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The Confirmed Validity of the Thermohydrogravidynamic Theory Concerning the Strongest Intensifications of the Global Natural Processes of the Earth in 2016 Since 1 September, 2016

Sergey V. Simonenko[1*]

[1]*V. I. Il'ichev Pacific Oceanological Institute, Far Eastern Branch of Russian Academy of Sciences, Vladivostok, Russia.*

Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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ABSTRACT

The article presents the confirmed validity of the established global prediction thermohydrogravidynamic principle (of the developed thermohydrogravidynamic theory containing the cosmic geophysics and the cosmic seismology based on the author's generalization of the first law of thermodynamics for non-stationary cosmic gravitation) concerning the predicted (in advance) strongest intensifications (in 2016 since 1 September, 2016) of the global seismotectonic, volcanic, climatic and magnetic processes of the Earth determined by the maximal combined integral energy gravitational influence on the internal rigid core of the Earth (and on the Earth as a whole) of the planets (Mercury, Venus, Mars and Jupiter) and the Sun due to the gravitational interactions of the Sun with Jupiter Saturn, Uranus and Neptune.

**Corresponding author: E-mail: sergeysimonenko@mail.ru;*

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1. INTRODUCTION

The deterministic predictions of the devastating earthquakes [1-4], volcanic [4,5], climatic [4,6,7] and geomagnetic [8-13] processes of the Earth are the urgent problems [14-16] for humankind before the founded [15,16] increased intensifications (during the ranges 2020÷2026, 2037.38÷2043.38 and 2055÷2064) of the global natural (sesmotectonic, volcanic, climatic and magnetic) processes [16] of the Earth. Based on the thermohydrogravidynamic theory (THGDT) [2-4,7,13-17] of the global natural processes of the Earth and based on the thermohydrogravielectromagnetic theory [13,15] of the controlled thermonuclear reaction, we concluded [13] that that the problem [13,18-20] of the controlled thermonuclear reactions is related with the problem [8-12] of the geomagnetic reversals. In this article, we present (to the British Journal of Applied Science & Technology) the prognosticating results of the THGDT [14-16] concerning the forthcoming ranges (since 1 September, 2016) of intensifications of the global natural (sesmotectonic, volcanic, climatic and magnetic) processes of the Earth in 2016.

In Section 2 we present the establishedgeneralization [2-4,7,13-17,21] of the first law of thermodynamics for the symmetric stress tensor $\mathbf{T}$ [22] and the established [15, 16] global and local (regional) prediction thermohydrogravidynamic principles determining the maximal temporal intensifications of the global and regional natural (sesmotectonic, volcanic and climatic) processes of the Earth.

In Section 3 we present the evidence of the causal linkage of the previous and the forthcoming intensifications of the global natural (sesmotectonic, volcanic and climatic) processes of the Earth in 2016 since 1 September, 2016.

In Section 4 we present the discussion of the main results.

In Section 5 we present the conclusions.

2. THE GENERALIZATIONS OF THE FIRST LAW OF THERMODYNAMICS AND RELATED GLOBAL AND LOCAL PREDICTION THERMOHYDROGRAVIDYNAMIC PRINCIPLES

2.1 The Generalizations the First Law of Thermodynamics for the Galilean Frame of Reference

Based on the general equation of continuum movement [22], the classical differential formulation [23] of the first law of thermodynamics (FLT) for the one-component macrodifferential continuum element, the decomposition $\mathbf{P} = p\boldsymbol{\delta} + \boldsymbol{\Pi}$ [23] for the pressure tensor $\mathbf{P} = -\mathbf{T}$ [22], the viscous-stress tensor $\boldsymbol{\Pi}$ [23] and the symmetric stress tensor $\mathbf{T}$ [22] ($\boldsymbol{\delta}$ is the Kronecker delta-tensor, p is the thermodynamic pressure), we derived [2-4,14,24] the generalization of the FLT (for individual finite continuum region τ considered in a Galilean frame of reference with respect to a Cartesian coordinate system K shown on Fig. 1):

$$dU_\tau + dK_\tau + d\pi_\tau = \delta Q + \delta A_{np,\partial\tau} + dG, \quad (1)$$

where δQ is the classical [22,23,25,26] infinitesimal change of heat across the boundary of the continuum region τ, dU_τ is the classical [22,23,25,26] infinitesimal change of the internal thermal energy U_τ, dK_τ is the established [2-4, 7,14-16] infinitesimal increment of the macroscopic kinetic energy K_τ [21,27] of the continuum region τ, $d\pi_\tau$ is the infinitesimal increment of the gravitational potential energy π_τ [2-4,7,14-16] determined by the potential ψ of the combined (cosmic and terrestrial) non-stationary gravity field, $\delta A_{np,\partial\tau}$ is the generalized [2-4,7,14,21] infinitesimal work done by non-potential terrestrial stress forces acting on the continuum boundary surface $\partial\tau$ of the continuum region τ,

$$dG = dt\iiint_{\tau}\frac{\partial\psi}{\partial t}\rho dV \quad (2)$$

is the infinitesimal combined (cosmic and terrestrial) non-stationary energy gravitational influence [2-4,7,13,14] on the continuum region τ during the time interval dt. The relation (2) for dG takes into account the partial derivative of the potential ψ of the combined (cosmic and terrestrial) non-stationary gravitational field, the local mass density ρ of the differential volume dV in the continuum region τ.

The generalization (1) of the FLT gave the theoretical foundation of the detected [1] non-relativistic classical "gravitational" waves [3,4,15, 16] from the focal regions of earthquakes. This theoretical foundation [3,4,15,16] is based on the following relation:

$$dG = dt\iiint_{\tau}\frac{\partial\psi}{\partial t}\rho dV = -dt\iint_{\partial\tau}(\mathbf{J}_g\cdot\mathbf{n})d\Omega_{\mathbf{n}}\,, \quad (3)$$

where $\mathbf{J}_g$ is the power of the gravitational energy across the surface element $d\Omega_{\mathbf{n}}$ determined by the external normal unit vector $\mathbf{n}$. The divergence $\mathrm{div}\mathbf{J}_g$ is determined by the relation [3,4,15-17]:

$$\mathrm{div}\,\mathbf{J}_g = -\rho\frac{\partial\psi}{\partial t}\,. \quad (4)$$

We established the generalization of the FLT [13,17]

$$\begin{aligned} &dU_\tau + dK_\tau + d\boldsymbol{\pi}_\tau + dE_{e,m,\tau} \\ &= \delta Q_{e,m} + \delta Q + \delta A_{np,\partial\tau} + \delta\Phi_{e,m} + dG \end{aligned} \quad (5)$$

extending the established generalization (1) of the FLT by taking into account (along with the classical terms δQ and dU_τ [21,23,25] and the established [2-4,7,14-16] terms dK_τ, $d\boldsymbol{\pi}_\tau$, $\delta A_{np,\partial\tau}$ and dG) the additional terms [13,15,17]: the differential change $dE_{e,m,\tau}$ of electromagnetic energy $E_{e,m,\tau}$ inside the individual region τ (considered in the Galilean frame of reference), the differential energy flux $\delta\Phi_{e,m}$ of the electromagnetic energy exchanged across the boundary surface $\partial\tau$ (of the individual region τ), and the differential heating $\delta Q_{e,m}$ due to the differential work of electrodynamic forces and due to the dissipated electromagnetic waves.

