

The Natural Accidents Forecasting System Concept and the Practical Results, Obtained from Nonlinear Physics, Mathematics and System Data*

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The “tiring - topology” Crone’s ideas and network tensor analysis application to the polarized spaces of our Universe together with Vlasov’s ideas about dot - the polarization core - non-locality, mathematics of the space polarization by the polarization core and the associated kinetic equations had been considered; it is shown, that the conservation laws defining the geodynamics are realized by the polarized spaces complex action; the geodynamic processes complex monitoring had been based on the data indicated by the system of wide-range gradientmeters (WRG) based on the “Cavendish's balance” with the special antennas with the instrument system on the; the WRG system indication data provides the dynamical real-time reproduction of fracton holograms, represented in the space in the form of phonons within the frequency range of $< 10^{-10}$ Hz, and the coordinates and time of the earthquakes with magnitude $M>6$, hurricanes, floodings and other natural accidents calculation on the base of developed physical concept and nonlinear thermodynamics mathematics.

1. POLARIZED MEDIA AND THEIR POTENTIALS CORELLATIONS

Our representations about the reasons of the natural accidents mechanism had been based on the well-known, usually observable data about the world around us: vacuum polarization, Kazimir’s effect, finiteness of the light velocity, the concrete magnetic and electric constants values in vacuum, Lambe’s shift, zero corpuscle oscillations etc.

Thus we had replaced terms “Universe” and “physical vacuum” with the term: *the “Comprehensive medium” (CM)*.

This medium stratification is known by its components including “Local Group of Galaxies”, our galaxy – the “Milky Way”, the local stellar cluster – the “Gould Belt”, the Solar system, the Earth planet, the Earth planet core, its mantle, lithosphere, atmosphere, etc.

Each planet level has its mass centre (the polarization centre) in the system which it is embedded in, and also it has its oscillation cycle characterized by definite frequency range more high then the system frequencies had been. Thus the frequency splitting is observable, for example, within the solar cycles spectrum, which frequencies are shifted aside well indicated more high values.

The following dependence had been chosen for the modern science stored data about the structural base of our world and its dynamics system analysis:

$$A_{\dagger} = \hbar^n 1,62^{\dagger} \quad (1)$$

here, A_{\dagger} – are the discrete numerical values of the scale axis, associated with the concrete volume – the V matrix in the CM; \hbar^n - is the action constant - association coefficient of some structural compounds within any CM volume (in our galaxy $\hbar = h$ – the Planck's constant) n – is any integer number, associated with the stratified spaces – CM volumes – number, where some structures (systems) had been formed, \dagger – is the integer natural numbers set; 1,62 – is the base defining the CM volumes discrete intermediate values in the unit scale segment number.

* The theory, developed by the author during 1980 – 1989 was presented in the article. This theory had been the base of the 12 stations first generation WRG apparatus polygon creation. The stations were arranged as follows: in the territory of Kazakhstan (9 stations), in the suburb of Monino in Moscow region (1 station), in Klitchev in Belarus (1 station) and in Tula (TSU) (1 station). The whole system had been networked by the common modem connection and it worked in real time up to 1993, till the USSR had been disintegrated. The multi-channel system WRG-9 with the new class of antennas for the natural accidents monitoring and forecasting from the single observation point (the system had been disposed in the TSU laboratory) had been created in 1999 on the base of the further fundamental researches. The practical results of the period 1999 – 2008 were presented in the article.

The base of logarithm value 1,62 has been established empirically, by the different set with various base values construction and the really existing sizes substitution in these scales. The choosing criterion was, on the one hand, the scale operating convenience (not to have its extremely large size), and on the other one, - to have enough points in the definite scale segment for the statistically authentic processing for the characteristic structures sizes placing.

The planet radiuses and their orbit radiuses, tabular values of the known corpuscle radiuses and their orbit radiuses, etc., i.e. the known geometrical sizes from the submicro-, up to the macro- and megacosm etc. had been dimensioned to the numerical axis resulted from the equation (1).

In conformity with the above stated principles, our part of the Universe structure can be represented, as the set (the scale) of asymmetric n -matrixes embedded into the unified CM polarization potential. Thus it is necessary to emphasize, that asymmetry should be interpreted as the space polarization asymmetry in every CM structural level. Polarizing asymmetry includes the structural asymmetry (for example, the baryon one) as the part of the general asymmetry. Any newly created structure, i.e., the structure that has any weight, has the polarizing asymmetry with the opposite sign relatively the structure associated with its generation, and at the same time the new structure forms the CM space polarizing centre by itself.

The asymmetric n -matrixes would be referred to as As , the bottom n -matrix index has the meaning of the structural level:

$$-\infty \dots \leftrightarrow As_{ac} \leftrightarrow As_a \leftrightarrow As_m \leftrightarrow As_s \leftrightarrow As_p \leftrightarrow As_{st} \leftrightarrow As_g \leftrightarrow As_{mg} \leftrightarrow \dots + \infty, \quad (2)$$

here the matrix associated with structural level had been named As_n with indexes: ac – atom cores; a – atoms; m – molecules and crystals; s – substances; p – planets; st – stars; g – galaxies; mg – metagalaxies.

Each of the matrixes in the above represented set has the straight couplings and the feedbacks with the other ones. However, each of the matrixes is characterized by the symmetry zones (the compensation – is the conservation laws action in the form of CM polarization with the opposite sign, including “screening” and anti-screening) and the asymmetry zones presence in it.

The asymmetry zones form the structural level, in which the basic (analyzed) matrix polarizing condition had not been absolutely compensated by the “opposite polarization” process. Thus the established law is notable: the movement in the set “to the right”, aside macro- and mega-levels, results to the polarization amplification and the associated greater extent of interactions, “to the left” – aside sub-micro levels. Therefore the supersymmetry process and the “asymptotic freedom” effect appear.

The dissipation, bifurcation processes, the chaos state in the symmetric and asymmetric structural components (substructures) or system components steadying, and generally all the interaction forms within the levels from the substructural one up to the mega- and the more high levels are realized via the asymmetry zones, and also they define the processes of the controlling chaos by the more polarized (more low-frequency with the greater associated CM volumes) and the more powerful polarized fields.

Basing on the existing now Universe structure models analysis the following conclusion had been established – Crone’s theory about “tiring-topology” – “discontinuous space”, i.e. the space with definite potential difference action was the most appropriate for the natural accidents forecast and monitoring [2]. This approach had been confirmed by Faraday-Maxwell’s practice solutions validity total complex. [3]

Following the Faraday’s and Crone’s logic, the galactic center should be considered, as the «grounding» potential and our galaxy space polarization center. And then the following general relation of the potentials (with the remarks about our galaxy) in the “grounding” point and in the “nets” should be accepted on the base of Newton’s logic and the scale (2) analysis:

$$\operatorname{div} \mathbf{U}_0 \geq \hbar \left| \sum_n \operatorname{rot} \mathbf{U}_n \right| \quad (3)$$

here $\text{div } \mathbf{U}_0$ - is the divergence or the matter field discrepancy with the polarization impulse \mathbf{U}_0 in our galaxy CM; \hbar - is the coupling coefficient between the CM formations (structures) in our galaxy; $\text{rot } \mathbf{U}_n$ - are the field $\text{div } \mathbf{U}_0$ components, compensating this CM field state changes in the form of the CM wave excitation compensatory process volumetric derivatives:

$$|\Psi_0\rangle = |\text{div } \mathbf{U}_0\rangle \otimes \langle \sum_n |\text{rot } \mathbf{U}_n\rangle \quad (4)$$

here $|\Psi_0\rangle$ - is the CM wave excitation, including $\text{div } \mathbf{U}_0$ field system generation and the response to this field in the form of the compensatory process matrixes sum $\sum_n \text{rot } \mathbf{U}_n$, defining the primary impulse scalar; n - is the number of structural formations - the CM space stable stratifications by the impulse $\text{div } \mathbf{U}_0$ and the counter impulses $\sum_n \text{rot } \mathbf{U}_n$

The concept of potential had been used in full conformity with I. Newton's term in the page 2 of his foreword for the first edition of the work: "The natural philosophy mathematical foundations" (Moscow, Science, 1989.) as the term with the essence of the matter capabilities within the concrete mass - volume [4].

The structures could be distinguished by the compensation impulses directivity (screening and anti-screening effects) and the frequency range; they would exist in this range for the certain time (the lifetime!!!!) after their excitation from the environment by the impulse \mathbf{U}_0 . The medium state determines the depth of their polarization and information capacity in the CM either in the level of the asymptotic freedom, and the associated structures, for example, named as "quarks", or in the level of structures named as "black holes", "galaxies", "star systems":

$$\hbar^n = \frac{\text{div } \mathbf{U}_0}{\sum_n |\text{rot } \mathbf{U}_n|} \quad (5)$$

The equation (5) represents any structure, any substance form cohesion with the so-called "dark mass" and "latent energy" or "latent matter part" (LMP), whether the associated value n could be determined in it, all the more so our visible world amounts to only 4-6% of the LMP .

Considering the CM polarizability and the conservation laws, represented by the compensatory processes, some object most similar reflection into the general CM space, and also into itself, could be represented only by its topolog - the geometric image with every physical association coefficients, associated with the CM determined space dynamics and structural construction also, because of its invariance and nonlinearity. Certainly, the contrary scenario is quite probable; our world is the reflection of the polarizing processes in the LMP. The right parts of (3) and (4) represent the topological concept of the CM hierarchical polarization in our world; therefore it is necessary to consider the total cascade hierarchy, total hierarchy of the frequencies embedded into some values. Then the Plank's constant in equation (3) could be represented in the form of:

$$\hbar = \sum \nabla \xi_n \quad (6)$$

otherwise

$$\hbar_i = \nabla_i \int f(\xi_n) \partial \xi_n \quad (7)$$

but in the concrete level i , associated with the considered substance (matter form), or in our galaxy:

$$\xi_n = \{\xi_i\}, \hbar = \{\hbar_i\}, \quad (8)$$

here ξ_n - is the coefficient of the substructures associations within the general system (structure), represented by formulas (3) and (4).

For example, $\hbar = \{\hbar_i\}$ - is the Planck's constant, but it is also Newton's constant, the constant of Boltzmann, Wien, Faraday etc.; it depends on the conditions of the process responding to the CM polarization level by the impulse like $\text{div } \mathbf{U}_0$, and the associated compensatory processes like $\sum \text{rot } \mathbf{U}_n$.

Hamiltonian operator ∇ is used in the right part of the equations (6) and (7) to consider the energetic association in the stratified spaces level, and also the energetic association with

LMP. The ξ concept should conclude the total complex of the unbalanced polarizing processes in the CM, including screening, and anti-screening complexes, and the matter structural form level should be adjusted by the index i .

As a matter of fact there is the response to the physical essence of any mass concept, so also there is the response to the nature of gravitation in these equations.

Each of the $\text{rot} \mathbf{U}_n$ would be characterized by the definite natural oscillation frequency range, as it had been generated within the anisotropic volume bounded by the polarized scalar $\text{div} \mathbf{U}_0$, etc.

The stratified spaces $\text{div} \mathbf{U}_0$ and $\text{rot} \mathbf{U}$ union in the form of their vectors various directivity and the associated various charges providing this union generates the new structural formation (S.Okubo's effects, partially-conjugated reactions). But the fundamental true results from this simple association, that is - each concrete structural formation potential associated with the concrete structural formation would be characterized by the concrete excitation frequency of the total CM medium (the nature of the magnetism), and the field of new vortexes in the form of the electrical field (or the electrical fields) with the magnetic characterization would appear in the neighborhood of the associated polarized volume (mass) and within the medium boundary.

2. THE CONCEPTS OF MASS, POTENTIAL AND KINETIC ENERGIES

On the base of the above stated logic, the following assumption is valid: the total sum, including the integrated sum of the processes represented by the equations (3) - (5) contains our world total nonlinearity, and also any energy form of this nonlinear world processes. The formulas (3) - (5) characterize the space stratification and (in Russian words) the potential energy concept. The initial unbalanced CM polarization field independently on the impulse action time and the rank-consequent fields of the compensatory processes with more short time ranges, that had generated the integrated total: substance or some form of the complicated matter (system), should be contented into the potential energy concept. The resultant action of the fields with the different polarization depth and their vector directivity in some system (substance, matter form) structural level compensation absence should be associated with the kinetic energy concept, including its interaction with another field systems and substances features. That is the nature of gravitation, the world poly fractality, the endless set of the infinite CM variety, anisotropy and asymmetry, any radiation, interactions, Belousov's reactions physics, the potential and kinetic energies physical essence, magnetism effects etc., and also the physical essence of the temperature \mathbf{T} and time \mathbf{T} concepts in their topological contents, in absolute conformity with the works of I. Newton, G. Maxwell, N.Umov, K. Minkovsky, L.Pontryagin, A.Vlasov, G.Crone, O.Bartiny and I.Prigogine [2 -18, 25].

Our total visible or baryon world also can be described by the right parts of the mathematical equations (3) and (4). These are the only parts with the content of definite but always not absolute primary signal compensation, as the concepts of matter structure and the associated potentials difference, coupled by the factors represented generally in formula [5] \hbar^n with the definite topological contents, had been used.

I. Newton had written about the mass concept in definition **I**: "The matter amount (mass) is its measure, it is directly proportional to its density and volume." [4]

The most modern researches and the generated results confirm the correctness of I.Newton, N.Umov, A.Vlasov, G.Crone's ideas about the polarization structure unlimitedness in every matter level, as the foundation of its contents in some mass defining the volume and the potential of this mass. D.J.Gross, H.D.Politzer and F.A.Wiczek were granted with the Nobel Prize in the physics field in 2004 for the so-called "*asymptotic freedom*" discovery [19].

F.A.Wiczek writes in his Nobel's article: "... *the usual substance mass results from the energy of the massless gluons and almost massless quarks being the protons, and consequently the atomic cores components... The quark's color charge can be contracted by either the antiquark (then the meson would be generated), or by the quarks couple with the complementary*

colors (in this case the baryon would be generated)... Quarks and antiquarks could be described by the wave functions, and their space gradients represent the energies” [19]

There is the statement, it is named the paradigm 2: “the mass is generated from the energy” in the F.A. Wiczek article. Admitting the Wiczek’s statement absolute validity it is necessary to divide the question into two concepts: the united steady structure formation energy and the radiation energy. Speaking about the formation energy, this form of energy was generated as the result of mass generation (F.A. Wiczek and his co-authors had appeared to be correct 500 years later Newton) following the conservation laws, because they are the basic laws of the nonlinear world. But in the result of absolute compensation of $\text{div } U_0$ by the sum

$\left| \sum_n \text{rot } U_n \right|$ absence, this non compensated part should be associated with the radiation energy,

i.e. the media residual polarization–excitation level with the definite frequency complex or, in other words, it should be associated with the system kinetic energy. If the energy, associated with the mass formation, should be released, i.e. the matter part that had been incorporated into the compensation process stable connection, the other values and the energy essence should be spoken about.

Then the addition of two impulses is necessary:

$$\nabla \left(\text{div } U_0 + \hbar^n \left| \sum_n \text{rot } U_n \right| \right) = m \tag{9}$$

here m – is the mass.

That is the representation of the asymptotic freedom, and the Universe quantization, and the space stratification, and everything known about the substance or any structure in absolute conformity with the Newton’s definition in this expression.

At the same time as it had been established before there were no absolute compensation of the CM wave excitation process and system generation, and this uncompensated CM polarization part should be considered as the kinetic energy of this system.

