyclones formation in the Earth atmosphere!

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