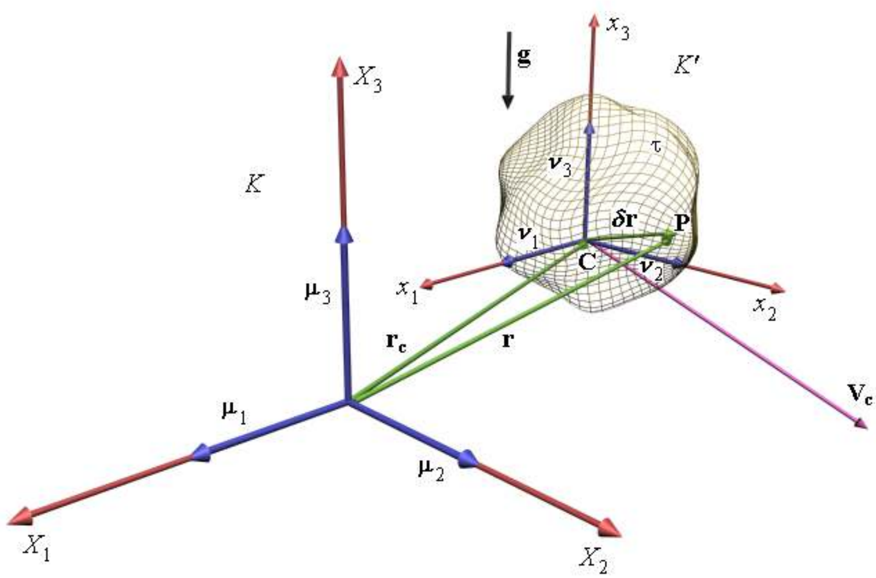

Fig. 1. Cartesian coordinate system K of a Galilean frame of reference and an individual finite continuum region τ subjected to the non-stationary Newtonian gravitation field, non-potential terrestrial stress forces and non-stationary electromagnetic field

2.2 The Global Prediction Thermohydrogravidynamic Principles Determining the Maximal Temporal Intensifications the Global Natural (Sesmotectonic, Volcanic and Climatic) Processes of the Earth

Taking into account the general relation (2) for the infinitesimal gravitational energy influence dG, we obtained [16] the following relation for the combined differential cosmic non-stationary energy gravitational influence $dG(\tau_{c,r})$ (during the infinitesimal time dt) of the Solar System (the planets, the Moon and the Sun) on the internal rigid core $\tau_{c,r}$ of the Earth:

$$dG(\tau_{c,r}) = dt\iiint\limits_{\tau_{c,r}} \frac{\partial \psi_{comb}}{\partial t}\rho_{c,r}dV, \tag{6}$$

where $\rho_{c,r} = 12800\,kg \cdot m^{-3}$ [28] is the mass density of the internal rigid core $\tau_{c,r}$, $\partial\psi_{comb}/\partial t \equiv \partial\psi_{comb}(\tau_{c,r},t)/\partial t$ is the partial derivative (of the combined cosmic gravitational potential $\psi_{comb} \equiv \psi_{comb}(\tau_{c,r},t)$ in the internal rigid core $\tau_{c,r}$ of the Earth) approximated as follows

$$\frac{\partial\psi_{comb}(\tau_{c,r},t)}{\partial t} = \frac{\partial\psi_{3MOON}(C_3,t)}{\partial t} + \sum_{i=1,i\neq 3}^{9}\frac{\partial\psi_{3i}(C_3,t)}{\partial t} + \sum_{j=5}^{8}\frac{\partial\psi_{3j}^{S}(C_3,t)}{\partial t}. \tag{7}$$

Here $\partial\psi_{3MOON}(C_3,t)/\partial t$ is the partial derivative [2,7,29] of the gravitational potential $\psi_{3MOON}(C_3,t)$ created by the Moon at the mass center C_3 of the Earth; $\partial\psi_{3i}(C_3,t)/\partial t$ is the partial derivative [2,7,14,29] of the gravitational potential $\psi_{3i}(C_3,t)$ created by the planet τ_i at the mass center C_3 of the Earth; $\partial\psi_{3j}^{S}(C_3,t)/\partial t$ is the partial derivative [15] of the gravitational potential $\psi_{3j}^{S}(C_3,t)$ created by the Sun (due to the outer large planet τ_j) at the mass center C_3 of the Earth.

We established [16] that the combined differential cosmic energy gravitational influence per unit time and per unit volume $dG(\tau_{c,r})/(dtV(\tau_{c,r}))$ on the internal rigid core $\tau_{c,r}$ of the Earth:

$$\frac{dG(\tau_{c,r})}{dt\iiint\limits_{\tau_{c,r}}dV} = \frac{dG(\tau_{c,r})}{dtV(\tau_{c,r})} = \frac{\partial\psi_{comb}}{\partial t}\rho_{c,r} \tag{8}$$

has the maximal absolute value for the internal rigid core $\tau_{c,r}$ of the Earth (from all interior of the Earth):

$$\frac{\left|dG(\tau_{c,r})\right|}{dtV(\tau_{c,r})} = \left|\frac{\partial\psi_{comb}}{\partial t}\right|\rho_{c,r} \tag{9}$$

since the mass density $\rho_{c,r} = 12800\,kg \cdot m^{-3}$ [28] (of the internal rigid core $\tau_{c,r}$) has the maximal value and the partial derivative $\partial\psi_{comb}/\partial t$ is nearly constant value in the Earth [7,29]. Taking into account this fact, we concluded [16] about the maximal intensity of the thermohygrogravidynamic processes in the internal rigid core $\tau_{c,r}$ of the Earth (and in the boundary region τ_{rf} between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth) with respect to others regions of the Earth.

We established [16] that the maximal combined differential cosmic energy gravitational influence (8) determines the intense thermohygrogravidynamic processes [16]. We established [16] that the radiation of the geo-acoustic waves by the boundary region τ_{rf} (between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$) is characterized by the power $W_{c,\partial\tau_{rf}}$:

$$W_{c,\partial\tau_{rf}} = -\iint\limits_{\partial\tau_{rf}}\left(\frac{2}{3}\eta - \eta_v\right)\mathrm{div}\,\mathbf{v}(\mathbf{v}\cdot\mathbf{n})d\Omega_{\mathbf{n}}, \tag{10}$$

where $\mathbf{v} = (v_1, v_2, v_3)$ is the hydrodynamic velocity vector ($\mathrm{div}\,\mathbf{v} \neq 0$ means the acoustic compressibility), $\partial\tau_{rf}$ is the outer boundary surface (of the continuum boundary region τ_{rf})

characterized by the external normal unit vector $\mathbf{n} = (n_1, n_2, n_3)$, η is the coefficient of the molecular dynamic (shear) viscosity [21,26], η_v is the coefficient of the molecular volume (second) viscosity [21,26]. We established [16] that the radiation of the geo-deformational waves by the boundary region τ_{rf} is characterized by the power $W_{s,\partial\tau_{rf}}$:

$$W_{s,\partial\tau_{rf}} = \iint\limits_{\partial\tau_{rf}} 2\eta\left(\sum_{\alpha,\beta=1}^{3} v_\beta n_\alpha e_{\alpha\beta}\right) d\Omega_n \ , \qquad (11)$$

where $e_{\alpha\beta}$ is the rate of strain tensor [2,21] on the outer boundary surface $\partial\tau_{rf}$ of the boundary continuum region τ_{rf} .