Thus, the mass concept can be represented by strictly definite volume V_{Mh} of the CM polarized part (volume):

$$m = V_{Mh} \left(\nabla \int \nabla \left(\sum_n \int V_n \partial V \right) \right) \partial V, \tag{10}$$

here V – is the volume with the definite matter quantity in the form of polarized particular volumes characterized by various vectors and their spaces polarizations; ∇ - is the Hamiltonian operator, it defines the energy interactions between the volumes V_n participating in the global volume V .

Compensation processes would exist in the set of the CM exited part levels. But each CM level would response in different time characteristics, in different wave levels L_i and in different potentials interaction frequency ν_i ranges according to the formulas (3) and (4). But there wouldn’t be absolute compensation of the CM primary excitation.

That is why the system wave function m can be represented in the form of the wave functions tensor product of the potentials providing the synchronization in the controlling chaos modes in the form of $\text{div } U_{n-1}$ and $\sum_n \text{rot } U_n$ resulting the new structure generation in the planet

system with the kinetic energy impulse release in the form of $|\Psi_K\rangle$:

$$|\Psi_K\rangle = |\text{div } U_{n-i}\rangle \otimes \left\langle \sum_n \|\text{rot } U_i\| \right\rangle.$$

The sentinels of the CM polarized fields’ level and vector directivity are the associated charges q values and the signs “+” or “-” representing itself formula (3).

It should be emphasized, that the generalized chaotic synchronization modes in this case are the results of one reason – the chaotic natural oscillations suppression by the dissipative effect

based on the global gravitational fields action and the associated frequencies, for example for the Earth planet the frequency range is 10^{-7} - 10^{-10} Hz, that is very important for Lyapunov characteristic indexes spectrum definition. However, every modern publication does not consider the questions of the chaotic processes synchronization by the events with the extra low frequency spectra action either the basic ones (i.e. more global gravitational fields dynamics and synchronization) or the Belousov's autowaves [6] with every researching methods.

3. PHYSICAL AND MATHEMATICAL PRINCIPLES OF THE GEODYNAMICAL PROCESSES DESCRIPTION

There is the following statement in Vlasov's works: "the formal electrodynamics and the mass distribution gravitation theory give the following expression for the potential energy of the body - U_{macro} [12]:

$$U_{macro} = \int E(|r-r'|)p(r)p(r')dr dr'$$

here $E(|r-r'|)$ - is the kernel with the essence of the total and exact energy of interaction with integration by every distance" [12-15].

Formula (12) is based on the transition from dot particles interaction energy $\frac{1}{2} \sum_i \sum_{ij} \frac{q_i q_j}{|r_i - r_j|}$ to the spatially distributed charges and masses.

The following expression is appropriate for the continuity equation with the long-range forces in consideration of the localized point impossibility (following Vlasov) and the researching results on the base of the topological representations:

$$V(r, \tilde{T}) = \iint E(|r-r'|)p(r', v) \partial v \partial r' \quad (13)$$

here V - is the considered volume associated with the definite (Newton's) mass with the concrete topological temperature \mathcal{F} contents and topological time \tilde{T} , and consequently it its associated with the potential energy of this volume; $V=A$ in the formula (1), $V=A_S$ in the scale (2); E_0 - is the total integral (potential) energy within the real system volume $V(r, \tilde{T})$.

$$E_0 = \iint E_i(|r-r'|)p(r_1)(r_2) \partial r_1 \partial r_2 \quad (14)$$

However, for the more accurate consideration, the Hamiltonian operator ∇ should be used, representing Crone's matrixes interactions essence and Vlasov's functions and self-consistencies set. Than the total and precise energy of the CM baryon part interaction with the planet system polarization core should be represented by the following expression:

$$E_0 = \nabla_0 \int \nabla_i \int E_i(|r-r'|)p(r', \tilde{T}) dr' d\tilde{T} \quad (15)$$

here E_i - is the interaction energy within any baryon system structure with the opposite generalized thermodynamic potentials signs and different associated charges values resulting from the CM LMP systems and CM baryon part polarization processes.

$$\text{div } p(r, \tilde{T}) = \int f(r, v, \tilde{T}) dv. \quad (16)$$

Here $\tilde{T}(V) = \nabla U_i$ - is the topological time, it is one of the basic characteristics of the considered system state, it is represented by the integrated sum of the oscillations frequencies and the polarized media dynamics resulting from the contrary vector directions of two or the set of flows; $\text{div } p(r, \tilde{T})$ - is the charges density scalar product in their topological distribution, it characterizes some baryon part of the Universe interaction with LMP; r and r' - are the considered structure's physico-topological coordinated associated with some CM polarization core within the baryon system; v - are the different CM space potentials interactions frequencies associated with the geometrical position of the generalized thermodynamic potential gradient between the definite structure and its polarization core; also it is the frequencies cascade

topographic matrix $\{v\}$ characterizing the CM strictly definite volumes dynamics indicated by the WRG instrumental equipment and corresponding the strictly definite coefficients of the potential interactions association within the space area representing the generalized thermodynamic potential gradient geometrical position between the definite structure and the global stratified spaces system (for example, volume) polarization core; dv – are the associated auxiliary frequencies for any dynamics characterization during the time \tilde{T} .

The following expression is adequate in consideration of the potential and kinetic energies concepts for the continuity equation with the long-range forces and the localized point impossibility (following Vlasov) using some potentials frequencies strictly definite correlations:

$$V_p(r_M, \mathcal{F}, \tilde{T}) = \iint E_i(|r_M - r'|) p(r', V_{nstr}) \partial V_{nstr} \partial r', \quad (17)$$

here r_M - is the topological size, including the polarized volume from the planet core mass centre up to the border of the CM space polarized by the planet core, i.e. up to the border with the valid enough known data – the so-called planet gravitational field in the stratosphere upper layers; $\tilde{T}(V)$ - is the topological time in the form of frequency characteristics cascade for each of the stratified spaces – the volumes of the global space – the planet volume V_p ; $v(V)$ - are the temperatures distributions in the form of frequencies with different time periods in the considered volume, including our planet volume characterizing the new formation dynamics within the planet volume associated with its global geodynamics; $\mathcal{F}(v(V))$ - is the topological temperature representing the structures generation processes set in mantle, atmosphere and lithosphere; V_{nstr} - is the newly generating volume in the border of “mantle-lithosphere” with mirroring in mantle and aqueous medium, and atmosphere, stratosphere, and in periodic fluctuations in mesosphere; V_p - is the considered volume (in this case – it is the planet volume associated with the definite mass with the concrete topological temperature \mathcal{F} and time \tilde{T} content); $\|M_p\| \in \|V_n\|$ - are the volumes (in absolute conformity with Newton’s formulation) in the planet CM stratified spaces, in which the global planet mass is generated also in the result of the conservation laws action, it provides our planet stability during long period of time; r_i - is the parameter of the $r'(v_n)$ layer in the planet space, in which the new structure generation process was the most evident.

Each of these flows contains the medium part with the motion energy (the deeper medium structural level polarization vector).

Thus, to obtain the information about the dynamics in some space-mass (structure), its properties dynamics, it is necessary its volume dV dynamics definition in the topological time, estimated on the base of the WRG system data, and after that the following relationship should be used for the analysis:

$$dU_k = \|dV_{Mh}\| \left\langle \int \nabla_{n-1} U_i \partial \tilde{T}(V) \right\rangle, \quad (18)$$

here dU_k - is the additional kinetic energy in the considered space, or it is the additional kinetic potential of the considered system; dV_{Mh} - is the part of the new volume V_{Mh} , in which the compensational processes results are realized in the planet volume in the form of $\int \nabla_{n-1} U_i \partial \tilde{T}(V)$.

At the same time L.S. Pontryagin’s works had appeared to be the most adequate for the n and the associated coupling coefficients ξ estimation justification. So the Pontryagine’s duality theorem “establishes the algebraic relation between the homology group $H_2^r \frac{R^n}{K}$ of the space

$\frac{R^n}{K}$ and the homology group $H_2^r(K)$ of the complex K ” [9 - 11]. Thus it is extremely important, the result distinct of every other isomorphism theory follows from the Pontryagin’s

theorem as it's not the only and unique one. I.e. the real natural systems nonlinearity and openness preserve in the real processes dynamics: “ $H_2^r \frac{R^n}{K}$ containing some subsystems quantity $\frac{R^n}{K}$ with the homology group $H_2^r(K)$ of the complex K ”. In this way the engagement coefficients (which we consider now as the coefficients of association) are defined by the generalized thermodynamic potentials and entopies with the associated ranks in geometrically bounded space stratification. That is why $\frac{R^n}{K}$ would be further referred to as N – the number of the subsystems, attractors compounds, characterizing the considered system represented by the matrix \mathbf{As}_n in the scale (2) with their structures-matrixes. These principles had implied the possibility of using the L.S. Pontryagin's works chapters about the homology groups' invariance at barycentric subdivisions in the researches.

It follows from the formulas (2) – (7) analysis that there always would be the nonlinear asymmetry in the world around us, therefore it would be some dynamics there resulting from the kinetics conservation laws action, and this dynamics wouldn't be only the thermodynamics in its custom contents. This is valid for every point, every structural either mega- or sub-structural matter level in absolute conformity with Vlasov's works [12-13].

4. THE ENERGIES AND ENTHROPY RANKS VALUES CORRELATIONS IN THE POLARIZED MEDIA

N.A.Umov in 1874 in his doctoral dissertation “The energy kinetics in the bodies' equations” had established the association between the amount of energy per one time unit inflowing the system from its boundaries and the system amount of energy variation [7]:

$$\iiint \frac{\partial E}{\partial t} dx dy dz + \iint El_n d\sigma = 0, \quad (19)$$

here the triple integral extents to the global polarized medium volume; $d\sigma$ represents its boundary element; l_n - is the energy motion velocity along the outward normal to the boundary element, i.e.

$$l_n = l_x \cos(n_x) + l_y \cos(n_y) + l_z \cos(n_z) \quad (20)$$

Tamm represents the above mentioned Umov's equations in the well-simplified form:

$$\frac{\partial E}{\partial t} = P - Q - \oint_G G_n dG \quad (21)$$

here $\frac{\partial E}{\partial t}$ - is the energy flow incoming to the considered substance from the environment; P – is the energy part wasting for the energy geometrical distribution within the substance change, and the other part of energy interacting with the environment through its surface G is also represented by the geometrical relations, like $Q - \oint_G G_n dG$.

This part of energy Umov had established to be the electromagnetic flow in geometrical form orthogonal to the unit surface G or, to be more precise in Umov's words, it is the geometrically polarized fields (the Gauss potential geometrical image), which he had applied for the first time in the world for the geomagnetism magnetic images, or as we refer to it now, the associated systems holograms, research.

N.A.Umov's works provided the physical essence of the energy and mass concepts elucidation, it had been confirmed by the Nobel Prize for Physics in 2004 and 2006, and it were used for the polarized holograms research on the base of the conservation laws basing on the

Minkovsky and Bartiny's space-time logic [16 – 18]. This is rather important circumstance, as the great energy generates in the united system of the compensation processes within the finite period of time, it results the imbalance in the general system energy balance and it is represented by the earthquakes cycles, cyclones, hurricanes, typhoons.

It is known

$$E_\nu = h \nu, \text{ or } h = E_\nu / \nu, \tag{22}$$

here E_ν – is the energy element; h – is the Planck's constant; ν – is the radiation frequency.

The charge passing through any system value change, depends on the potentials distribution inside of the system, i.e.

$$q_i = q(U), \tag{23}$$

It is associated either with the charge distributed on the Dirac mare in the standard Young – Mills Hamiltonian or with the supercharge Q in the Hilbert space. At the same time [21]:

$$dq_i = \frac{\partial q_i}{\partial U_{j_1}} dU_1 + \frac{\partial q_i}{\partial U_{j_2}} dU_2 + \dots + \frac{\partial q_i}{\partial U_{j_n}} dU_n = \sum_{j=1}^n \theta_0 dU_j \tag{24}$$

here θ_0 – is the system thermodynamic capacity; i – is the charge component symbol; j – is the potential argument symbol.

In turn, the charge distribution in accordance to the potentials distributions and their values are interconnected and on the contrary, i.e.

$$U = U(q_i), \tag{25}$$

$$dU = \frac{\partial U_i}{\partial q_1} dq_1 + \frac{\partial U_i}{\partial q_2} dq_2 + \dots + \frac{\partial U_i}{\partial q_n} dq_n = \sum_j D_{ij} dq_j \tag{26}$$

$$dU = \sum_j D_{ij} dq_j \tag{27}$$

here D - is the thermodynamic system resistance, which is numerically equal to the system potential change because of the unit charge change.

It is generally accepted that any system could be characterized by the thermodynamic potential and entropy, which include the structures – system compounds – thermodynamic potentials' and the associated entropies' integral sums.

Any process within strictly definite boundary conditions (in the certain structural level) has the interaction relations in the other various levels with rather developed diversity (the determined freedom degree). In that case the “energy – information” concept becomes the basic one for all the Natural interaction modes unified mechanisms definition. It is followed by the entropy concept could be applied to any processes and any material object states practically in the open systems.

The Boltzmann-Planck's entropy is:

$$S = k \ln W, \tag{28}$$

here S - is the system entropy, W – is the probability energy - information system state,

$$W = \frac{N}{n_\xi! n_\xi!}; N = W \cdot n_\xi! n_\xi! = \frac{R^n}{K}, \text{ i.e. it is the concrete volume } V_i \text{ represented in the formula (28)}$$

in the form of the stochastic dynamics W of its substructures N – the number of structures-attractors of the dynamical polarized system with volume V_i , $n_\xi f(\xi)$ – is the distribution function of the particles-holograms (including microstructures, etc.) by the interactions energies within the volume V_i , in which the stratification processes dynamics, controlling chaos bifurcation state generation, synchronization and balance state return processes of our interest take place. The associated generalized thermodynamic potential and rank entropies cascade varies in accordance with these processes at every stage; k – is the Boltzmann-Planck's constant, which is associated with the (6), (7) and (8) equations on the base of polarized media with different geometry potentials natural frequency characteristics relations hierarchy interpretation with the following addition:

$$k = \hbar_i = \nabla \sum_n \int f(\xi_n) \partial \xi_n; \quad (29)$$

Formula (29) characterizes the physical essence of the generalized coupling coefficient between the formations (structures) of our baryon (visible) CM part, generated by the conditionally - equilibrium CM state disorder by the initial polarization impulse $\text{div } \mathbf{U}_0$ and the stratified space, including LMP, with its associated coupling coefficients following Markov, Lyapunov, Pontryagin, Kolmogorov, Prigogine, Ebeling [5,10,11, 24 - 29]. Then on the base of the presented works and [30-33]:

$$W = \frac{N!}{n!n!} = \tilde{\lambda} = \delta\Phi(\nu), \quad (30)$$

here, $\tilde{\lambda}$ – is the stochastic frequency of the transformation expectation within the strictly definite volume of the considered system - the CM space, it is associated with the Lyapunov's characteristic index, this allows using the time factor in the problem of the unbalanced process finish and the new structure generation (for example, in the “mantle-lithosphere-atmosphere” coherence) finish, it would be defined by the associated concrete values of the generalized thermodynamic potential and the entropy – S (the topological entropy) in its rank essence; δ – is the function of the stratified space new variations index, represented by the formula (3); $\Phi(\nu)$ - is the tone frequency function or the function of changing proportions between the frequency characteristics of the various structural levels generalized potentials complexes [28-30], N – is the number of attractors, and the information capacity measured in the sign states “+” and “-“ is [24, p.261]:

$$I = \log_2 N \quad (31)$$

These variations include bifurcation processes, chaos suppression by the global gravitational fields within the extra low frequency range (ELF) (Belousov's autowave processes), system transition to the “controlling chaos” states in the more high-frequency but still ELF range. The following stages of return to the equilibrium is characterized by the first and the second Faihenbaum's constants, the new polarization centre or the future catastrophe focus (the generalized thermodynamic potential focus of the newly generated structure) generation (following Ivanov and Vlasov) and this focus transition to the “Sobolev's space” states with focus dynamics – the “Sobolev's derivative” with the same geomorphology. [12, 33 - 38].