It was pointed out [28] that "the present translational rate is found to be typically 100 million years for the inner core to be entirely renewed". We concluded [16] that the renewed time period of 100 million years [28] is in good agreement with the founded [7,14,29] time periodicity of 100 million years, which explains (in the frame of the THGDT [2,7,14,29]) the maximal endogenous activity of the Earth (characterized by the same time period of 100 million years [30]) as a consequence of the periodic changes (characterized by the approximate time period of 200 million years) of the gravitational potential of the Solar System (and the Earth) moving around the center of our Galaxy. Based on this agreement, we concluded [16] that the thermohygrogravidynamic processes in the internal rigid core $\tau_{c,r}$ of the Earth (and in the boundary region τ_{rf} between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth) have the fundamental influence on the global natural (seismotectonic, volcanic and climatic) processes of the Earth.

Based on the generalization (1)of the FLT (used for the internal rigid core $\tau_{c,r}$ of the Earth), we formulated [15,16] the global prediction thermohydrogravidynamic principles determining the maximal temporal intensifications of the established thermohygrogravidynamic processes (in the internal rigid core $\tau_{c,r}$ [16] and in the boundary region τ_{rf} [16] between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ [16] of the Earth considered as a whole [15]) subjected to the combined cosmic energy gravitational influence of the planets of the Solar System, the Moon and the Sun (owing to the gravitational interaction of the Sun with the outer large planets). We concluded [16] (based on the generalization (1) of the FLT used for the internal rigid core $\tau_{c,r}$ of the Earth) that the maximal intensifications of the established thermohygrogravidynamic processes are related with the corresponding maximal intensifications of the global and regional natural (seismotectonic, volcanic and climatic) processes of the Earth.

The rigorous global prediction thermohydrogravidynamic principles (determining the maximal temporal intensifications near the time moments $t = t^*(\tau_{c,r})$ and $t = t_*(\tau_{c,r})$, respectively, of the thermohydrogravidynamic processes in the internal rigid core $\tau_{c,r}$ and in the boundary region τ_{rf} between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth) are formulated as follows [16]:

$$\Delta G(\tau_{c,r}, t^*(\tau_{c,r})) = \max_t \int_{t_0}^{t} dt' \iiint\limits_{\tau_{c,r}} \frac{\partial \psi_{comb}}{\partial t'} \rho_{c,r} dV \qquad (12)$$

$$-\text{local maximum for time moment } t^*(\tau_{c,r}),$$

and

$$\Delta G(\tau_{c,r}, t_*(\tau_{c,r})) = \min_t \int_{t_0}^{t} dt' \iiint\limits_{\tau_{c,r}} \frac{\partial \psi_{comb}}{\partial t'} \rho_{c,r} dV \qquad (13)$$

$$-\text{local minimum for time moment } t_*(\tau_{c,r}).$$

The global prediction thermohydrogravidynamic principles (12) and (13) define the maximal and minimal combined cosmic integral energy gravitational influences ((12) and (13), respectively, for the time moments $t = t^*(\tau_{c,r})$ and $t = t_*(\tau_{c,r})$) on the considered internal rigid core $\tau_{c,r}$ (of the Earth) subjected to the combined cosmic integral energy gravitational influence of the planets of the Solar System, the Moon and the Sun (owing to the gravitational interaction of the Sun with the outer large planets). The formulated [16] global prediction thermohydrogravidynamic principles (12) and (13) are analogous to the established previously global prediction thermohydrogravidynamic principles [15] formulated for the Earth as a whole. Based on the formulated [16] principles (12) and (13), we founded [16] (not taking into account the gravitational potential $\psi_{3MOON}(C_3, t)$ [2,7,29] created by the Moon) the same catastrophic planetary configurations 1 and 2 (shown on Figs. 2 and 3, respectively) characterized by the maximal temporal intensifications of the thermohygrogravidynamic processes (in the internal rigid core $\tau_{c,r}$ and in the boundary region τ_{rf} between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth, and consequently, in all geospheres of the Earth including the fluid core $\tau_{c,f}$ of the Earth, the mantle of the Earth and the Earth's crust) related with the maximal temporal intensifications of the global and regional natural (seismotectonic, volcanic and climatic) processes of the Earth.

The catastrophic planetary configuration 1 (shown on Fig. 2) is determined by the maximal combined integral energy gravitational influence (12) on the internal rigid core $\tau_{c,r}$ of the Earth (and on the Earth (τ_3) as a whole) of the planets (Mercury (τ_1), Venus (τ_2), Mars (τ_4) and Jupiter (τ_5)) and the Sun due to the gravitational interactions of the Sun (τ_0) with Jupiter (τ_5), Saturn (τ_6), Uranus (τ_7), and Neptune (τ_8) aligned in a straight line. The catastrophic planetary configuration 2 (shown on Fig. 3) is determined by the minimal combined integral energy gravitational influence (13) on the internal rigid core $\tau_{c,r}$ of the Earth (and on the Earth (τ_3) as a whole) of the planets (Mercury (τ_1), Venus (τ_2), Mars (τ_4) and Jupiter (τ_5)) and the Sun due to the gravitational interactions of the Sun (τ_0) with Jupiter (τ_5), Saturn (τ_6), Uranus (τ_7), and Neptune (τ_8) aligned in a straight line.

We founded previously [15] the catastrophic planetary configuration 1 (shown on Fig. 2) based on the global prediction thermohydrogravidynamic principle [15]:

$$\Delta G(\tau_3, t) = \int_{t_0}^{t} dG(\tau_3, t') = \quad (14)$$
$$= \textit{local maximum for time moment } t = t^{\bullet}(\tau_3),$$

where the time moment $t = t^{\bullet}(\tau_3)$ is related with the maximal (for all possible planetary configurations) combined planetary and solar (owing to the gravitational interaction of the Sun with the outer large planets τ_j, $j = 5, 6, 7, 8$) integral energy gravitational influence on the Earth (τ_3):

$$\Delta G(\tau_3, t^{\bullet}(\tau_3)) = \max_t \Delta G(\tau_3, t) =$$
$$= \max_t \left\{ \sum_{i=1, i\neq 3}^{9} \int_{t_0}^{t} \left(\iiint_{\tau_3} \frac{\partial \psi_{3i}}{\partial t'} \rho dV \right) dt' + \sum_{j=5,6,7,8} \int_{t_0}^{t} \left(\iiint_{\tau_3} \frac{\partial \psi_{3j}^{S}}{\partial t'} \rho dV \right) dt' \right\}. \quad (15)$$

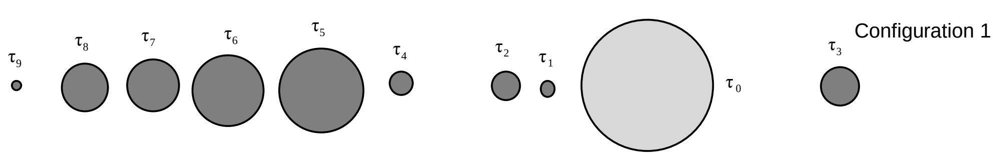

Fig. 2. The catastrophic planetary configuration 1

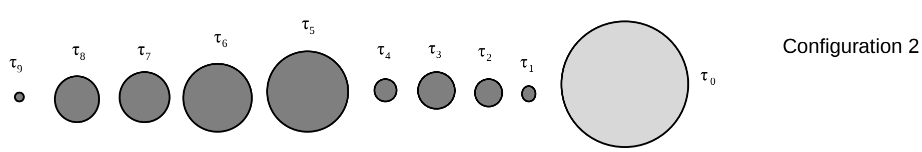

Fig. 3. The catastrophic planetary configuration 2

We founded [15] previously the catastrophic planetary configuration 2 (shown on Fig. 3) based on the global prediction thermohydrogravidynamic principle:

$$\Delta G(\tau_3, t) = \int_{t_0}^{t} dG(\tau_3, t') = \textit{local minimum for time moment } t_*(\tau_3), \tag{16}$$

where the time moment $t = t_*(\tau_3)$ is related with the minimal combined planetary and solar integral energy gravitational influence (for all possible planetary configurations) on the Earth (τ_3):

$$\Delta G(\tau_3, t_*(\tau_3)) = \min_t \Delta G(\tau_3, t) =$$
$$= \min_t \left\{ \sum_{i=1, i\neq 3}^{9} \int_{t_0}^{t} (\iiint_{\tau_3} \frac{\partial \psi_{3i}}{\partial t'} \rho dV) dt' + \sum_{j=5,6,7,8} \int_{t_0}^{t} (\iiint_{\tau_3} \frac{\partial \psi_{3j}^{S}}{\partial t'} \rho dV) dt' \right\}. \tag{17}$$

The established [15] global prediction the rmohydrogravidynamic principles (14) and (16) determine (in the frame of the cosmic seismology [15]) the maximal temporal intensifications near the time moments $t = t^{\bullet}(\tau_3)$ and $t = t_*(\tau_3)$, respectively, of the thermohydrogravidynamic processes (in the Earth as a whole) related with the maximal temporal intensifications of the global natural (sesmotectonic, volcanic and climatic) processes of the Earth. It is clear that the established [16] global prediction thermohydrogravidynamic principles (12) and (13) (determining in the frame of the cosmic seismology [15] the maximal temporal intensifications near the time moments $t = t^*(\tau_{c,r})$ and $t = t_*(\tau_{c,r})$, respectively, of the thermohydrogravidynamic processes in the internal rigid core $\tau_{c,r}$ and in the boundary region τ_{rf} between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth) are closely related with the previously established [15] global prediction thermohydrogravidynamic principles (14) and (16) determining (in the frame of the cosmic seismology [15]) the maximal temporal intensifications near the time moments $t = t^{\bullet}(\tau_3)$ and $t = t_*(\tau_3)$, respectively, of the thermohydrogravidynamic processes in the Earth as a whole. Based on the established cosmic geophysics [2-4,7,13,14,16,17], we concluded [16] that the maximal temporal intensifications of the thermohydrogravidynamic processes (in the internal rigid core $\tau_{c,r}$ and in the boundary region τ_{rf} between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth, and in the Earth as a whole) determine the maximal temporal intensifications of the global natural (sesmotectonic, volcanic and climatic) processes of the Earth.

We stated [15] that the catastrophic planetary configuration 1 (shown on Fig. 2) was approximately attained on 16 February, 3102 BC (the beginning of the Kali Yuga in the Hinduism), when all planets lined up approximately in a straight line (the Sun (τ_0) - the Earth (τ_3)) with the narrow range of angles. We concluded [15,16] that this approximately catastrophic planetary configuration (attained on 16 February, 3102 BC) should be related (according to the established [16] global prediction thermohydrogravidynamic principle (12) and according to the established [15] global prediction thermohydrogravidynamic principle (14)) with the strong catastrophic intensifications of the global natural (sesmotectonic, volcanic and climatic) processes of the Earth, including the ancient India. We presented [15,16] the convincing evidence of the validity of this conclusion related with the fact that the date 3102 BC (16 February, 3102 BC) belongs to the time range (3150±90) BC [31] of the strongest intensification (during the total range (3150±90) BC $\div$ 1963 [31]) of the volcanic activity of the Earth. We shall use in Section 3.3 the global prediction thermohydrogravidynamic principle (of the cosmic seismology [15]) (12) to predict in advance (on 31 August, 2016, and then on 7 November, 2016 during the first correction of this article) the ranges ((35), (38), and then (42), (43), (44), respectively) of the next strongest intensifications (since1 September, 2016) of the global natural (sesmotectonic, volcanic and climatic) processes of the Earth in 2016.

2.3 The Local Prediction Thermohydro-gravidynamic Principles Determining the Maximal Temporal Intensifications of the Regional Sesmotectonic and Volcanic Processes of the Earth

We formulated the local prediction thermohydrogravidynamic principles (determining the maximal temporal intensifications the regional sesmotectonic and volcanic processes near the time moments $t = t^*(\tau)$ and $t = t_*(\tau)$ in the considered macroscopic continuum region τ (near the surface of the Earth) subjected to the terrestrial and combined cosmic integral energy gravitational influence of the Moon, the Sun and the planets of the Solar System) mathematically as follows [15,16]:

$$\Delta G(\tau, t) = \int_{t_0}^{t} dG =$$
$$= \int_{t_0}^{t} dt' \iiint_{\tau} \frac{\partial \psi}{\partial t'} \rho dV = \textit{local maximum for time moment } t^*(\tau), \tag{18}$$

and

$$\Delta G(\tau, t) = \int_{t_0}^{t} dG =$$
$$= \int_{t_0}^{t} dt' \iiint_{\tau} \frac{\partial \psi}{\partial t'} \rho dV = \textit{local minimum for time moment } t_*(\tau). \tag{19}$$

The local prediction thermohydrogravidynamic principles (18) and (19) are related with the attainments of the maximal and minimal combined integral energy gravitational influences ((18) and (19) for the time moments $t = t^*(\tau)$ and $t = t_*(\tau)$, respectively) on the considered macroscopic continuum region τ rotating around the axis of the Earth subjected to the terrestrial and combined cosmic integral energy gravitational influence of the Moon, the Sun (owing to the gravitational interaction of the Sun with the outer large planets) and the planets of the Solar System. We established [15,32] the significance of the Moon as the predominant cosmic trigger mechanism of earthquakes prepared by the combined integral energy gravitational influences on the Earth of the Sun, Venus, Jupiter, Mars and Mercury.

To investigate the predominant cosmic trigger mechanism of the Moon, we considered [16] the oscillatory motion of the internal rigid core of the Earth relative to the fluid core of the Earth owing to the non-stationary energy gravitational influence on the internal rigid core $\tau_{c,r}$ (of the Earth) of the Moon and assumed [16] the following relation (characterized by the amplitude $x_{oi}(\omega_{sd})$ of the oscillatory motion of the internal rigid core of the Earth along an arbitrary fixed axis, the circular frequency $\omega_{sd} = 2\pi / T_{sd}$ of the oscillatory motion, the semidiurnal time period $T_{sd} = 12.4$ h of the oscillatory motion corresponding to the semidiurnal tidal motion) [16]:

$$x_{cr}(t) = x_{oi}(\omega_{sd}) \sin(\omega_{sd} t) = x_{oi}(T_{sd}) \sin\left(\frac{2\pi}{T_{sd}} t\right) \tag{20}$$

for the time displacement $x_{cr}(t)$ of the internal rigid core $\tau_{c,r}$ of the Earth in the fluid core $\tau_{c,f}$ of the Earth (relative to the mass center $C \equiv C_3$ of the Earth) along the fixed axis. We used [16] the local prediction thermohydrogravidynamic principles (18) and (19) for the considered surface point D_i (of the Earth), which is the intersection of the considered fixed axis with the surface of the Earth.