This statement follows from Lyapunov and Kolmogorov's ideas [28-29]:

$$S \leq \sum_{\tilde{\lambda} < 0} \tilde{\lambda}_i. \quad (32)$$

The functional variation range is calculated by relations represented in [30-32]:

$$|\delta\Phi_k| \leq \sum_{i=1}^N |\Gamma_{ki}| |\delta Y_i| \quad (33)$$

here, Γ_{ki} - is the function of the functional variation sensitivity, or the expectation functional which could be represented in the form of Euler-Fourier's gamma-functions with some conditions, δY_i - are the variations of the generalized thermodynamic potentials in the analyzed space, they could be represented in the form of the associated matrixes in the scale (2) and the coupling coefficients $\nabla \sum_n \int f(\xi_n) \partial \xi_n$.

The above stated physical principles establish the deterministic-stochastic approach. The estimation of the mathematical expectation would be like:

$$\tilde{\lambda}(\delta\Phi(\nu)) = \sum_{i=1}^N \Gamma_{ki} \tilde{\lambda}(\delta Y_i) \quad (34)$$

The oscillator's probabilities (the potentials frequencies relations) could be represented by Bose and Fermi distributions. Some state duration statistical weight is the reciprocal of this state variation probability. Thus n_0 is the most probable and actual number of the ensemble configurations measurements, n_0 is the value providing the minimal value of $\{\nu\}$, and it is associated with $\text{div } \mathbf{U}_0$ generation.

On the basis of the stated general conception, the newly generated structure entropy and the coefficients of association values could be estimated also in the form of the Lyapunov's indexes with the total complexity of the polarized media - systems interaction consideration.

The entropy value, as it is known, varies in the range from 0 up to 1, but the critical limit of the total planet and its substructures is even and constant one for some planet structures development stage. This allows the formulated problem solution on the basis of the "Markov chains" in the frequency range of $<10^{-1}$ Hz by using the low-frequency and extra low frequency ranges as the master one for the high frequency polarized systems embedding, and also on the base of previously stated concepts of the thermodynamic or, to be more precise, frequency-dynamical resistance and the associated thermodynamic capacity θ_0 – the basic ergodic parameters of the process.

There is the single-valued relation between the system dynamic capacity θ_0 and the associated primary potential generation in the CM, topological temperature and the charges variations with their topological content in time [22 - 25]:

$$\frac{\partial q_i}{\partial \mathbb{F}} = \frac{\theta_0 \partial U_0}{\partial \mathbb{F}}. \tag{35}$$

On the base of this concept the following statement is approved for the single motion, because $\theta_0 = \text{const}$ (while the planet is integral)

$$\Delta E = E_2 - E_1 = \frac{\theta_0 U_i^2}{2}, \tag{36}$$

i.e., the dynamical capacity is numerically equal to the charge variation resulting from its associated potential unit change. Generally, $D_0 = \frac{1}{\theta_0}$ and $\theta_0 = \frac{1}{D_0}$, i.e. the system self-capacity is

inversely proportional to its resistance and simultaneously it is inversely proportional to the charge variation and it is directly proportional to the potential variation, its increase. Consequently the dynamical capacity is closely connected with the information containing in some generalized thermodynamic potential value, in terms of the system stability.

The second law of thermodynamics classical formulation would be as follows for the heterogeneous non isolated (open) system, [23 - 26]:

$$dS = d_e S + d_i S \tag{37}$$

Whether the stream $d_e S$ changed the stream $d_i S$ the system had became more complicated, and its entropy remains constant in the averaged value proximity. Here $d_i S$ in absolute accordance with Umov's works represents the energy wasting for the new structure generation in the system $d_e S - d_i S = Q - \oint_G G_n dG$, and it characterizes the transforming system electromagnetic state.

The distinction between open and closed systems is expressed by the component $d_i S$, which considers the entropy variation, following by the energy - information exchange with the environment in the open systems. But the question of $Q - \oint_G G_n dG$ or $d_i S$ informational contents close relation with the system internal processes, i.e. the processes of the stream $d_e S$ participation in complicating or not complicating system processes, had never been considered in literature for some reason.

As it is known the processes contributing to $d_i S$, are referred to as the general term "streams", and they are designated as J_i , and their reasons (the thermodynamic potentials deviating from the equilibrium values) - are referred to as X_k . The relation between J_i and X_k is expressed in the form of Onzaharr's phenomenological equations.

In other words, the i -th character stream is in the linear relationship with all the thermodynamic forces in the system. If some substructure had changed in the open system, the system medium (being the CM part) would resist this resulting to the interacting subsystems potentials frequencies proportion variation, followed by heat release or in other words it is followed by system kinetic energy more high-frequency field generation. But the system entropy increase follows heat release so the next statement would be valid:

$$\mathcal{F}\left(\frac{dS}{dF}\right) = \sum J_i X_i, \quad (38)$$

if $\tilde{T} = const$ - the time period of the system internal changes, then

$$X_i = -grad q_i, \quad (39)$$

here X_i - are the dynamical forces associated with the planet dynamical capacity and dynamical resistance, and the subscripts indicate the charge symbol and some potential argument symbol represented by fig.1.

In other words, the j -th character stream is in the linear relationship with all the thermodynamic forces in the system.

Fig.1. gives the representation of \mathbf{J} - thermodynamic flows, \mathbf{X} - the thermodynamic forces, which determine the general thermodynamic capacity θ of the system (mass) as long as it is integral.

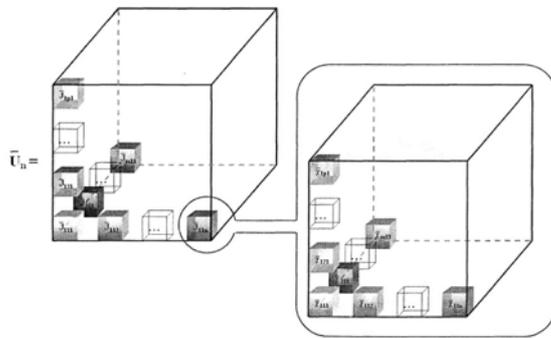


Fig. 1. The graphical representation of the $\sum rotU_n$ contents in the formula (5)

The planet core and its total structure are characterized by the associated potentials frequencies correlations in their topological (volumetrically geometrical) representations in the galaxy-planet CM system in agreement with the formula (3), they are reducing with drifting away from the planet volume polarization center:

$$v_{internal\ core} > v_{external\ core} > v_{mantle} > v_{lithosphere} > v_{atmosphere} > v_{stratosphere} > v_{mesosphere} > v_{near\ space}, \quad (40)$$

here $v_{internal\ core}$ - is the topological frequency of the planet internal core; $v_{external\ core}$ - is the topological frequency of the planet external core; v_{mantle} - is the mantle topological frequency; $v_{lithosphere}$ - is the lithosphere topological frequency; $v_{atmosphere}$ - is the atmosphere topological frequency; $v_{stratosphere}$ - is the stratosphere topological frequency; $v_{mesosphere}$ - is the mesosphere topological frequency; $v_{near\ space}$ - is the topological frequency of the near space.

The following generalized thermodynamic potentials distribution, for example, for our planet - the Earth according to the conservation laws and masses (potentials) correlations, could be represented in a more general sense in absolute conformity with Markoff chains mathematics [27]:

$$\bar{\nabla}_0 U_{nl} \geq \bar{\nabla}_1 U_{я} + \bar{\nabla}_2 U_{.M} + \bar{\nabla}_3 U_{.lum} + \bar{\nabla}_4 U_{.am} + \sum \bar{\nabla} \iiint_{x dx} U_{npov}. \quad (41)$$

here, $\bar{\nabla}$ - is the Hamiltonian operator, it is the confirmation of the fact that the interaction energy is distributed in agreement with the signs of the interaction vectors of any spaces - structures, associated with some generalized thermodynamic potential; $\bar{\nabla}U_{nl..}$ - is the planet generalized thermodynamic potential; $\bar{\nabla}U_{я.}$ - is the generalized thermodynamic potential of the planet core, $\bar{\nabla}U_{.M}$ - is the generalized thermodynamic potential of the mantle structures, $\bar{\nabla}U_{.lum..}$ - is the generalized thermodynamic potential of the lithosphere structures, $\bar{\nabla}U_{.am.}$ - is the generalized

thermodynamic potential of the atmosphere structures, $\sum \bar{V} \iiint_{x\delta x} \iiint U_{npou} x\delta x$ - is the generalized thermodynamic potential of the other substructures.

At the same time, the local volume of each specified structural level in conformity with the scale (2) has its definite polarization center associated with the CM polarization depth (depth – i.e. the level of the solar system disequilibrium) and the local potential gradient associated with the definite frequency on the scale (2). *The local* potentials interaction frequency within the limits of this local volume with greater distance away from the polarization center is subordinated to the same rule: high frequency of the local volume substructures potentials correlation in proximity to the local polarization center reduces with greater distance from this local center. At the same time topological temperature of the global planet system, as well as the potential gradient generated it generally remain close to a constant in accordance to the integrated entropy values fluctuations at about some optimum constant value. Within the separate volume in the result of its generating potentials frequency correlations drop the specific structural formations would be generated in absolute conformity with the same principles: the medium polarization center and this polarized space reaction are associated with the real temperature and medium anisotropy. This could be Benar cells, and the associated different molecular and similar formations in the mantle, structural formations in the liquid-solid part, structural molecular, atomic and the other formations in the lithosphere, etc. The dissociation, decomposition of the molecules and other formations in the atmosphere, stratosphere and mesosphere top layers processes, characterized by the higher potentials frequency correlations of the new polarization centers in absolute conformity with the conservation laws, start in the top atmosphere layers as the result of sun and galaxy radiation and primary polarizing potential reduction. However, this process is also observable for the other planet layers in the form of local disintegration processes to the smaller structural formations with the higher frequency characteristics of the separate structures, but not the general structure and the associated volume, potentials correlations. The potentials, which had defined the compensation processes structure in relation to the planet polarizing general center, frequency correlation variation is constant for the global structure.

The primary impulse, in conformity with the formula (4), which had resulted our planet generation, had polarized the definite volume V_0 of the solar system topological space. This symbol is associated with the size of the volume participating in the coupled polarizing processes or, in other words, it is an element of the polarized subspace space-like extension, with the required definition of the concepts of time \bar{T}_0 and temperature Φ in it on the basis of the equations (3 - 9) physics, and also the physical essence of the exponentially - topological description of the wavelength L_i , which is inversely proportional to its topological frequency ν_i . Consequently, the temperature within the separate system in the polarized space would be inversely proportional distributed to the polarization time of this space:

$$\Phi = f\left(\frac{1}{\bar{T}_0}\right). \quad (42)$$

That is the only base for consideration the nonlinearity and openness (non closeness), i.e. the researches would be valid.

The total history of the planet Earth present state formation had been occurred within this polarized space between some global catastrophe (bifurcation state of the planet system substructures) and the next one, and later the bifurcation processes would be suppressed by more global polarized volume states, including planet, and the planet would transit or not transit to its new evolutionary level in the result of processes in the Solar system and Galaxy.

The planet structures: its core, external core, mantle and the upper mantle part, lithosphere, atmosphere, etc. were formed, changed and changing within this already polarized space V_0 and they stay within definite CM volume and potentials gradient ∇U_0 and also ∇U_i .

The above stated non consideration for seismic, meteorological, and also climatic, sociological and the other events is equivalent to the searching for the needle tip in the haystack.

The generalized potential would change at these processes generation, that would be defined by radiation (entropy outflow from the system), and also it would be defined by $|\Delta S|$ generation which could be used for the new structure generation within the initial system (system complication), i.e. the evolution process realization. That is why the following statements understanding is extremely important.

“Scillard and Bruelenn’s fundamental researches had dedicated that indefiniteness decrease is quantitatively associated with the entropy exchange. The transferring information quantity is defined by the indefiniteness decrease [24, p.258]

$$\Delta I = -\Delta H \quad (43)$$

There is the following proposition in the above mentioned work: “Shannon’s basic idea was to consider symbol set from the alphabet $\{A_i; \mathcal{O} - 1, 2, \dots, \lambda\}$ as the random process in which every symbol could be generated with the probability p_i . Shannon had chosen $\log p_i^{-1}$ for measuring the indefiniteness eliminating with the letter A_i generation. Each symbol averagely eliminates the indefiniteness

$$H = \sum_{i=1}^{\lambda} p_i \log \left(\frac{1}{p_i} \right) = - \sum_{i=1}^{\lambda} p_i \log(p_i) \quad (44)$$

(the logarithms base could be arbitrary). This parameter is referred to as informational entropy (sometimes just information or entropy)”.

Shannon’s prescription could be formulated in the following way:

“The information of one symbol = the average indefiniteness of one symbol”.

“Shannon’s indefiniteness of the system with n constants would be defined by the following formula [23, p. 258]

$$H = p_i \sum_{i=1}^n p_i \log p_i^{-1} \quad (45)$$

here H – is the average value of the definite states indefiniteness $\log p_i^{-1}$ ”.

At the same time the system can sustain the equilibrium state only within limited time period, then after the processes (Belousov autowave processes) in the environment (in the CM) action, its entropy would either decrease, or increase, or any part of the energy, and entropy (the internal entropy outflow) would be “released” for the new features of information flow internal generation from the environment by the new structure generation with new communications (the external entropy outflow) with CM. So, the total system entropy would remain in the average value proximity, but the global system had became more complicated, it had got new facilities of conservancy in its evolution way.

Every indefiniteness variation is associated with system entropy variation [23, p.258]:

$$\Delta S = k_B \cdot \Delta H \quad (46)$$

here: k_B – is Boltzmann constant, and H value is calculated with the natural logarithms.

But as not every entropy is associated with the information transfer the following inequality is generally valid:

$$\Delta I \leq k_B^{-1} |\Delta S|. \quad (47)$$

This inequality represents: information transfer is always less than entropy transfer (in the k_B measurement units). The information concluded in ΔH and ΔI contents would be determined by the polarizing process followed by the structure generation and its dynamics within definite period of time depth. Therefore, any process in our world consideration, should consider the asymmetry or to be more precise – the definite space, definite level asymmetry polarization, and also the so-called supersymmetric state within this CM structural level. The above presented approach gives the composition of the field theory in giga-, mega- and macro-world (“discontinuous space” - Crone’s “tiring - topology”) and the theory of asymptotic freedom in

the submicro-world (it is the “rubber belt” in the terms of the customized and developed so-called “classic, fundamental” methodology).

As it is known, “Shannon entropy depends only on the probabilities of the required information generation by the stochastic source, therefore it is the source property and it does not characterize the separate message” [24]. Therefore it is necessary to use the higher entropies, with the elements being not the separate structures, but the higher order structures or the structures with the rank r , which the information of our interest, being in this structure, is “embedded” in, for the problem decision. Thus the value n should be considered as the rank in the formula (3), with the associated structure complex ∇U_{str} and the associated set $\{h\}$ representing the CM polarization level characteristics. In this respect it should be emphasized again, that more low-frequency characteristics of the polarized media and subsystems dynamic potentials proportions in the global system within the extra-low frequency range are associated with the higher rank.

If the information source (for this problem particularly – it is the system “Sun – planet core”) was stationary and it generated the ergodic Markov sequence (the generalized dynamic potentials proportion) within the definite extra low frequency range spectrum, the inequality $S^{(r+1)} \leq S^{(r)}$ is valid and there is the limit [23-26, 40]

$$S = \lim_{r \rightarrow \infty} S^{(r)} = \lim_{r \rightarrow \infty} \frac{S_r}{r} = \lim_{r \rightarrow \infty} \bar{h}_r. \tag{48}$$

Here the S value is the information source entropy, later it would be referred to as S_{inf} . The generalization for the case of the m -order Markov source is like:

$$S_r = S_{r-1} + (r-m)(S_{m+1} - S_m). \tag{49}$$

It is clear, that for the m -order Markov source analysis, it is enough the entropies up to $(m+1)$ -order inclusively calculation.

If the probabilities were substituted by the relative frequencies embedded, both to the structure of our interest and to the structure of the higher rank, the following modified entropies would be found:

$$S_r = - \sum_m h_m^{(r)} \log h_m^{(r)} = \log N^{(r)} - \frac{1}{N^{(r)}} \sum_m N_m^{(r)} \log N_m^{(r)}, \tag{50}$$

here $N_m^{(r)}$ - is the absolute frequency of the m -th mode of the structure with the rank r in the specified set:

$$\bar{h}_m^{(r)} = \frac{N_m^{(r)}}{N^{(r)}}, \quad N^{(r)} = \sum N_m^{(r)}; \tag{51}$$

$$\left. \begin{aligned} \bar{h}_k^{(n)} &= \frac{N_k^{(n)}}{N^{(n)}}, \\ N^{(n)} &= \sum N_k^{(n)}, \\ S &= \sum_{x_0}^I \frac{n(x)}{N} \log_2 (n(x)/N), \\ S_{inf} &= \frac{6.62}{I^{3.59}} \ln I. \end{aligned} \right\} \tag{52}$$

The I value should be calculated on the base of (31), (43), (46) and (48) and the wide-range gradientometer (WRG) system data. At the same time $N! = W \cdot n_\xi! n_\xi!$. Also it is necessary to remember that $\nabla \Delta H$ in (43).

But the concept of information containing the initial CM polarization and the following system polarizing processes evolution in respect of the conservation laws should be included into the above stated representations honestly and carefully considered by Zalitchev [40]. That’s the only way to the theory of fractals-fractons-phonons in the form of similar structures-volumes in the stratified space within the extra wide frequency range including extra low frequencies ($<10^{-3}$

Hz) and the associated concrete values of the generalized dynamic potentials gradients, charges and also entropy as the basic and for some reasons enough sufficient dynamical characteristics of the considered process. In the other words, the volumes (structures) with the generalized thermodynamic potentials, coupling coefficients and generalized charges characterized by frequencies either less than 10^{-3} Hz or more than 10^3 Hz should be considered and analyzed for the frequency range of, for example 10^{-3} Hz.

Every generalized thermodynamic potential should be represented by information of some structure, it could be accepted on the base of its hologram (geometrical, or to be more precise, topological image) generation and associated evolution dynamics analysis only, this mean that the processes in the environment should be considered. In the other words, Markov's chains should be used, but in this respect the physical processes in the analyzed media following after the conservation laws should be considered. And the real events in geodynamics, economics, society, etc. forecast program should be based on the mathematical program of the WRG system data objective analysis [1, 51, 52].

However it is possible only on the base of coupling coefficients and the associated physical constants defined by general principles and maximally associated with the world nonlinear physics.

5. CM POLARIZATION LEVEL AS THE INFORMATION CONTENTS IN THE ANALYSED SYSTEM (VOLUME-MASS) CHARACTERISTIC VALUE

The radiation processes within the CM physical characteristics, depend on the global interactions complex. This could be expressed by the gradient dynamics between the potentials U_{str} and U_{CM} in absolute conformity with (3) and (4), and also it could be expressed by physical and topological contents of the coefficients ξ , \hbar , k and entropy – matrix S_{inf} definition with consideration of their proportions dynamics for each case on the base of the process previous period system analysis data received from WRG monitoring system. But for this reason the physics of the concepts “kinetic energy” and “mass” should be used on the base of the stated principles in conformity with CM volumes polarization level and hence, the information, participating in this processes.

Any structure (any weight) interactions with the stated mechanism are characterized by the energy radiation with the strictly definite frequencies and the wavelengths defined by the potentials gradient within the structure ∇U_{str} and in the environment ∇U_{env} , in absolute conformity with N.Umov's and I. Pontryagin's works. This could be represented by any system great (generalized) potential using the non-equilibrium processes thermodynamics terminology:

$$\nabla U_{cmp} = \nabla \sum \nabla \sum_{j=1}^n q_j \frac{\partial U_n}{\partial X_j}. \quad (53)$$

On the stated basis the considered processes unity and validity could be represented by the tensor analysis and the associated networks topological parameters [2]. Thus one very essential G.Crone's remark based on G.Maxwell's work analysis should be mentioned [2,3]: “The motion equations representing the network character definition gives the opportunity of two variants of the network response, following the conservation laws action, presentation:

1. the currents in the closed loops;
2. the “potential differences” in the nodal pairs.

In the work “Electricity and magnetism” [3] Maxwell had developed two specified approaches but only the first method is used for some reason. Maxwell had considered the node potential, of any network, as the reference potential or the grounding “potential” and had calculated the potential differences between this node and the other ones... Each of the network types has the specific “motion equation”, describing the network behavior.” [2]

At the same time the similarity principles specific for the considered allocated space are implemented between the nodes following the fractality principle. For the facing problems

decision, these are our galaxy as the “grounding” centre, and our star, and our planet are considered as the “nodes” with their “nodes”.

∇U_{env} occurrence is followed by the compensatory processes situation station via the bifurcational state and new structures like the “strange attractors” formation at the first stage in the result of the medium anisotropy. But at the following stage the strange attractor acquires more concrete edges, i.e. the new structure - attractor attributes generate due to the global gravitational fields action. The primary structure disordered equilibrium could be restored by the new structure completed formation.

The polarized self-embedded CM “volumes” are represented in the medium of the more polarized (more low-frequency) CM level following the similarity laws (“fractality”) depending on the interaction vector direction in the form of the fractons and the associated phonons various invariant holograms [33, 42, 43, 49 - 51].

The potentials difference between our world and LMP predefines the set of variants like $\nabla div U_0$ and also $\nabla rot U_n$ generation. But they would be associated to the definite potentials gradients in the LMP and in the global CM system. At the same time the different potentials gradients between some concrete value $div U_0$ and $\sum rot U_{1-n}$ within the LMP would be generated in the result of CM anisotropy by the conservation laws. The greater this potentials difference would be, the more polarized subspaces V_i would participate in the compensation process with the reverse sign. This logic is valid for the so-called *pseudo-Euclid space (E^n)* and *Riemann's space (R^n)*.

The mechanisms of the system interactions with medium on the base of the conservation law and nonlinear physics laws should be considered for the system openness and first of all association with LMP analysis. This deals with any system complication by the accumulated information in its infinite evolution way, the transition to the more complicated structure with the greater opportunities for the correct continuous safety decisions would be provided. But the system saturation with the new facilities is associated with the system immersion to the more deep CM polarization level, i.e. it is realized in our visible world by the exponential topological dependence based on the monodromy principles with the self mirror image and the mirror image in the LMP within the exponential topologic spaces but with the reverse sign.

The known concepts of the saddle point or the saddle are the most valid in topological essence. The saddle point is unstable following Lyapunov's theory. Whether the matrix $A = f'(x_0) \neq 0$, the singular point x_0 (the matrix space-volume polarization center) should be close to the saddle point variant. Thus the characteristic values $\lambda_1, \lambda_2, \dots, \lambda_n$ of the matrix A_n should be sufficient for the following restrictions: $\lambda_1 \leq 0 \neq \lambda_n$; $\lambda_0 > \lambda_1 > \dots \lambda_n < 0$.

For every case the point x_0 could be the saddle or the node or the other point for the system. Whether it was the saddle point, then every x_0 adjacent half system trajectory (i.e. visible in our baryon world) would tangent the directions defined by the matrix characteristic vectors in this point. On the base of the historical development of the above stated ideas and with the help of the real physics advances the local for the definite medium polarization centre had been established to be the centre of any structure generation in the visible world in conformity with Vlasov's fundamental equation (12), in which $E(r, r')$ - is the core with the essence of the global and exact energy of interaction with integration by every distance, r and r' - are the spatial coordinates of the core interaction with the environment. This equation had been the base for the gravitation theory development and the associated equations set defining the geodynamical processes description methods without any postulates and assumptions. The mathematics of the planet polarized space and its structures polarized in the CM interaction topology should be involved in (12) in the form of the associated matrixes following N. Umov, A. Markov, L. Pontryagin and I. Prigogine (these are the equations (4) and (5)).

But as the mathematical description of the nonlinear processes in the environment requires the topological principles introduction, the principles of the nuclear normed space

should be introduced to the matrixes defined by the equation (12), whereas the real space of our planet and its geodynamics are finite-dimensional in the polarized embedded spaces association. Such spaces obtain the approximation property. This means, that any continuous linear operator in this space could be approximated by the finite rank operators (i.e. the continuous linear operators with the finite-dimensional images) to the precompact convergence in the operator topology. In this space every linear continuous mappings to the Banach's absolute normed vector space are the nuclear operators. Thus on the represented formulas base the nuclear and exponential topology necessity had been established in association with the geometrical distances away from the centre increase and these geometries kinetic energies decrease in conformity with the formula of the kinetic energy: $dU_k = dV_i \otimes \int \nabla_n U_i \partial \tilde{T}(V)$.

The local models with a set of structural beams $\Phi(N)$ should be used simultaneously with the finite dimensional case for the models of formulas (30) and (33). (B – is the planet space in the Banach's space, and it is N in the variance sense). The open set in the space B and $\Phi(\Gamma)$ should be defined as the factor of the potentials analytical mappings $U \rightarrow \Gamma$ germs beam on the beam of mappings like $x \rightarrow \varphi(x)f(x)$, here $\varphi: \text{Hom}(U_0, \Gamma)$ – is the local analytical mapping, and $\Phi(N) \subset \Phi(\Gamma)$ is generated by the mappings in N . The above stated positions allow the process representation in the form of Banach's analytical variety – i.e. it is locally isomorphic to the Banach's spaces opened subsets.

In accordance to the exponential topology the following sets are generated:

$$\langle U_1, \dots, U_n \rangle = \left\{ \hat{E} \exp U : E \subset \bigcup_1^n U_i \ \& \ E \cap U_i \neq \emptyset, i=1, \dots, n \right\} \quad (54)$$

here, E is the polarization center, and it could be represented as the point $\exp U_i$, associated with the considered closed set $E \subset U_n$ with the opened subsets, following Vlasov's formula (12) and his notation, and on the basis of the author's researches.

The homeomorphism and mapping concepts are quite approved for systems, structures and substructures of the world around us researching, as it follows from the fig. 1 and formulas (4) - (6) analysis. And there is one rather important circumstance following from the Arnold's catastrophe theory about mapping and Whitney's features [53].

The gradient mappings are transformed to the normal ones in the polarization centre point under definite conditions. The scale (2) physics should be mentioned here, i.e. $\text{div} U_0$ of our planet matrix (A_{Sp}) is one of the $\text{rot} U_{n-1}$ in the Solar system structure matrix A_{St} . This provides the symplectic space theory including their isomorphism application for the mapping by bifurcation state in the LMP and this state suppression by the more global polarized fields, or in our words – the more global gravitational fields using for the considered processes analysis. The monodromy mechanisms defining one-to-one bicontinuous variety mapping to itself should be considered for the geodynamic processes analysis at the same time. And this mapping is not the identical transformation. It could be realized by the separate local polarization centers in the bifurcation processes. These points are generally not only the members of the planet space, but they are in the space which some image could be mirrored to. But bifurcation system generation followed by the above mentioned mechanism requires several or almost every structural level of the mapped system simultaneous transition to the bifurcation state notably in the respect of the medium of mapping anisotropy.

The following conclusion results from the stated researches: every new volume in formulas (17) and (18) would be characterized by the associated energy contents (information features), multi-variety of the interactions by the direct and reverse communications with the environment and the structures within the system depending on the polarization center of the CM space in which it had been generated characteristics.

As ∇U is the constant value for the total system including some considered subsystem and this global complex is the part of the CM polarized space system speaking of the whole integral not destructed system and its subsystems within definite time period, the corrections for $\text{grad } U = \text{const}$ should be made at every stage. But that is the reason for the space generated by

this gradient strict stratification by the impulses in accordance with the relations in the formula

$$\int \nabla \left\| \sum_n \int v_n \partial v_j \right\| \text{ or in the formula (5) in accordance with the impulses: } \sum_n rot U_n .$$

The result of the basic conservation law action in the open nonlinear system is observable here: the system structure content complication, this structure acquisition of the new communications with the medium and consequently this structure stabilization.

But then the distance in this space which is denoted as L_x or L_i should be represented by the exponential topology as its contents is determined by the polarized spaces with different geometrical shapes and concrete frequency complexes $v_n \partial v$ in the dynamics of the analyzed system kinetic energy damping relations during the screening and anti-screening processes in the form of polarized spaces with different geometry and volumes relatively the global planet polarization center, as ∇U is constant. In this respect the necessity of exponential topology has its representation in the associated structural formations potentials frequency characteristics decrease with distance form the polarization center of the considered volume increase, but these frequencies total integral sum was predefined like ∇U by the primary polarization resulting the analyzed system generation.

Therefore with the certain $\nabla U_i \in \nabla U_n$ the dynamic system develops the chaotic properties that results the compensatory processes with different degrees realization. These compensatory i.e. driven processes $\sum_i rot \|U_i\|$ are characterized by the frequencies in the range of $10^{-3} - 10^{-5}$

Hz, and they are associated with the total geodynamical complex. The specified potentials complex generation directions would be defined by the WRG system associated channels orientation deviation.

The distance away from the new formation core should be defined by the polarized waves lengths and within the associated frequency range of $\geq 10^{-6} - 10^{-7}$ Hz with the resprct of the future event focus border starts its generation in the border of the “mantle-lithosphere” in absolute conformity with Benar cells dynamics in the mantle and Bartiny’a mapping in the form

like $x_i = \sum_{T=1}^{n+1} a_{iT} x_{iT}$. Then for every real a_{iT} the unitary transformation with the coordinates g_{iT} would be like

$$g_{iT} (\delta_i \delta_{iT}) = \sum_{\mathcal{F}} a_i \times a_l = \sum_{\mathcal{F}} a_{Fi} \times a_{Fl} (i, \tilde{T} = 1, 2, \dots, n+1) \tag{55}$$

here $(\delta_i \delta_{iT})$ are absolutely associated with (34) and they are orthogonal, as $\det a_{iT} = \pm 1$. Hence this transformation is the representation of rotation or the inversion turn with the cosine law using in the calculation programs and hologram topology design with the consideration of these processes mappings to the planet polarization centre (gravity centre) and to the LMP.

\mathcal{F} – is the polarized space temperature in (55), it is defined by this space geometrical (topological) characteristics during the time period \tilde{T} , i.e. the greater volume L had participated this associated polarization processes, the less is the frequency of the interacting potentials. Benar cells generation and the plankton displacement lanes are the best confirmations of the above stated positions.

But at the CM anisotropic space sets start interacting in the more deep level than the potential U_0 , these varieties geometry would be defined by their metrics measured by the interval, and more convenient - by the Bartiny’s quadratic form within strictly definite period of time:

$$\Delta Z^2 = \Phi_n^2 \sum_{iT}^n g_{iT} \Delta x^i \Delta^{\mathcal{F}} (i, \mathcal{F} = 1, 2, \dots, n) \tag{56}$$

This interval depends on either the coordinates function g_{iT} , or on the number of independent parameters Φ_n function. In the formulas (55), (30), (33) and (34) associated with

either substructural CM polarization level including the levels of “asymptotic freedom” processes and further more to the LMP, or with the mega-structural level of the Solar and Galaxy systems etc. by their geometries.