Assuming the relation (20) for the time displacement $x_{cr}(t)$ of the internal rigid core $\tau_{c,r}$ of the Earth in the fluid core $\tau_{c,f}$ of the Earth (relative to the mass center $C \equiv C_3$ of the Earth) along the considered fixed axis, we deduced [16] from the local prediction thermohydrogravidynamic principle (18) that the local gravity acceleration $g_{c,rf}(t, D_i, T_{sd})$ (created by the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth at the surface point D_i on the surface of the Earth) is characterized by the local maximal value. Assuming the relation (20) for the time displacement $x_{cr}(t)$ of the internal rigid core $\tau_{c,r}$ of the Earth in the fluid core $\tau_{c,f}$ of the Earth (relative to the mass center $C \equiv C_3$ of the Earth) along the considered fixed axis, we deduced from the local prediction thermohydrogravidynamic principle (19) that the local gravity acceleration $g_{c,rf}(t, D_i, T_{sd})$ (created by the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth at the surface point D_i on the surface of the Earth) is characterized by the local minimal value. We concluded [16] that the maximal and minimal local gravity accelerations in the macroscopic continuum region τ (near the surface point D_i of the Earth) are more probable (according to the local prediction thermohydrogravidynamic principles (18) and (19)) for formation of fractures (related with earthquakes) in the crust of the Earth under the energy gravitational influence of the Moon on the internal rigid core $\tau_{c,r}$ of the Earth.

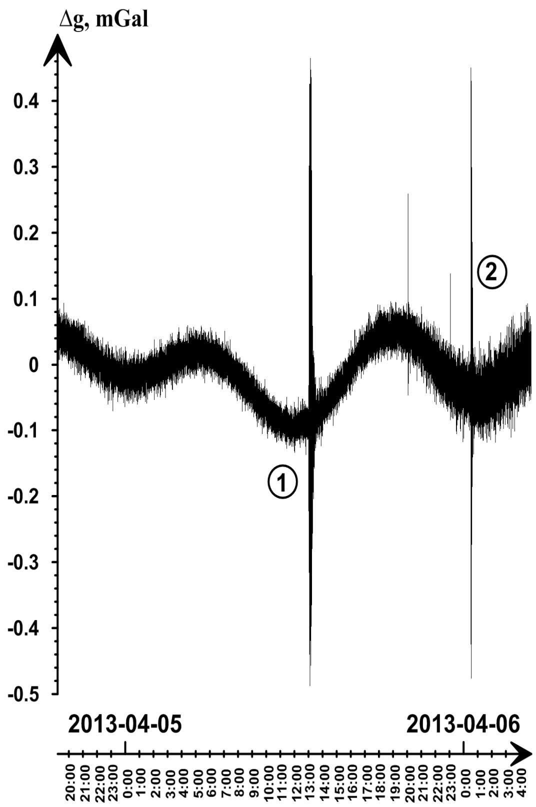

Fig. 4. The temporal variations of the combined gravity acceleration [34] induced by the semidiurnal tide, two strong earthquakes (marked by number 1 corresponding to 6.3-magnitudeearthquake occurred on 05.04.2013 13:00:02 UTC with the epicenter's coordinates $42.736\ ^{o}N$, $131.003\ ^{o}E$ on the depth $H = 563.8\ km$, and by number 2 corresponding to 5.8-magnitudeearthquake occurred on 06.04.2013 00:29:55 UTC with the epicenter's coordinates $42.736\ ^{o}N$, $130.976\ ^{o}E$ on the depth $H = 561.9\ km$) and natural and tool-making noises

Based on the general physical point of view, we concluded [16] that the realizations of earthquakes (related with formation of fractures in the crust of the Earth) are more probable under the maximal and minimal local gravity accelerations at the surface of the Earth subjected to the combined cosmic energy gravitational influence of the Moon, the planets of the Solar System, and the Sun (owing to the gravitational interaction of the Sun with the outer large planets). In accordance with this conclusion, the experimental studies [33] of the time variations of the gravitational field on the surface of the Earth (before and after the strong distant earthquakes) showed that almost all strong distant earthquakes were closely related [33] with the maximal and minimal local gravity accelerations measured [33] at the "Binagadi" station located near Baku (Azerbaijan) characterized (however) by the large distances from the epicenters of the considered earthquakes.

The modern experimental studies [34] of the tidal variations (on the surface of the Earth) of the gravity acceleration measured at the experimental station (before and after strong earthquakes occurred in 2013 near the experimental station located on the cape of Gamov) showed that almost all strong nearest earthquakes (with the epicenters near the experimental station) were closely related with the maximal and minimal local gravity accelerations measured at the experimental station located on the cape of Gamov (near the Japan Sea shelf zone of Russia). The Fig. 4 (given from the experimental studies [34]) shows the temporal variations (measured by Dr. R.G. Kulinich and Dr. M.G. Valitov [34]) of the combined gravity acceleration induced by the semidiurnal tide (characterized by the time periodicity $T_{sd} = 12.4\ h$), two strong earthquakes (marked by numbers 1 and 2 corresponding to 5 April, 2013 (05.04.2013) and 6 April, 2013 (06.04.2013), respectively) and various natural and tool-making noises. The Fig. 4 shows that the times of two strong earthquakes (marked by numbers 1 and 2) are in very good agreement with the times of the local minimal gravity accelerations (measured at the experimental station [34]), that confirmed the established [15,16] local prediction thermohydrogravidynamic principle (19).

3. THE CAUSAL LINKAGE OF THE PREVIOUS AND THE FORTHCOMING INTENSIFICATIONS OF THE GLOBAL SEISMOTECTONIC, VOLCANIC, CLIMATIC AND MAGNETIC PROCESSES OF THE EARTH IN 2016 SINCE 1 SEPTEMBER, 2016

3.1 The Forthcoming Intensifications of the Global Natural (Seismotectonic, Volcanic, Climatic and Magnetic) Processes of the Earth Since 2016

Based on the empirical range (1450±14) BC [4,16] of the last major eruption of Thera, we calculated [4,16,17,24,35] the range of the forthcoming intensifications of the global natural (sesmotectonic, volcanic and climatic) processes of the Earth:

$$-(1450\pm14) + 5\times(702 \pm 6) = (2060\pm44) =(2016\div2104) . \quad (21)$$

Based on the range (10584±36)BC [16, 24] of the former strongest intensifications of the global natural processes of the Earth, we calculated [16,17,24,35] the range of the forthcoming intensifications of the global natural processes of the Earth:

$$-10584\pm36+2\times(6321\pm3) = (2058\pm42)= (2016\div2100), \quad (22)$$

which is characterized by the same initial date 2016. We concluded [17,24] that the evaluated three subranges (2023 ± 3) [15,16], (2040.38 ± 3) [15,16] and (2059.5 ± 4.5) [16] (of the increased intensifications of the global natural processes of the Earth in the 21st century AD) belong to the ranges (21) and (22).

We evaluated [16,24,35] the date of the possible intensification of Santorini volcano:

$$1928 +88 = 2016 \quad (23)$$

by taking into account the date 1928 [36] of the previous eruption and using the established fundamental global seismotectonic and volcanic periodicity $T_f(4) = 88$ years [3]. The evaluation (23) cannot be considered [16,24,35] as the prediction of the next eruption of Santorini volcano since the detailed combined experimental studies (based on the generalization (1) of the FLT) are needed to investigate the increased microseismic activity [37] and the gravitational field near Santorini volcano.

We evaluated [3] the range of the possible intensification of the seismic activity in Japan [3, 35]:

$$(2015 \div 2017) \quad (24)$$

by taking into account the established [3] decompositions and using the dates (818, 1605, 1703, 1855 and 2011) of the strongest earthquakes near the Tokyo. We confirmed [32] the practical validity of the forecasting aspects of the deterministic THGDT [2] by the strong intensification (during 25 ÷ 30 May, 2015) of the Japanese seismic activity (including Tokyo and near the Tokyo region on 25 May, 2015) occurred during the evaluated [3] range (24) of the possible intensification of the Japanese seismic activity (including the Tokyo region).

We obtained [24] the range of the possible intensification of Fujiyama volcano:

$$(1707 \div 1708) + 176+88+44 = (2015 \div 2016) \quad (25)$$

by taking into account the date (December 16, 1707) of the last strong eruptions of the Fujiyama volcano and using the established mean fundamental global seismotectonic and volcanic periodicities $T_f(3) = 176$ years [3], $T_f(4) = 88$ years [3], $T_f(5) = 44$ years [3].

We stated [16,17] that the possible forthcoming intensifications (since the predicted intermediate range 2014÷2016 [38]) of the seismic and volcanic processes of the Earth (determined by the non-stationary energy gravitational influences on the Earth of the system Sun-Moon, Venus, Mars, Jupiter and the Sun owing to the gravitational interactions of the Sun with Jupiter and Saturn [38]) are related with the possible last major eruption of Thera (during the range (1450±14) BC) [38]).

We concluded [17,35] that the established [38] intermediate range (of the moderate intensifications [4,16,17,38] of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth):

$$(2014\div2016) \quad (26)$$

contains the date 2014 of the occurred outstanding global wintry climate anomaly worldwide (especially in the USA).

Based on the considered combined convincing arguments [4,16,17,24,35], we can conclude that the forthcoming intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth in the 21st century AD since 2016 are determined by the combined predominant non-stationary energy gravitational influences on the Earth of the system Sun-Moon, Venus, Mars, Jupiter and the Sun owing to the predominant gravitational interactions of the Sun with Jupiter and Saturn. Thus, we see the urgent necessity to evaluate (based on the global prediction thermohydrogravidynamic principle (12) and using the real planetary configurations of the Earth and the planets of the Solar System for 2016) in advance the short ranges of the possible forthcoming intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth in 2016 since 1 September, 2016.

3.2 The Date 2007.3 of the Very Rapid Changes of the Geomagnetic Field as the Precursor of the Beginning 2016 of the Forthcoming Intensifications of the Global Natural (Seismotectonic, Volcanic and Climatic) Processes of the Earth

We presented [24] the evidence of the established causal linkage between the date 2007.3 of the “very rapid changes in the trend of the secular variation of the geomagnetic field (geomagnetic jerks)” [39] and the beginning (10629 BC) of the geomagnetic reversal during the range (10629÷10429) BC revealed [10] in Gothenburg (south-west Sweden), the beginning (6372 BC) of the outstanding climate anomaly during the range (6372÷6192) BC in the North Atlantic [40] and the established [31] range (50±30) BC of the strongest global volcanic activity of the Earth.

Based on the total range (10629÷10429) BC [17, 24] of the “late Weichselian palaeomagnetic reversal” [10], we calculated [17] the range of the possible intensification of the global magnetic processes of the Earth.

$$-(10529\pm100)+2\times(6321\pm3)=(2113\pm106)= =(2007\div2216)\,. \qquad (27)$$

We concluded [17,24] that the lower date 2007 of the range (27) is located near the established date 2007.3 [39] of the very rapid changes of the geomagnetic field. Taking into account this agreement, we concluded [24] that the established intensification [16] of the amplitude of oscillation of the internal rigid core $\tau_{c,r}$ of the Earth (relative to fluid core $\tau_{c,f}$ of the Earth) is related with the revealed [39] rapid changes of the geomagnetic field.

We demonstrated [24] that the lower date 10629 BC (of the total empirical [10] range (10629÷10429) BC of the geomagnetic reversal event [10]) gives the following range (of the intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth):

$$-10629+2\times(6321\pm3)=(2013\pm6) =(2007\div2019), \qquad (28)$$

which includes “the forthcoming range (2016÷2019)”[24] (of the active intensifications of the global natural processes of the Earth) before the established [15,16] first subrange (2020÷2026) of the increased intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth. Taking into account that the revealed date 2007.3 [39] (of the very rapid changes of the geomagnetic field) is in very good agreement with the lower date 2007 (of the range (28)), we concluded [24] that the revealed very rapid changes of the geomagnetic field [39] near the established date 2007.3 [39] can be considered as the real beginning of the geomagnetic reversal of the of the Earth’s magnetic field during the predicted [17] range (27). Taking into account the demonstrated [24] convincing evidence of the established causal linkage between the date 2007.3 [39] of the very rapid changes of the geomagnetic field and the beginning (10629 BC) of the geomagnetic reversal during the range (10629÷10429) BC [17,24] revealed [10] in Gothenburg, we can conclude now (by taking into account the results of the previous Section 3.1) that the established date 2007.3 [39] of the very rapid changes of the geomagnetic field may be considered as the precursor of the of the beginning 2016 of the forthcoming intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth during the very consistent ranges (21) [16,24] and (22) [16,24].

Taking into account the established [24] fundamental significance of the established [16] thermohydrogravidynamic processes (in the internal rigid core $\tau_{c,r}$ of the Earth and in the boundary region τ_{rf} between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth), in Section 3.3 we present the evidence(based on the global prediction thermohydrogravidynamic principle (12) and the real planetary configurations of the Earth and the planets of the Solar System for 2016) of the forthcoming intensifications of the global natural (seismotectonic, volcanic and climatic) processes of the Earth since 1 September, 2016.

3.3 The Evidence of the Cosmic Energy Gravitational Genesis of the Forthcoming Intensifications of the Global Natural (Seismotectonic, Volcanic, Climatic and Magnetic) Processes of the Earth Since 1 September, 2016

Based on the fact that the powerful 7.8-magnitude (according to the US Geological Survey) earthquake occurred (on 30 May, 2015) near the Tokyo region, we presented [24] the additional evidence of the evaluated [4,16,17,35] date 2016 as the valid beginning of the active forthcoming intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth duringthe range (2016÷2019) before the subsequent three subranges (2023 ± 3) [15,16], (2040.38 ± 3) [15,16] and (2059.5 ± 4.5) [16] of the evaluated increased intensifications of the global natural processes of the Earth in the 21st century AD.

Based on the established range [7] of the seismotectonic, volcanic, climatic and magnetic time periodicities (determined by the Chandler's wobble of the Earth's pole [41])

$$T_{Ch} = 405 \div 447.25 \text{ days} \qquad (29)$$

and the related range [7,24] of the seismotectonic, volcanic, climatic and magnetic time periodicities (determined by the periodic tectonic-endogenous heating of the Earth owing to the periodic Earth's continuum deformation [7])

$$T_{Ch}/2 = 202.5 \div 223.625 \text{ days} = 0.55441 \div 0.61225 \text{ years}, \qquad (30)$$

we obtained [24] the mean seismotectonic, volcanic, climatic and magnetic time periodicity

$$\langle T_{Ch}/2 \rangle = (202.5 + 223.625)/2 \text{ days} = 213.0625 \text{ days} = 0.58333 \text{ years}. \qquad (31)$$

Considering the Japanese powerful 7.8-magnitude (strongest in the range from 1 January, 2015 to 30 May, 2015) earthquake (occurred on 30 May, 2015 near the Tokyo region), we evaluated (on 22 October, 2015 [24]) the temporal center (corresponding to (27.5±0.5) December, 2015)

$$\langle t_{int} \rangle = 2015.994 \text{ years} \qquad (32)$$

of the next possible intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth. Based on the established [7] range (30), we evaluated (on 22 October, 2015 [24]) the range t_{int} of the possible intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth [24]:

$$t_{int} = 2015.96508 \div 2016.02292 \text{ years}, \qquad (33)$$

which corresponds to the range from 18 December, 2015 to 9 January, 2016. We considered [24] the range (33) as the first candidate of the possible burst of the next active intensifications (near 2016) of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth. We see now that the center ((27.5±0.5) December, 2015) of the range (33) is very close to the date 26 December, 2015 of the strongest flood in England.