The flow $|\Psi_i\rangle$ in the form of $|\text{div}U_0\rangle$ in Vlasov’s formula (12) results the reaction in the planet structures in the form of the bifurcation processes associated with $\{\nabla U_n^{\ddagger}\}$ under the conservation laws action.

The sets of one-parametrical transformations of the space B to itself would be like $\nabla U_n^{\ddagger_1+\ddagger_2} = \nabla U_n^{\ddagger_1} \circ \nabla U_n^{\ddagger_2} = \nabla U_n^{\ddagger_2} \circ \nabla U_n^{\ddagger_1}$ for any \ddagger_1 and \ddagger_2 , here \ddagger_1 and \ddagger_2 are the time periods. And furthermore $B \subset U_n$; $\nabla U_n^{\ddagger} \bar{B} \subset B$ if $\ddagger = 0$ here, \bar{B} is the B closure; ∇U_n^{\ddagger} - the finite dimensional variety (B,S) differentiable mapping [33]. The same approach is also appropriate for the system $U_n \subset U_i$. With the certain $\nabla U_i \in \nabla U_n$ the dynamic system develops the chaotic properties.

Considering the attractor to be the definite evolutional “target” (system complication) by the structures complication, we’ll always have the certain area $B(\nabla U_n)$, that is the area of the attraction (absorption) or the attractor ∇U_n . The ∇U_n attractor, in turn, is the area of the attraction (absorption) of the attractors of the subsets ∇U_i . Thus, the set $\bigcap_{T>0} \nabla U_n^{\ddagger} B$ is being referred to as the maximal attractor in the absorbing area $B(\nabla U_{pc})$, here ∇U_{pc} – is the thermodynamic generalized potential of the planet core. ∇U_n^{\ddagger} , B and $\{\nabla U_n^{\ddagger}\}$ - characterize the shift reflection, the phase space and the dynamic system with the properties corresponding to the data of the actual research results analysis. The considered space has the measure $\{B, E, \mu\}$ - here E - is the σ - algebra of the subsets ∇U_i , μ - is the definite measure in E , i.e. it is the invariant measure respectively the ∇U_n^{\ddagger} transformation, whether $\mu(\theta_n) = \mu(\nabla U_n^{-1} \theta_n)$ for any $\theta_n \in E$, here θ_n - is thermodynamic capacity, it is the analogue information capacity, and E is associated with the polarization centers set by the Vlasov’s formula (12).

In this case $\{\ddagger\}$ takes the discrete set of values $\ddagger \in \mathbf{Z}$, $\ddagger \equiv E$, $\{\nabla U^k\}$, associated with the dynamic system with the discrete time or the formulas (54) and (55) reflection. The area $\{\nabla U_n\} \subset \{\nabla U_i\}$ is absorbing one, as $\{\nabla U_n^{\ddagger} \bar{U}_n\} \subset U_n$, here \bar{U}_n is the closure of U_n , as well as \bar{U}_i is the closure of U_i , whether $\ddagger > 0$. The dynamic system is extremely sensitive to external influences (Ψ_{BC}) in conditions of chaos proximity, that leads to the sequence of independent self-organizing actions generation, both inside the set ∇U_n^{\ddagger} , and in the subset ∇U_i . And this process is observable in the frequency range of $10^{-3} - 10^{-5}$ Hz associated with the formations $\sum_j \text{rot} \|U_j\|$

with the topologic parameter \mathbf{r}_j . The last one is associated with the boundary zones of “lithosphere-atmosphere” or “lithosphere-pelagic environment-atmosphere”, and it represents the processes of the planet CM polarization by the new structural formations within the global complex of the compensation processes in mantle – lithosphere – supra-lithosphere environment etc. These parameters relation in the form of CM wave excitations within strictly definite frequency range characterizes almost any process of interaction and new structure generation. The absolute mapping of the specified processes global complex is realized by the new potential energy (in terms of the potential and kinetic energies physical concepts represented above) values establishment following the conservation laws. This potential energy is concentrated within the planet volume but this volume structure is already more complicated with the topological parameter to be at the final stage of the new volume - planet structure formation in the form $\mathbf{r}_j(\mathbf{v}_j)$ and $\mathbf{r}(\mathbf{v}_0)$, with the global complex of the previous frequencies. Here it is necessary to emphasize again, that \mathbf{v}_i - is the complex of the frequency characteristics associated with the new structure generation start in the concrete coordinate within the boundary “mantle-lithosphere”. It results the situation of the chaos proximity. And \mathbf{v}_j would define the frequency

characteristics complex of the new structure generation final stage, but it would be the other geographical coordinates within the boundary of the united association “mantle-lithosphere-atmosphere”. This allows the catastrophe coordinates calculation by the program based on the above stated physical – mathematical principles, global planet observation data and the cosine theorem.

The concepts of ξ and k should be characterized by the global complex of the uncompensated polarization processes $\sum_n |rot U_n|$ within the planet CM, including the screening and anti-screening complexes. The level of the considered matter structural form should be defined by the energy proportions associated with potentials oscillation frequencies within the analyzed volume. The following legend would be further used – the index i and Hamiltonian ∇_i . The definite state duration statistical weight is inversely proportional to this state variation probability. This question should be investigated in detail separately, especially in scope of the latent matter part (LMP) consideration. That is why the most probable actual number of the ensemble configuration measurements is the number n_0 which provides the maximal value in the cascade contents $\{\pm v\}$ relatively the visible and with the excited (with the inverse sign) part of the CM in association with $div \bar{U}_{0-1}$ generation. That would be represented by the earthquake with the level of $M = 8 - 9$, or the hurricanes (typhoons) complexes with the category more than 3.

In this respect the function $\Phi(v)$ inverse value is associated with the more low-frequency range with the constant mapping into the LMP in the result of conservation laws action within the media constrained by the polarization processes which are defined in the analyzed system by the polarization impulses following the next general rule:

$$\Phi_{pl} = 1/\Phi(v) = {}_z U_{n-1} = {}_t V_n. \tag{57}$$

The isomorphous functions of the surface space U_{n+1} - are the hyperspheres with the unit radius within the $(n-1)$ -dimensional space with the volume of n -dimensional one. For example, it could be the “hyper-torus” with the potential U . And ${}_t V_n$ is the time period of the frequency generated the considered volume within the polarized system, it could contain the giga-volumes of the medium information, which also could be characterized by $F=2.74$ K [16, 17, 25, 26].

The index F is associated with the topological temperature in the form of time extremely various transformations within the CM function.

Every \bar{U}_n value in the fig.1 and in the above represented formulas could be expressed by:

$$\bar{U}_n = V_n = \frac{\partial V_1}{\partial x_1} + \frac{\partial V_2}{\partial x_2} + \dots + \frac{\partial V_n}{\partial x_n}, \tag{58}$$

here $\partial \bar{U}_n$ - is the additional planet polarization potential; ∂V_n - is the planet additional volume; ∂V_1 - is the new volume at the distance ∂x_1 away from the planet system polarization center; $\partial x_1, \partial x_2, \dots, \partial x_n$ - are the associated distances within the field of the CM polarized part in the planet system.

But the following circumstance should be considered for the formula (58) analysis: the intervals $\partial x_1, \partial x_2$, etc. represent the set of distances between the volumes. These distances are the volumes representing the distances and the definite angle (φ) from the polarization center of the global system, i.e. the polarization center of our planet. The volumes and these distances represent definite potentials with the opposite sign proportions, and they are characterized by the strictly definite relations – the potentials with the opposite signs interactions. Their energetic contents also would be various and it would decrease in appropriate way following the exponential law with the exponential increase of the distance away from the polarization center. That is why they would stay within the integral system generally defined by the initial potential and the state – the CM reaction which this potential had been realized in. But this would predefine the following processes of the secondary, tertiary, etc. CM polarization processes, screening and anti-screening ergodicity, and the total mathematics associated with the concept of ergodicity and “Markov’s chains” application validity.

Any way these principles are adequate for the ergodic concept. In the conformity with this concept the time and space aggregation is the equivalent aspect of the variety, and they are characterized by the generalized thermodynamic potentials, entropy, electric charges complex cascades association processes integrity, and consequently by the dynamical resistance and the associated dynamical capacity of the system in the topological contents. That would be characterized by the additional space polarization associated with the primary scalar $\mathbf{div}\bar{U}_0$ and the definite polarization processes in the space characterized by $\left| \sum_n \text{rot}\bar{U}_n \right|$. They would have the mapping in the CM LMP at the deep enough CM polarization level with the opposite vector orientation in the associated interwoven stage. Or in other words that would be the compensation process or the nonlinear multivariable world conservation laws action to the potentials proportion $\mathbf{div}\bar{U}_{0,1}$ and the associated events within the medium $\left| \sum_n \text{rot}\bar{U}_{n-x} \right|$.

That is why the most probable actual number of the ensemble configuration measurements is the number n providing the minimal value of (ν) (for example $<10^{-10}$ Hz), it would be associated with $\mathbf{div}\bar{U}_0$ generation, and the compensation processes would be within the range of $>10^{-7}$ Hz.

The volume associated with some definite Riemann's space (R^n) (the inseparable part of our space, our Universe) polarization depth would be in strict relation with the initial value of the potential difference in the LMP polarized space extension. That is the reason for

$$\nabla U_0 = \frac{\hbar L_i}{\nu_i}, \quad (59)$$

Here L_i - is the exponential topological (volumetric – vector) parameter of the CM polarization, including LMP realized within the strictly definite CM volume with the strictly definite action frequency ν_i , associated with the polarization depth “ n_i ”, i.e. with \hbar_i^n and the wavelength $\nu_i=1/L_i$. As it is known, the less would be the wave frequency, the more is the length of the space polarized by it and on the contrary. That is why this parameter generally in its integration with pseudo-Euclid geometry and Riemann's space could be referred to as the Minkovsky space – time parameter and on of the basic criteria for the future events coordinates establishment, including some natural accident.

The coefficient \hbar would have the same physical contents in the topological essence for our visible baryon Universe part and for the part of the Universe which is referred to as the dark matter – the source of our CM part generation. But the facilities of information reception and transmission by the holograms immersion into the field level $\nabla \mathbf{div}U_0$ and LMP as it is represented on the fig. 2. follows from that.

The stated cascades is associated with $\left\{ \sum \text{rot}U_n \right\}$. But speaking of our world openness and the dark matter commensalism, the processes mapping to the LMP, which is practically uninvestigated, should be applied.

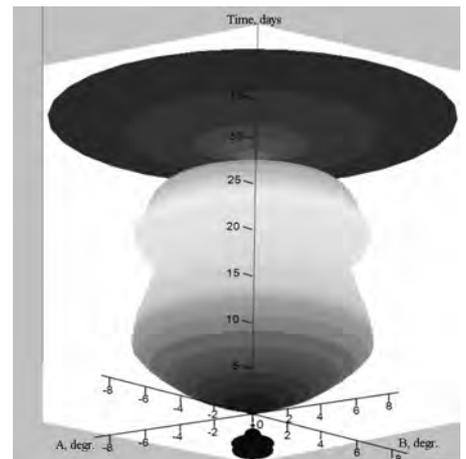


Fig.2: The hologram of the generated new structure being the reason of the disaster in the form of earthquake with M=8

The concrete value of the CM volume V_i defines the potential energy participating in these processes definite value. The volume with the greater CM space polarization level generates the higher value of the potential energy participating in some process. But than the greater spaces specter would participate in the compensation process or in Markov, Pontryagin

and Prigogine's space stratification process. Therefore the following detailed analysis should be based on Bartiny and Pontryagin's works, and it should consider that the polarized space (planet) entropy is constant within definite period of time, and its kinetic energy would be approximately constant, i.e. $U_k \approx \text{const}$. Therefore the definite value dV generation is followed by the processes characterized by the value $\int \nabla_n U_i \partial \tilde{T}_0$, it could be represented by, for example, synoptic and seismic processes which are closely interconnected. Their dynamics could be calculated on the base of the WRG system indications: the primary signal dV_{mh} within the frequency range of $10^{-7} - 10^{-9}$ Hz, and the signals characterizing $\int \nabla_n U_i \partial \tilde{T}$ would be within the frequency range of $10^{-3} - 10^{-6}$ Hz. They would be associated with the frequencies complexes of the cyclones, hurricanes with the earthquakes with $M < 6.0$ in the form of integral complexes of Ivanov's foreshocks, and finally the earthquakes with magnitude $M > 7.0$ or the hurricanes of the 3-rd and higher category within the strictly definite period of time.

Entropy is the interwoven measure for the wave function $|\Psi(\partial \tilde{T})\rangle$. It should be calculated on the base of the above stated principles solutions. The following expression results from the works of Markov, Lyapunov, Kolmogorov and the executed researches with the accepted conditions:

$$S_{\text{inf}} = S_{\text{mon}} = - \sum_{j=-\infty}^n \xi_j \ln \xi_j, \quad (60)$$

here ξ_j - are the denseness reduced matrix characteristic values associated with Lyapunov's characteristic indexes specter with the sign "-". It is connected with the bifurcation modes generation, the most unstable planet structure part immersion to the chaotic modes and the global system transition to the space with the more low-frequency driving characteristics.

The new structure (Feigenbaum's attractors) would be generated on the next stage by the global gravitational fields transiting the system to the modes of the controlling chaos. This structure would have the focus - the new polarized space centre in the planet mantle - lithosphere in absolute conformity with the works of A.A.Vlasov and V.V.Ivanov, and this focus would have the dynamics within the stereotyped geomorphology, it could be sufficiently represented by the Sobolev's generalized derivative mathematics in the Sobolev's space [10, 21, 30 - 37].

Whether the dimensionless topological time \tilde{T} had been considered as the moment of time when the structure transformations had had stopped and had returned to the conditional equilibrium by the complex of cyclones, anticyclones, typhoons and earthquakes with $M < 6.5$, then the association coefficient ξ would be defined in the following form as the Lyapunov's characteristic indexes specter:

$$\xi_{n\tilde{T}} = \frac{\nabla \tilde{T}}{n}. \quad (61)$$

The calculations provided on the stated basis allowed the geodynamical processes association coefficients and the wave function estimation; they also had confirmed the absolute non-factorization of any atomic - field system. That would be especially evident in the CM polarization depth increase or in I.Newton's words - in the mater i.e. the mass density increase. The system polarization depth, its dynamical capacity and the associated potential concepts provided the effects for the special stations and instrumental systems, which could be the base of the essentially new decisions in the area of power, transport, cyclones and anticyclones trajectories correction, essentially new facilities for the information exchanging, sociology, etc. The considered instrumental system had confirmed the fact of the additional high-frequency waves generation within the different frequency crossed waves complex, previously established by the P.K.Oschepkov - the author of the first radar in the world. It had been the base of the formations with the electrical charges, magnetism nature understanding and the apparatus for the energy generation from the environment construction, and also for the foreshock reception 3 - 5 days prior the catastrophe.[54]

The following fact had been established in the result of the executed researches complex - the necessary information on any stage of the considered geoprocesses, could be found out enough sufficiently and valid only on the basis of its (topological) holographic representation analysis described by fig.2 and its subsequent physical and mathematical consideration on the basis of the holograms analysis in their dynamics within the total planet as the global system. The hologram (fig.2) is represented in the orthogonal coordinates. The vertical axis represents the time of global polarized space formation where the new structure had been generated as the catastrophe cause, within the extremely low frequency range. The global subsequent structure geometry had been embedded (generated) in this space within more high-frequency range of the frequency cascade, they are represented by the horizontal orthogonal coordinates on the figure.

6. THE MODEL OF GEODYNAMICS AND ITS PRACTICAL REALIZATIONS*

6.1. The Geodynamics model. The general geodynamics model is represented in the form of:

$$\begin{aligned} \|M_p\| &= \nabla \left\| \left(V_0 \int \left(\sum_n \int v_p \partial v_p \right) \partial v_p \right) \right\|, \\ dU_k &= dV_p \otimes \int \nabla_n U_i \partial \tilde{T}, \\ \|M_{nstr}\| &= \nabla \left\| V_{nstr} \left(\int \nabla \left\| \left(\sum_n \int v_p \partial v_j \right) \right\| \right) \partial V_{nstr} \right\| = \nabla U_{nstr}, \\ &\left(\sum_n \int v_p \partial v_j \right) = V_{i-1nstr}, \\ q_{i+1} &= \frac{1}{2} \cdot \frac{1}{4\pi} \sum_{i,j} \int \theta_i d\nabla U_{i,j} \partial \theta_i \partial \theta_j, \\ \nabla U_{nstr} &= \frac{\hbar_{str} L_i}{v_i} = \hbar_{str} L_i^2 \quad \text{and} \quad L_i = \frac{1}{v_i}. \end{aligned} \quad (62)$$

\tilde{T} - is the topological time of the structures generation within the core, mantle, atmosphere etc. processes set mapping; V_p - is the considered volume (in this case it is the planet volume associated with the definite mass with the concrete topological contents) in (62).

On the base of the obtained results and the principles stated in [1, 51, 52] the following fact had been established: the newly generated structure (the attractor) hologram mapped in the system of the polarized extra-low frequency spaces has the amplitude transmission $\mathcal{F} \left(\int \frac{v_i \partial v}{\partial \tilde{T}} \right)$ - the basic criterion for the required antenna construction design with the aim of the definite information reception.

The hologram should be designed in accordance with the model (62) on the base of the successive incorporation of the most low frequencies into the volume geometry, and after that the frequencies complex following the sequence represented by formulas (40), (54) and (58) with the final goal of the design test confirmation by the calculations with the formula

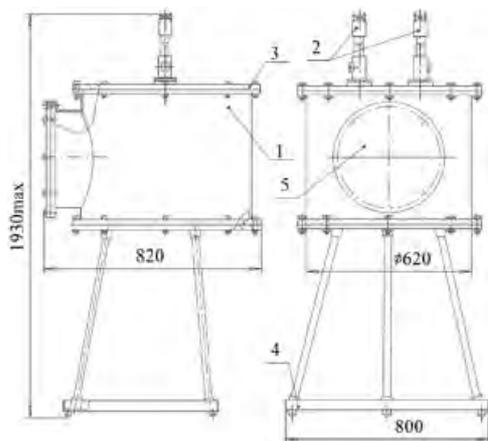
$$\left(\sum_n \int v_p \partial v_j \right) = V_{i-1nstr}.$$

6.2. The problem practical solutions. The state of the information carrier wave within the additionally polarized space – the base of the hologram of the newly generated structure – is

* This part of the work had been accomplished by O.V. Morozov, O.O. Morozov, V.N. Sharikov, O.D. Lamykin, S.P. Kurotshenko, A.V. Legkov, R.V. Parshutin, L.L. Semenov, A.V. Surkov, S.A. Shopin, V.A. Shoping by the author's leadership.

associated with the harmonics being multiple to the ν_x of the reference extra low-frequency waves from the range of $10^{-9} - 10^{-10}$ Hz is being the basis of the antenna construction at the stage of the required information restoration.

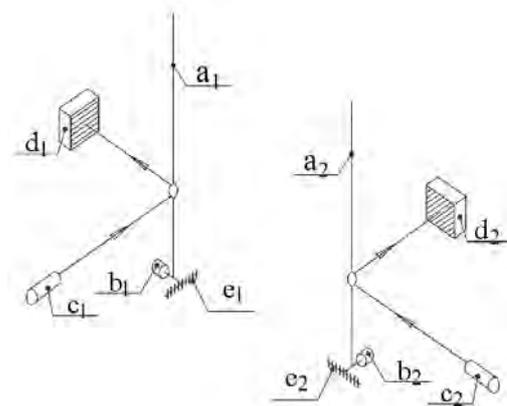
Therefore the accepting antenna construction should contain the “concentrators” of the wave harmonics associated with the definite extra low-frequency range and later with the wave harmonics set with the frequency ranges of: $10^{-7} - 10^{-5}$ Hz, $10^{-4} - 10^{-3}$ Hz, etc. up to the absolute compensation of the additional volume mapped by the primary wave, i.e. up to the new structure hologram final generation.



The antenna should be optically non transparent and non magnetic in its space, also it should be “released” of the planet gravitational field vertical component action, i.e. it should be the analogue of the “Cavendish balance”. But for the reason of the hologram “mapping restoration” the fixation of the waves by the antennas with the different natural oscillation frequency ranges is necessary. This could be accomplished by using the hangers systems with different heights associated with the antennas constructions and their orients with strict association in degrees with the longitude and latitude in relation to the basic wave received by the frequency of the planet ELF range.

Fig. 3: The wide-range gradientmeter:
1 - the case-screen; 2 - the fastening and adjustment device of the torsion system;
3 - the cover of the case; 4 - the supporting basis of the device; 5 - the working wiring

The WRG system consists of 3 subsystems (with 2, 3 and 4 channels); each of them contains the asymmetric, closed, metallic, grounded vessel, represented by fig.3. There is the system elements insensitive to the electromagnetic radiation of the macro world (the grad U of the gravitational wave reception block) inside of the vessel. These elements contain special antennas with the definite orient.



The torsion system schematic diagram is represented by fig.4.

The fig.5 represents the graphic received from one of the device channels in the undisturbed state associated with the Earth gravitational field disturbances absence. The vertical axis represents the rocker arm rotational angle in the definite units being referred to as A , the horizontal axis is the time axis. The fig.5 represents the torsion system equilibrium state and some deviations from this state with small amplitude.

Fig. 4: The torsion system: a – the hanger;
b - the trial body; c - the light-emitting diode;
d - the photo cell; e - the antenna.

The occurrence of perturbations in the gravitational field of the Earth, preceding the forthcoming compensatory processes in the mantle, lithosphere, atmosphere causes the steady large period (frequency range $<10^{-9} - 10^{-10}$ Hz) deviations of the device torsion system from the equilibrium state. The antennas deviation demonstrates the change of the direction and size of the Earth vector horizontal component gravitational field. The data, describing deviations, is being imported to the PC by the systems of reading, archiving and graphic transformation of

information. The navigation block indications, defining the azimuth direction of the necessary information about the events on the mantle – plate lithosphere level within the strictly definite frequency range in some concrete planet region, are being inputted to the data processing program in the PC.

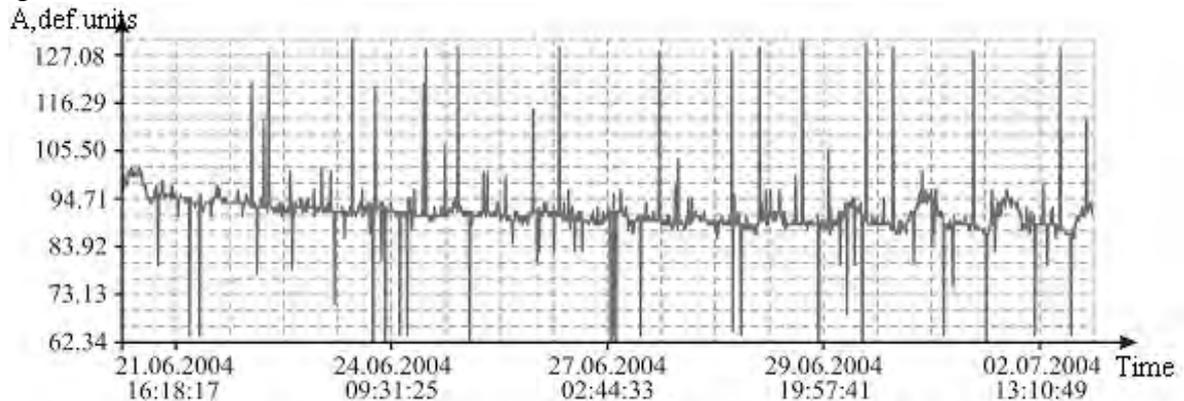


Fig.5: The indications of one of the device channels in the equilibrium state.

The geological, geophysical and meteorological data of the previous 5-10 years should be analyzed and statistically processes in the determined direction. And this together with the calculations should be the base for the following definition of the forthcoming earthquake with $M > 6.5$ new structure polarization center focus. This could be defined 10 year prior or 2-3 months prior the event.

The fig.6 represents the photography of the laboratory which the 9-channels system containing 2-, 3- and 4-channels devices is situated in.



Fig.6: The 9-channels WRG system photography.

The major earthquakes foreshocks indicated by the WRG system during the period from 2004 till the August of 2008 are driven below (table 1). Fig. 7 and 8 represent the processed and filtered signals of the antennas large period deviations indicated by the WRG system. The vertical axis represents the antennas deviations from the equilibrium state – the unbalance indicator in the polarizing processes of the planet CM in the definite units.

Table 1. The major earthquakes characteristics within the period of 2004-2008.

Date	Magnitude	Latitude, N degrees	Longitude, E degrees	Region
26.12.2004	9.0	3.30	95.98	South East Asia
15.11.2006	8.3	46.59	153.27	Kurile Islands

13.01.2007	8.2	46.24	154.52	Kurile Islands
01.04.2007	8.1	-8.46	157.04	Solomon Islands
12.05.2008	7.9	31.42	103.53	China, near the town Chengdu

Fig. 9-12 confirm the fact that the major earthquakes foreshocks could be recognized much time prior the event. The vertical axis represents time periods (days, hours) and the horizontal axis represents the antennas deviation angle in this pictures. This real time data consideration allows the potentials with the inverse signs mapped for almost unbounded distances and overcoming any artificial screening correlation frequency definition. The actual data represented by pictures exposes the compensatory processes precedence within the planet structures to be the integral process and its period of time is rather large.

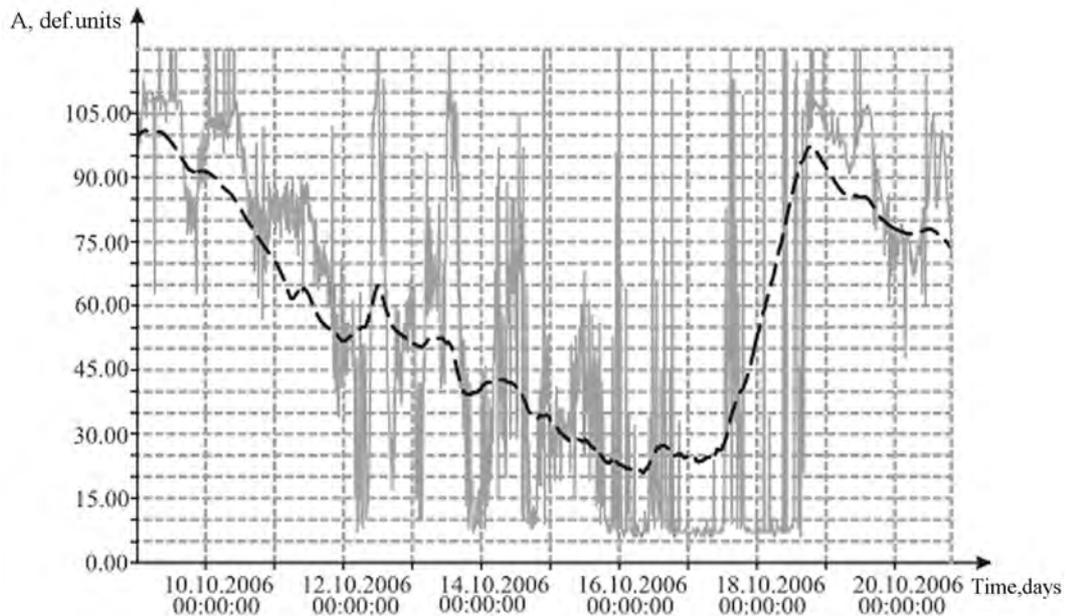


Fig.7: The large period deviation during 10.10.2006-19.10.2006 – the earthquake nearby the Kurile Islands on 13.01.2007 with Ms=8.2 foreshock.

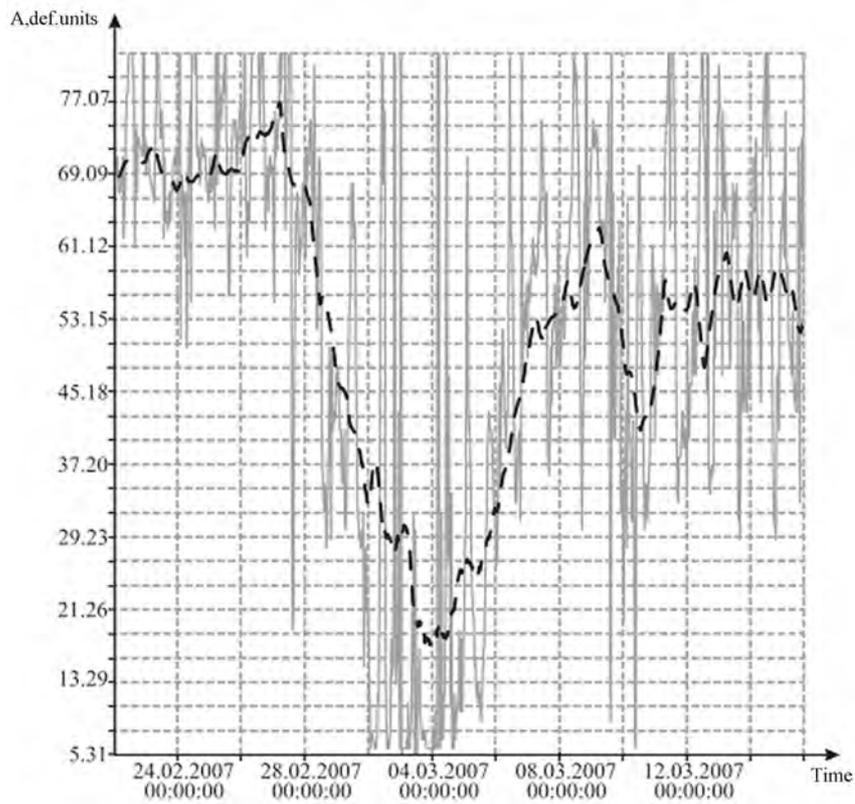


Fig.8: The large period deviation during 27.02.2007-12.03.2007 – the earthquake nearby the Solomon Islands on 01.04.2007 with $M_w=8.2$ foreshock.