To predict in advance (on 31 August, 2016) the forthcoming ranges (since1 September, 2016) of the next active forthcoming intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth in 2016, we use the established [16] global prediction thermohydrogravidynamic principle (12) determining the maximal temporal intensification near the time moments $t = t^*(\tau_{c,r})$ of the thermohydrogravidynamic processes [16] in the internal rigid core $\tau_{c,r}$ and in the boundary region τ_{rf} between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth. This principle (12) is used to obtain (for the considered real planetary configurations of the Earth and the planets of the Solar System) the numerical time moment $t^*(\tau_{c,r}, 2016)$ corresponding to the maximal combined planetary and solar integral energy gravitational influence (12) on the Earth (τ_3) in 2016. Based on the global prediction thermohydrogravidynamic principle (12) and considering the real planetary configurations of the Earth and the planets of the Solar System for 2016, we obtained (in advance [42]) the numerical time moment (related with the maximal combined planetary and solar integral energy gravitational influence (12) on the Earth (τ_3) in 2016):

$$t^*(\tau_{c,r}, 2016) = 2016.7666, \qquad (34)$$

which corresponds approximately to 6 October, 2016. Based on the global prediction thermohydrogravidynamic principle (12) used for the range (2004 ÷ 2015), we calculate the dates $t^*(\tau_{c,r}, (2004+m))$ (m = 0, 1, …,11) corresponding to the different local maxima (12) of the combined planetary and solar integral energy gravitational influences (for the real planetary configurations during the range (2004 ÷ 2015)) on the Earth (τ_3).

Considering the range (2004 ÷ 2015) and analyzing the previous strongest earthquakes (occurred near the calculated dates $t^*(\tau_{c,r}, (2004+m))$, m= 0, 1, …, 11), we calculated [42] the probability

$$\Pr\{t_{e,max,2016} \in (1\,\text{September} \div 10\,\text{November}, 2016)\} = 0.75 \qquad (35)$$

of the forthcoming strongest earthquakes (and related [4,7,13-17,24,35,38] strongest volcanic, climatic and magnetic processes in 2016) near the calculated numerical time moment $t^*(\tau_{c,r}, 2016) = 2016.7666$ during the forthcoming range [42]:

$$(1\,\text{September} \div 10\,\text{November}, \ 2016). \qquad (36)$$

It means that the dates $t_{e,max,2016}$ of the forthcoming strongest earthquakes (and related [4,7,13-17,24,35,38] strongest volcanic, climatic and magnetic processes in 2016) will occur in the range (36) characterized by the probability (35).

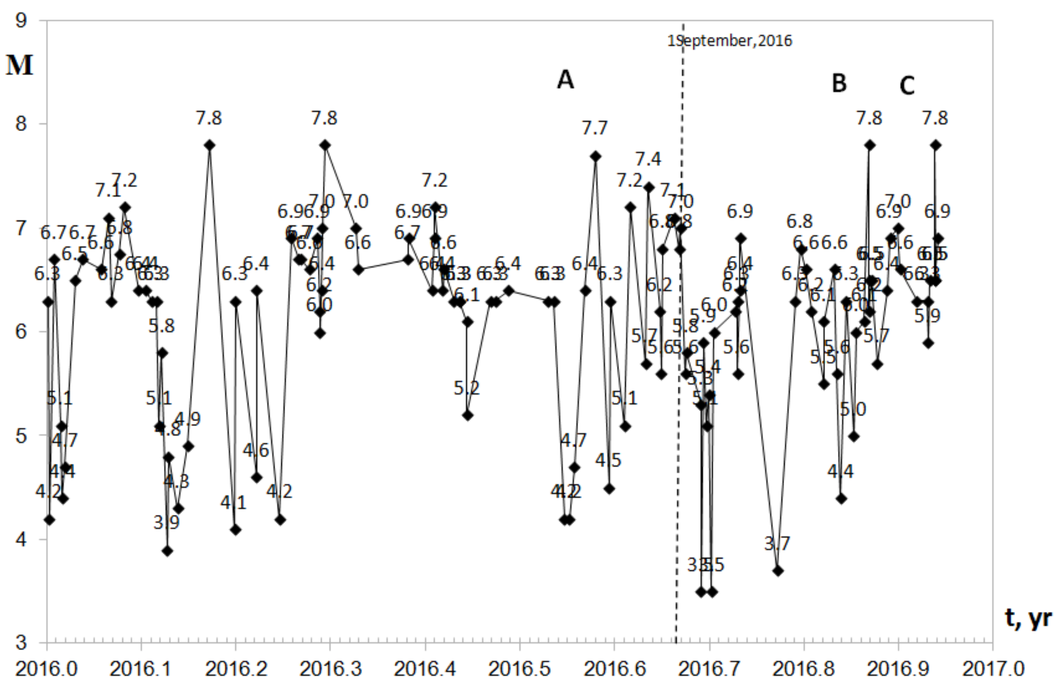

Fig. 5. The magnitudes M and the dates (in yr) of the significant earthquakes (according to the U.S. Geological Survey) in 2016 before 9 December, 2016

Considering the range (2004 ÷ 2015) and analyzing the previous strongest earthquakes (occurred near the calculated dates $t^*(\tau_{c,r}, (2004+m))$, m= 0, 1, …, 11), we calculated [42] the probability

$$\Pr\{t_{e,max,2016} \in (19\ \text{September} \div 23\text{October},\ 2016)\} = 0.416 \quad (37)$$

of the forthcoming strongest earthquakes (and related [4,7,13-17,24,35,38] strongest volcanic, climatic and magnetic processes in 2016) near the calculated numerical time moment $t^*(\tau_{c,r}, 2016) = 2016.7666$ during the forthcoming range [42]:

$$(19\ \text{September} \div 23\text{October},\ 2016). \quad (38)$$

It means that the dates $t_{e,max,2016}$ of the forthcoming strongest earthquakes (and related [4,7,13-17,24,35,38] strongest volcanic, climatic and magnetic processes in 2016) will occur in the range (38) characterized by the probability (37).

Considering (on 7 November, 2016) the range (2004 ÷ 2015) and analyzing (during the first correction of this article) the previous strongest earthquakes (occurred near the calculated dates $t^*(\tau_{c,r}, (2004+m))$, m= 0, 1, …, 11), we calculated (on 7 November, 2016) the following probabilities

$$\Pr\{t_{e,max,2016} \in (10\ \text{August} \div 30\ \text{November},\ 2016)\} = 0.833, \quad (39)$$

$$\Pr\{t_{e,max,2016} \in (28\ \text{June}, 2016 \div 13\ \text{January},\ 2017)\} = 0.916 \quad (40)$$

$$\Pr\{t_{e,max,2016} \in (15\ \text{June}, 2016 \div 26\ \text{January},\ 2017)\} = 0.99 \quad (41)$$

of the forthcoming strongest earthquakes (and related [4,7,13-17,24,35,38] strongest volcanic, climatic and magnetic processes in 2016 and in the beginning of 2017) near the numerical time moment $t^*(\tau_{c,r}, 2016) = 2016.7666$ [42] during the calculated (on 7 November, 2016) following ranges:

$$(10\ \text{August} \div 30\ \text{November},\ 2016), \quad (42)$$

$$(28\ \text{June}, 2016 \div 13\ \text{January},\ 2017), \quad (43)$$

$$(15\ \text{June}, 2016 \div 26\ \text{January},\ 2017). \quad (44)$$

It means that the dates $t_{e,max,2016}$ of the forthcoming strongest earthquakes (and related [4,7,13-17,24,35,38] strongest volcanic, climatic and magnetic processes in 2016 and in the beginning of 2017) will occur in the ranges (42), (43) and (44) characterized by the probabilities (39), (40) and (41), correspondingly.