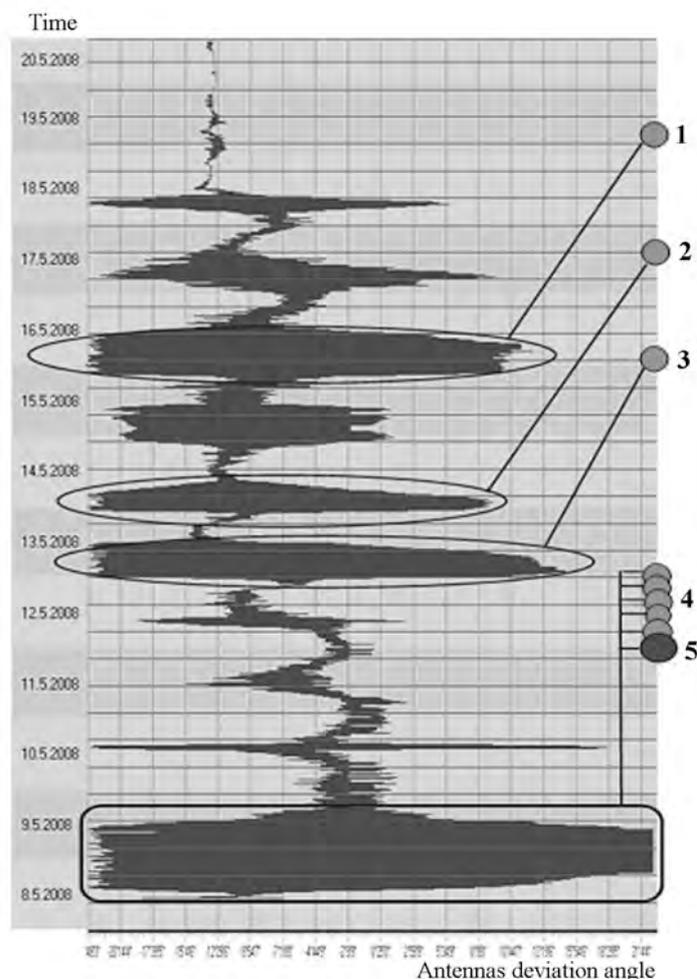


Fig.9: The WRG system zero channel indications of the earthquake with $M=7.9$ in China on the 12'th of May 2008 foreshocks 3-5 days prior the event (the vertical axis represents time - days): 1 - $M=5.6$, the earthquake at the border of the East of Russia and Northeast of China 42.61° N 131.61° E on the 19'th of May 2008 10:08:32, the foreshock had been determined on the 15'th of May 2008; 2 - $M=5.9$, the earthquake at the border of the Sichuan and Guangzhou (China) 32.29° N, 105.05° E on the 17 of May 2008 17:08:25, the foreshock had been determined on the 13' of May 2008; 3 - $M=5.5$, the earthquake in the East Sichuan (China) 31.42° N, 103.53° E on the 16 of May 2008 05:25:49, the foreshock had been determined on the 12 of May 2008; 4 - $M=5.7$; 5.6; 5.9; 5.6; 5.8, - the sequence of the earthquakes in the East Sichuan (China) $30.99 - 31.58^\circ$ N, $103.28-104.07^\circ$ E during 12-13 of May 2008, the foreshock had been determined on the 8'th of May 2008; 5 - $M=7.9$, the earthquake in the East Sichuan (China) 31.11° N, 103.32° E on the 12 of May 2008 06:28:00, the foreshock had been determined on the 8'th of May 2008.

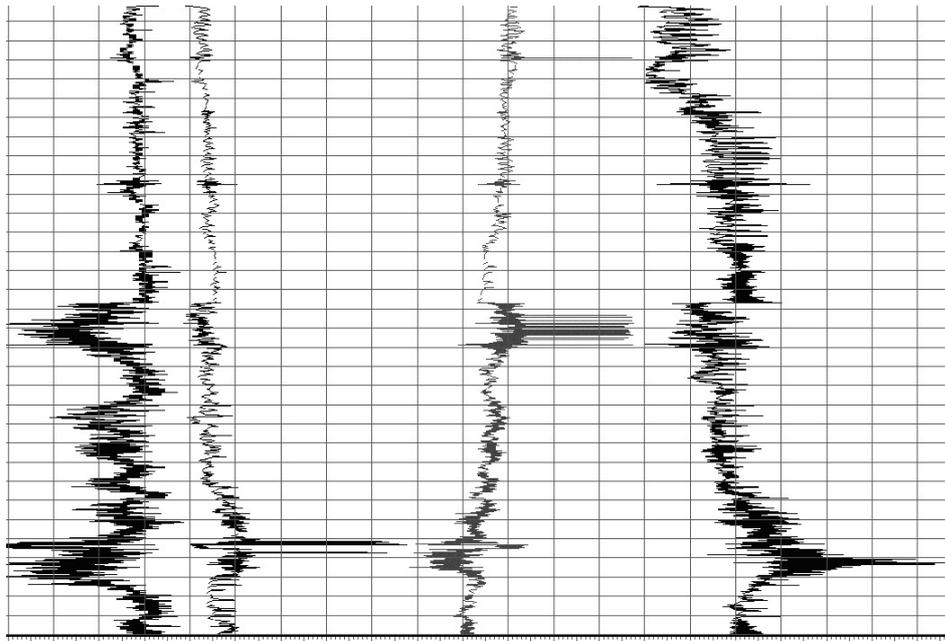


Fig.10: The indications of the unbalancing processes within the planet structures association, characterized by the various deviations from the equilibrium state ranges of each the WRG-4 system four channels (the horizontal axis represents the definite scale digits with the integer and the thousandth submultiples for each of the four antennas channels-handlers).

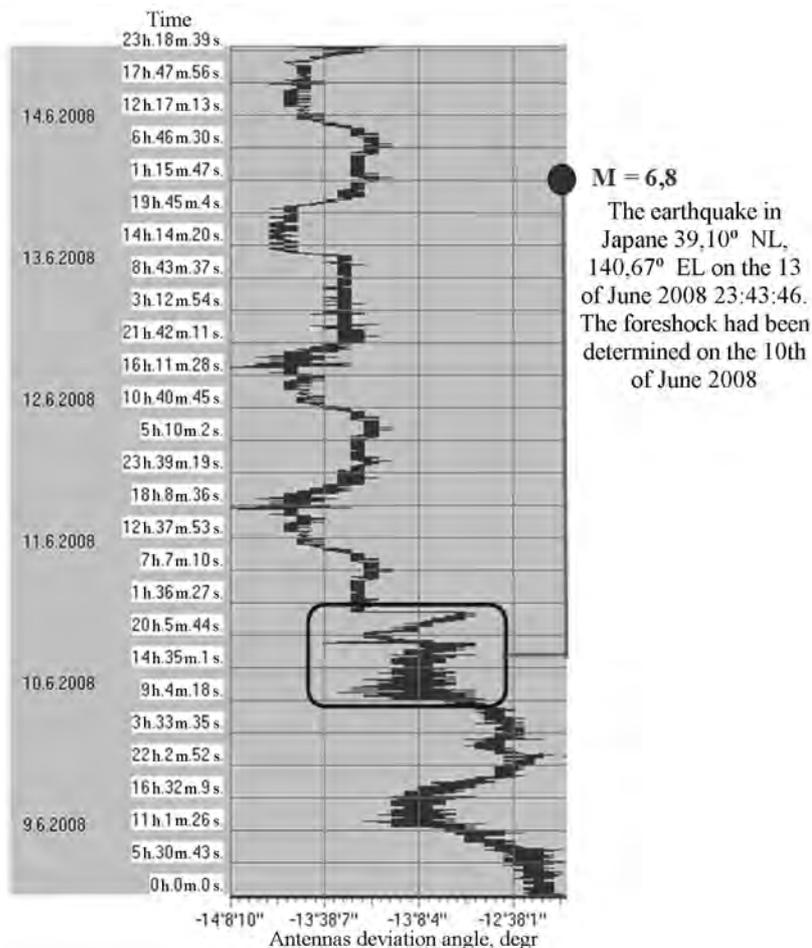


Fig.11: The WRG-4 system zero-channel signal during the period of 9-14 of June 2008. The foreshock of the earthquake in Japan on the 13 of June 2008 with M=6.8.

The new structure represented by its hologram final formation moment appears in Fig.11. The new structure had entrained the total range of the polarized spaces from 10-9 up to 103 Hz,

and it had been “coated” with the ultra-high frequencies (UHF), represented in the picture directly before the accident in the range of 3-5 days. But thus the fact should be mentioned that the primary impulse and the following hologram generation progress simultaneously with its mapping to the LMP in the range of the negative frequencies with the orthogonal coordinates consideration for the simplification. And that is also associated with the sequence of high-frequency waves characteristics of the planet processes in its various formations embedding into the ELF wave, which could last for many years.

Fig. 9 had represented the WRG system zero channel indications on the eve of the earthquake in China with $M=7.9$, and on the eve of the earthquakes with $M>5.5$ in the same region with the similar crust fractures.

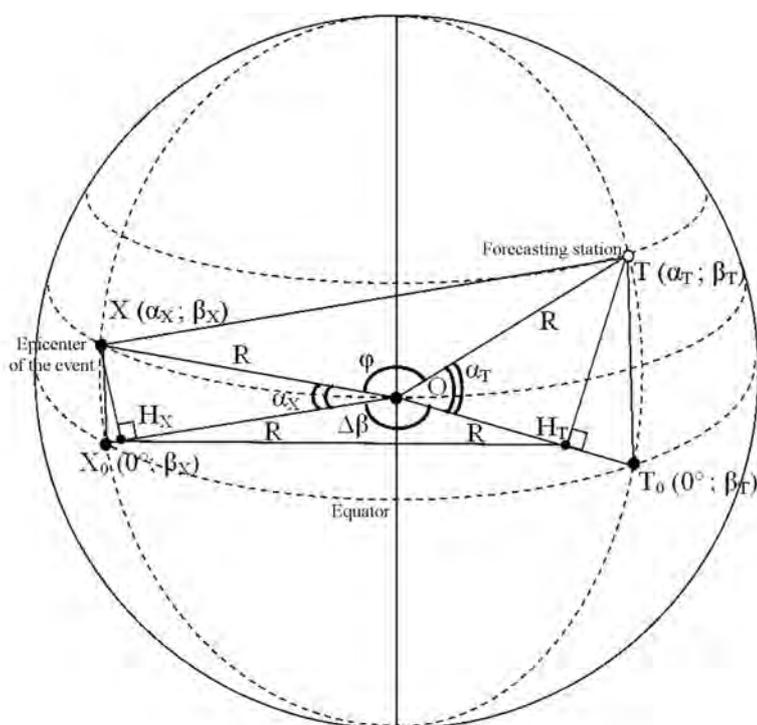
6.3. The catastrophe coordinates calculation method*. The future catastrophe coordinate should be calculated by the deviation angle φ in the navigation system on the base of the following method represented by fig.12. The angle φ - is the angle between the conditional line connecting the planet mass center (the planet system polarization center) with the instrumental equipment location and the conditional line connecting the mass center with the new structure generation in the planet system location point. This angle is the angle between the points X, O, T in the Fig.12.

The observatory of the seismic and synoptic events is located in the point $T(\alpha_T, \beta_T)$, and the future natural disaster epicenter is located in the point $X(\alpha_X, \beta_X)$; $TX=L_x$ or L_i in the formulas (59) and (62); the point O - is the center of the Earth. It is necessary to express the angle $\varphi=\angle TOX$ by the coordinates $\alpha_T, \beta_T, \alpha_X, \beta_X$. The acute angle $\Delta\beta$ between the points X, O, T should be established in the following way:

$\Delta\beta=|\alpha_T-\alpha_X|$ - if the observatory and the future natural disaster epicenter are located in the same hemisphere (east or west);

$\Delta\beta=|180^\circ-\alpha_T+\alpha_X|$ or $\Delta\beta=|\alpha_T+\alpha_X|$ - if the observatory and the future natural disaster epicenter are located in the different hemispheres.

The angle φ - is the angle between the conditional line connecting the planet system polarization center with the instrumental equipment location and the conditional line connecting the planet system center with the future event epicenter.



The event epicenter - is the coordinate of the new structure generation start in the planet system being the reason of the catastrophe in the form of the earthquake with $M>8$.

Let the Earth to be the perfect globe, i.e. the Earth radius to be constant everywhere and equal R (disregarding the Earth radius increase near to equator in the result of its rotation).

* This method had been developed by S.P.Kurotshenko.

Fig.12: The geometrical model of the planet Earth.

The Earth planet system is schematically represented by the Fig.12. Therefore

$$OT=OT_0=OX=OX_0=R, \quad (63)$$

here TH_T - is the ΔTOT_0 height; XH_X - is the ΔXOX_0 height:

$$TH_T=R \cdot \sin \alpha_T, \quad (64)$$

$$OH_T=R \cdot \cos \alpha_T, \quad (65)$$

$$XH_X=R \cdot \sin \alpha_X, \quad (66)$$

$$OH_X=R \cdot \cos \alpha_X, \quad (67)$$

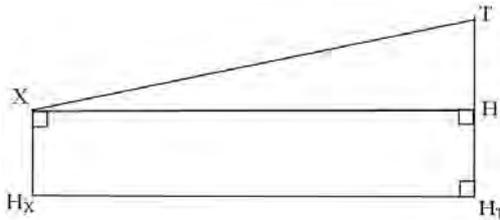
According to the cosine theorem the following results from the $\Delta H_X OH_T$:

$$H_X H_T^2 = OH_X^2 + OH_T^2 - 2 \cdot OH_X \cdot OH_T \cdot \cos \Delta \beta \quad (68)$$

The Fig.13 represents the auxiliary schema to the Fig.12 for the event coordinate calculations, here XT – is the distance between the instrumental equipment location and the event center; OT – is the line connecting the planet system polarization center with the instrumental equipment location; OX – is the line connecting the planet system polarization center with the future event center location; $TXH_X H_T$ - is the rectangular trapezoid; $\angle XH_X H_T = \angle H_X H_T T = 90^\circ$. Therefore

$$HT = TH_T - HH_T, \quad HH_T = H_X H_T \Rightarrow HT = TH_T - XH_X, \quad (69)$$

$$H_X H_T = HX.$$

Fig.13. The rectangular trapezoid $TXH_X H_T$

According to the Pythagoras theorem the following results from the ΔHTX :

$$XT^2 = H_X H_T^2 + (TH_T - XH_X)^2, \quad (70)$$

according to the cosine theorem the following results from the ΔXOT :

$$XT^2 = R^2 + R^2 - 2R \cdot R \cdot \cos \varphi, \quad (71)$$

$$XT^2 = 2R^2 \cdot (1 - \cos \varphi), \quad (72)$$

$$\cos \varphi = 1 - \frac{XT^2}{2R^2}, \quad (73)$$

$$\varphi = \arccos \left(1 - \frac{XT^2}{2R^2} \right), \quad (74)$$

according to the cosine theorem the following results from the $\Delta H_X OH_T$:

$$H_X H_T^2 = H_X O^2 + H_T O^2 - 2 \cdot H_X O \cdot H_T O \cdot \cos \Delta \beta. \quad (75)$$

Substituting equations (65) and (67) into the equation (75), we obtain

$$H_X H_T^2 = R^2 \cos^2 \alpha_X + R^2 \cos^2 \alpha_T - 2 \cdot R \cos \alpha_X \cdot R \cos \alpha_T \cdot \cos \Delta \beta, \quad (76)$$

Substituting equations (64), (66) and (76) into the equation (70), we obtain

$$XT^2 = R^2 \cos^2 \alpha_X + R^2 \cos^2 \alpha_T - 2R^2 \cos \alpha_X \cos \alpha_T \cos \Delta \beta + (R \sin \alpha_T - R \sin \alpha_X)^2, \quad (77)$$

$$XT^2 = R^2 \cos^2 \alpha_X + R^2 \cos^2 \alpha_T - 2R^2 \cos \alpha_X \cos \alpha_T \cos \Delta \beta + R^2 \sin^2 \alpha_T - 2R^2 \sin \alpha_T \sin \alpha_X + R^2 \sin^2 \alpha_X, \quad (78)$$

$$XT^2 = R^2 (\cos^2 \alpha_X + \sin^2 \alpha_X) + R^2 (\cos^2 \alpha_T + \sin^2 \alpha_T) - 2R^2 \cos \alpha_X \cos \alpha_T \cos \Delta \beta - 2R^2 \sin \alpha_T \sin \alpha_X. \quad (79)$$

The fundamental trigonometric identity $\cos^2 \alpha + \sin^2 \alpha = 1$ consideration results

$$XT^2 = R^2 + R^2 - 2R^2 (\cos \alpha_X \cos \alpha_T \cos \Delta \beta + \sin \alpha_T \sin \alpha_X), \quad (80)$$

$$XT^2 = 2R^2 (1 - \cos \alpha_X \cos \alpha_T \cos \Delta \beta - \sin \alpha_T \sin \alpha_X). \quad (81)$$

Substituting equation (81) into the equation (74), we obtain

$$\varphi = \arccos \left(1 - \frac{2R^2 (1 - \cos \alpha_X \cos \alpha_T \cos \Delta \beta - \sin \alpha_T \sin \alpha_X)}{2R^2} \right), \quad (82)$$

$$\varphi = \arccos (1 - 1 + \cos \alpha_X \cos \alpha_T \cos \Delta \beta - \sin \alpha_T \sin \alpha_X). \quad (83)$$

And finally:

$$\varphi = \arccos(\cos \alpha_x \cos \alpha_T \cos \Delta\beta - \sin \alpha_T \sin \alpha_x) . \quad (84)$$

6.4. The list of several forecasts confirming the concept advantages. The mathematical models for the instrument indication data processing, archiving and analysis had been developed on the basis of the non-equilibrium thermodynamics, nonlinear mathematics, topology, graphic methods of the hologram design. These models allow the beforehand definition of the coordinate and time of any natural disaster realization (Table 2). Every forecast had been sent to the corresponding embassies or the departments of the Russian Federation with the notification of the addressee receipt.

Since 1999 the potentials difference between the planet core polarization center and the Galaxy polarization center abnormal increase had been established. And simultaneously the abnormal deviations of the potential differences in the ranges associated with the structural formations in the system “mantle-lithosphere” and their orientation to the Solar system mass center had been revealed. This data had absolutely confirmed our previous invention of 1989, which had been recorded by the “Inventions and Discoveries Committee in the MS of the USSR” with the name “the Phenomenon of the Planet Gravitational Potential Gradient Distortions Prior to the Earthquake”.

Table 2. The list of some forecasts and actual data of the events

Addressees of the sent forecasts	Essence, characteristics and the coordinates of the sent forecasts of the events	Actual events	The damages and the human losses
The letter №21, 09.08.1999 to the Turkey Embassy	The violent earthquake M>6, coordinates: 40°N and 28-30° E or 40° N and 40-42°E	The earthquake M=7.8, 17.08.1999, coordinates 40.75°N and 29.86°E	More then 20000 persons were lost
		The earthquake M=7.5, 12.11.1999, coordinates 40.76°N and 31.16°E	7000 persons were lost
The letter №43, 12.03.2003	The earthquake with the coordinates: 37-38°N and 40-41°E, M>6	The earthquake M=6.4, 01.05.2003, coordinates 39°N and 40.44°E	640 children were lost
The letter for the president of Azerbaijan	The series of the earthquakes, coordinates 40°N and 48-49° E with the following motion to the Kazi Magomed, and later to the Baku, M>6 and at last to the oil production region in the Caspian sea	The earthquake M>6.2, 04.06.1999, coordinates 40.8°N and 47.45°E (nearby Agdam)	14 persons
		The earthquake M>5.5, 21.03.2000, coordinates 39.8°N and 48.30°E (nearby Kazi-Mohamed)	7 persons
		The earthquake M=6.5, 25.11.2000, coordinates 40.33°N and 49.9°E, Baku 26.11.2000 the earthquake M=6.3, coordinates 40.11°N and 49.9°E, Baku	600 persons were lost according to the Ministry of Emergency Measures of the Russian Federation
		06.12.2000 the earthquake M>7.2 in the Caspian sea, in the oil production region, coordinates 39.62°N and 54.77°E	-
The letter №29, 28.07.2000 for the Prime-minister of Italy and for the mayor of the Asti city	The earthquake with the coordinates: 44-45°N and 7-9°E	The earthquake with M>5.4, 21.08.2000, coordinates 44.3°N and 8.4°E	-
The letter №47, 24.05.2001 for the Prime-minister of Italy, for the President of America,	On the 24.05.2001 the future events before the meeting of the governments leaders in Genoa, and on the	During 6-8 of July 2001 in France and Germany the violent storm had taken place, on the, on the 16 and	The loss from hurricane in France had made more than 500 million dollars,

for the President of France (our first experience of time prediction)	20.06.2001 the violent hurricane and tornado within the territory of France and Italy and the earthquake in coordinates 44-45°N and 7-9°E were predicted	19 of July 2001 there had been the earthquake $M=4.9$ in the point with the coordinates specified in the letter. We had accepted congratulations from the Italian scientists, which we had cooperated with in the forecast development.	3 persons were lost
The letter №63, 21.06.2005 for the President of Kazakhstan republic (our second experience of time prediction within the range of 3-5 days)	The developing seismic intensity in the region of Alma-Ata in coordinates 43.5-44°N and 77.0-77.5°E had been reported about	The earthquake with $M=4.6$, 24.06.2005, coordinates 43.02°N and 77.17°E	-
The interview to Radio of Russia, the letter on the 12.09.2005. The letter for the Minister for Foreign Affairs of the Russian Federation Lavrov S.I. 14.11.2006	The reasons and forecasts of the coming nearer natural accidents within the territory of Europe and Russia had been discussed	The abnormal weather and seismic events are being developed since the winter of 2005 until the 2008 within the territory of Europe in absolute conformity with the mechanism reported in the interview to Radio of Russia and the letter for Lavrov S.I.: in Great Britain, France, German, Poland, Georgia, Russia	-
The letter on the 11.08.2006 (№1MT25433) for the minister of the Russian Federation on the state defense and extreme situations S.K.Shoigu	54-55°N and 144-145°E, $M>7$	The earthquake with $M>5$, 11.09.2006, coordinates 55.5°N and 143.33°E	-
The letters for the China government in 1998, 2000, 2003 and 2006 with the warnings of the increasing essential seismic and synoptic danger in the area of city Chengdu and with the offer on cooperation, including the letter on 19.05.06, confirmed by the first secretary of the Embassy in Moscow - Mister Sjun Sjan Fan	The earthquake with $M>7$ and the sequence of violent cyclones	Everything predicted had happened within the specified region including the earthquake on the 12.05.2008 with $M=7.9$ with the following rainstorms and waterflood	More then 70000 persons were lost, Economic damage > \$10 billions.

Since 1998, in 2000, 2003, 2006 and finally in 1008 the government of China had been offered to apply the developed method and instrumental hardware for the natural disasters monitoring and prediction, including the region of Chengdu and Nanchong of the Sichuan province where the violent earthquake with $M>6$ should be expected. In 2006 the embassy of China had reported about the forecast had been sent to the government of China. But nothing had been done.

The mathematical relations of the dynamic potentials representing in general all the galaxy-, gelio- and geo-processes global integral complex had been developed on the basis of the data about the world around us systematization and the non-equilibrium thermodynamics of the polarized CM principles. The physical and mathematical principles for the energy potentials representation in the interconnected polarized media of any matter structural level in the form of the equations for the potentials with various frequency ranges and the comprehensive material

media polarized volumes vector directivity relations. And the equation for any system stabilization mathematical expectation in the stratified spaces entropies dynamics had been developed simultaneously with this on the base of the polarized media potentials, thermodynamic resistance and thermodynamic capacity concepts application.

The mass concept had been defined as the topological geometry of the concrete volume in the polarized comprehensive medium characterized by the associated topological frequencies of the polarized media oscillations complex. These media are embedded each other and the considered volume, and they generate the screening and anti-screening effects realized by definite frequencies suppression by the more low frequencies of the global structures on the base of conservation laws. These solutions had been applied since 1987, they had been confirmed absolutely by the “asymptotic freedom” (the Nobel Prize, 2004) and the cosmic space anisotropy (the Nobel Prize, 2006) inventions.

The polarized media with different vector directivity flows combination in the topological essence defines the potential facilities of the energy embedded in this mass in the environmental interactions. The more polarized media would participate in this mass generation, the more its potential energy is. That is the essence of the potential energy and the generalized dynamic potential concepts.

The kinetic energy is definite in some structural level of the stratified polarized space with the screening absence. That is the physical foundation of the gravitation, magnetism, ionization, valence, any form of interactions, total classical thermodynamics and any form of dynamics, including the dynamics in cosmos, galaxies, star systems, planet structures etc. nature.

Any stratified space rank is associated with the concrete values of this volume entropy and oscillations topological frequencies relations (states). The considered volume or mass steady state should be defined by the more high rank, i.e. the more high-frequency range of the media polarization, associated with this volume-mass, or in other words the gravitational field, which this volume is immersed in.

The stratified spaces interaction processes unbalance within any volume-mass results from the unbalance of the concrete frequency range characterizing the considered mass (volume) topological state. This could be the result of the considered volume-mass stratified spaces internal processes, and also the processes in the environment could be the reason, that is the nature of the global processes in the world nonlinearity. These processes within the initial mass (the geological structure with the constant geomorphology) interconnection is followed by the new volume stratification, the new space, the new structural formation with the associated entropy and frequency range (specter) generation. The new space polarization by the new volume centre results with the steady generation of the new compensation processes, the electric and magnetic fields flows bursts and overshoots to the environment, the various forms of radiation abrupt activation, including the impact to the synoptic formations in the atmosphere (the most often in the form of steady anticyclones, and also in the form of the new electric charges flows with their following discharge with underground thunderstorm, acoustic radiation, etc.). The specified complex effects could move within the same geomorphology to the essential distances in the result of the planet global geodynamics in the polarized space of the Solar and Galaxy media. The geological and geophysical coordinate of this polarizing processes complex is the focus of the future earthquake with $M > 6.5$ or the future hurricane (typhoon), and also the cyclones complex. The finally generated new volume-mass within the strictly definite frequency range would be mapped to the space in the form of the hologram in the ELF range being the basic, carrier range by the fractals “fractons-phonons” dynamics (the similarity of the “mole holes”). This mapping wouldn’t be screened in the planet space because of using ELF as the carrier range. And its global dynamics could be indicated by the special WRG system at the unlimited distances away from the future natural disaster location.

The physical essence of the basic constants had been established on the base of the specified nonlinear processes theory. That had been made for the implementation of the basic constants to the mathematical models of the association coefficients like Lyapunov’s characteristic indexes specter and rank entropies calculation. *The extra low frequencies had been the carrier ones and the more high frequencies had been the guided ones. This had enabled the new methods for the geodynamics unbalance description by the associated holograms – the natural disasters foreshocks – monitoring.*

The precise forecasting of the synoptic and seismic events (some of them had been represented in the table 2) in the territory of Europe and Asia during 1999-2008 had been made with the reason of the desired concept and physics-mathematical essence of the considered processes nature correctness confirmation.

The essentially new phenomenon – high frequency interactions of the polarized spaces complexes generation at the new geometrical formations generation within the initial polarized space – had been established.

The specified representations were applied in the author's works during more than 20 years in the area of the natural disasters monitoring and forecasting, and they were used during more than 40 years in the area of the essentially new solutions, new materials development, atomic energy application to the metallurgical industry, social-economic problems solution and in the area of ecology, methodology of human creativity scientific foundations, Education of youth, the problem of orthodoxy and science interconnection, the human voyage choice etc.

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The Natural Accidents Forecasting System Concept and the Practical Results, Obtained from Nonlinear Physics, Mathematics and System Data

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It is shown, that any mass is associated with the definite volume and matter density in this volume, generated by the Comprehensive Medium (in modern terminology that is "physical vacuum") disequilibrium impulse on the base of I. Newton's definition No.1. The disequilibrium impulse consistent with conservation laws, causes the medium, polarized by the primary impulse, reaction in the form of the new volumes - vortexes integrated sum: $|\Psi_0\rangle = |\text{div}U_0\rangle \otimes \langle \sum_n |\text{rot}U_n\rangle$, here $|\Psi_0\rangle$ - is the CM wave excitation which also comprises the field system $\text{div}U_0$ generation and the compensatory process matrixes sum $\sum_n \text{rot}U_n$ reaction to this field, that defines the primary impulse scalar; n - is the number of the structural constructions - the CM space stable stratifications by $\text{div}U_0$ impulses, and the counter impulses $\sum |\text{rot}U_n|$. The G.Crone's potentials aggregation within every matrix - volume is provided by the Faraday-Maxwell's charge complexes. Therefore (in accordance with Vlasov's ideas), the total and exact energy of interaction within the mass-volume: $U_{macro} = \int E(|r-r'|)p(r)p(r')dr dr'$, here $E(|r-r'|)$ - is the kernel with the essence of the total and exact energy of interaction with integration by every distance r . Vlasov's formula is based on the transition from the dot particles interaction energy $\frac{1}{2} \sum_{ij} \frac{q_i q_j}{|r_i - r_j|}$, to the

volumetrically distributed charges or masses. This allows two impulses composition consideration in their topological tensor-vector contents $\nabla \left(\text{div } U_0 + \hbar^n \left| \sum_n \text{rot } U_n \right| \right) = m$, here

m - is the mass, and the associated volume - V_{Mh} , it can be geodynamically represented

as $V_{Mh} = \left(\nabla \int \nabla \left(\sum_n \int V_n \partial V \right) \right) \partial V$, here ∇ - is the Hamiltonian operator, it defines the energy

interactions between the volumes V_n , participating in the general volume V_{Mh} . But in this case $\hbar^n = \{\hbar_{ij}\} = \nabla_i \int f(\xi_n) \partial \xi$, here ξ_n - is the coefficient of association between the substructures in the general dynamic system (structure) represented by Liapunov's characteristic parameter, participating in Planck's, Newton's, Boltzmann's, Wien's, Faraday's and so forth constants, depending on the medium polarization conditions. The complementary kinetic energy is generated in the definite nonlinear geodynamic processes. This results planet structures transition to a chaos, and its subsequent suppression by the more global (less low-frequency fields), that is realized by the earthquake disasters with the kinetic energy release: $dU_k = \|dV_{Mh}\| \left\langle \int \nabla_{n-1} U_i \partial \bar{T}(V) \right\rangle$. The event duration is defined by the

rank entropies and the general system entropy, following Boltzmann-Planck $S = k \ln W$, here S - is the system entropy, W - is the stochastic energetically - informational system

state: $W = \frac{N}{n_\xi! n_\xi!} = V_n$, $n_\xi \sim f(\xi_i)$ - is the distribution by interaction energies function of the

particles-holograms (microstructures, etc.) in the volume V_i , within there are the processes of the stratification dynamics, transition to the controlled chaos bifurcation state, synchronization and return to the equilibrium. But in this case $W = \frac{N!}{n!n!} = \lambda = \delta \Phi(\nu)$, here

λ - is the stochastic frequency of the transformation expectation, associated with Liapunov's characteristic parameter, new structure generation completion, for example, within the mantle - lithosphere - atmosphere system; δ - is the function index of the stratified space, represented by the formula, new variations; $\Phi(\nu)$ - is the tone frequency function or the function of changing proportions between the various structural levels generalized potentials; N - is the number of attractors, and the informational (thermodynamical) capacity of system evaluated by the various frequencies ν cascade and

the associated volume: $V_i = \left(\sum_n \int \nu \partial \nu \right)$. The instrument system had been designed on the

base of the previously mentioned principles, it had allowed the geodynamical model development, real time monitoring, planet structures deviations follow-up control within the frequency range of 10^{-10} - 10^3 Hz. The monitoring is implemented on the basis of calculations and the events had been predicted precisely with the coordinate and time correct indication. The high-frequency signals complex develops three - five days before the event at the end of new structure generation process in the planet system. This process follow-up control is exercised on the basis of the hologram development following R.O. de Bartiny's principles. These principles have allowed all the physical quantities, including the basic physical constants, and also time and geometrical parameters representation in the form of the polarized media frequency characteristics proportion and the new formation hologram with its self-reflection and the reflection into the matter latent part as the reasons of accident development on this basis.

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