Consider the Fig. 5 demonstrating the magnitudes M and the dates (in yr) of the significant earthquakes (according to the U.S. Geological Survey) in 2016 before 9 December, 2016. We see (on 18 December, 2016, during the second correction of this article) that the predicted (in advance, on 7 November, 2016 during the first correction of this article) range $(10\ \text{August} \div 30\ \text{November},\ 2016)$ (of the probable strongest intensifications of the global seismotectonic and climatic processes of the Earth in 2016 since 1 September, 2016) contains the date (13 November, 2016 marked by symbol B on Fig. 5) of the strongest 7.8-magnitude (according to the U.S. Geological Survey) earthquake, which struck central New Zealand (near the city of Christchurch in the South Island) confirming the validity of the range $(10\ \text{August} \div 30\ \text{November},\ 2016)$ of the predicted probable strongest intensifications (characterized by the corresponding probability $\Pr = 0.833$) of the global seismotectonic and climatic processes of the Earth in 2016 since 1 September, 2016.

We see (on 18 December, 2016, during the second correction of this article) that the predicted (in advance, on 7 November, 2016 during the first correction of this article) range $(28\ \text{June}, 2016 \div 13\ \text{January},\ 2017)$ (of the probable strongest intensifications of the global seismotectonic and climatic processes of the Earth in 2016 since 1 September, 2016) contains (along with the strongest 7.8-magnitude earthquake occurred on 13 November, 2016) the date (8 December, 2016 marked by symbol C on Fig. 5) of the strongest 7.8-magnitude (according to the U.S. Geological Survey) earthquake, which struck near the Solomon Islands confirming the validity of the predicted range $(28\ \text{June}, 2016 \div 13\ \text{January},\ 2017)$ of the probable strongest intensifications (characterized by the corresponding probability $Pr = 0.916$) of the global seismotectonic and climatic processes of the Earth in 2016 since 1 September, 2016. We see also that the predicted range $(28\ \text{June}, 2016 \div 13\ \text{January}, 2017)$ contains the date (29 July, 2016 marked by symbol A on Fig. 5) of the strongest 7.7-magnitude (according to the U.S. Geological Survey) earthquake occurred before 1 September, 2016.

4. DISCUSSION OF THE MAIN RESULTS

We have presented in Section 2 the established generalization [2-4,7,13-17,21,35] of the FLT and the established [15,16] global and local prediction thermohydrogravidynamic principles (of the cosmic seismology [15]) determining the maximal temporal intensifications of the global and regional natural (sesmotectonic, volcanic and climatic) processes of the Earth. We have presented in Section 2.1 the generalization (1) of the FLT [2-4,7,14-17,21] for the individual finite continuum region τ (considered in the Galilean frame of reference) subjected to the cosmic and terrestrial non-stationary Newtonian gravitational field and non-potential terrestrial stress forces characterized by the symmetric stress tensor $\mathbf{T}$ [22]. We have presented also in Section 2.1 the next generalization (5) of the FLT [13,17] for the individual finite continuum region (considered in the Galilean frame of reference) subjected to the cosmic and terrestrial non-stationary Newtonian gravitational field, non-potential terrestrial stress forces and non-stationary electromagnetic field. In Section 2.2 we have presented the established [15,16] global prediction thermohydrogravidynamic principles (12) and (13) determining (in the frame of the cosmic seismology [15]) the maximal temporal intensification (near the time moments $t = t^*(\tau_{c,r})$ and $t = t_*(\tau_{c,r})$, respectively) of the thermohydrogravidynamic processes (in the internal rigid core $\tau_{c,r}$ and in the boundary region τ_{rf} between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth) related with the maximal intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth (as a whole).

In Section 2.3 we have presented the established [15,16] local prediction thermohydrogravidynamic principles (18) and (19) determining (in the frame of the cosmic seismology [15]) the temporal intensifications (near the time moments $t = t^*(\tau)$ and $t = t_*(\tau)$, respectively) of the regional sesmotectonic and volcanic processes in the considered macroscopic continuum region τ (near the surface of the Earth) subjected to the terrestrial and combined cosmic integral energy gravitational influence of the Moon, the Sun (owing to the gravitational interaction of the Sun with the outer large planets) and the planets of the Solar System. Based on the experimental results [33,34], we have presented in Section 2.3 the convincing evidence of validity of the established [15,16] local prediction thermohydrogravidynamic principles (18) and (19).

We have presented in Section 3 the evidence of the causal linkage of the previous and the forthcoming intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth in 2016 since 1 September, 2016. In Section 3.1 we have presented the evidence of the cosmic and terrestrial energy gravitational genesis of the forthcoming intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth since 2016. In Section 3.2 we have presented the evidence (based on the established cosmic geophysics [2-4,7,13,14,16, 17]) that the date 2007.3 of the very rapid changes in the geomagnetic field [39] may be considered as the precursor of the beginning (2016) of the forthcoming intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth during the very consistent ranges (21) [16,35] and (22) [16,35].

In Section 3.3 we have presented the evidence of the cosmic energy gravitational genesis of the forthcoming intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth in 2016 since 1 September, 2016. In the beginning of the Section 3.3 we have presented the confirmation that the center ((27.5±0.5) December, 2015) of the evaluated (in advance [24], on 22 October, 2015) range (33) (of the predicted [24] intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth) is very close to the date (26 December, 2015) of the strongest flood in England. We have presented in Section 3.3 the obtained (for 2016) numerical time moment $t^*(\tau_{c,r}, 2016) = 2016.7666$ (corresponding approximately to 6 October, 2016 [42]) based on the established [15,16] global prediction thermohydrogravidynamic principle (12) used for the real planetary configurations of the Earth and the planets of the Solar System. The founded (on 31 August, 2016 AD) numerical time moment $t^*(\tau_{c,r}, 2016) = 2016.7666$ [42] is related with the maximal (for 2016) combined planetary and solar integral energy gravitational influence (12) on the internal rigid core $\tau_{c,r}$ of the Earth τ_3 and on the Earth τ_3 as a whole.

We have presented in Section 3.3 the founded [42] ranges $(19\ \text{September} \div 23\,\text{October}, 2016)$ and $(1\ \text{September} \div 10\ \text{November},\ 2016)$ of the probable (characterized by the probabilities $\Pr = 0.416$ and $\Pr = 0.75$, respectively) strongest (in 2016) intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth near the calculated [42] numerical time moment $t^*(\tau_{c,r}, 2016) = 2016.7666$ (for 2016). These ranges (36) and (38) were founded exceptionally (by eliminating the analysis of the strongest global climatic activity of the Earth during the range (2004 ÷2015)) based on the combined analysis of the dates of the previous strongest earthquakes occurred during the range (2004÷2015) near the calculated dates $t^*(\tau_{c,r}, (2004 + m))$ (m = 0, 1, …, 11) corresponding to the different local maxima (12) of the combined planetary and solar integral energy gravitational influences (related with the real planetary configurations during the range (2004 ÷2015)) on the internal rigid core $\tau_{c,r}$ of the Earth τ_3 and on the Earth τ_3 as a whole.

Analyzing (on 7 November, 2016 during the first correction of this article) the previous strongest earthquakes (occurred in the range (2004 ÷ 2015) near the calculated (for m = 0, 1, …, 11) dates $t^*(\tau_{c,r}, (2004 + m))$ of the maximal combined planetary and solar integral energy gravitational influences (12) on the internal rigid core $\tau_{c,r}$ of the Earth τ_3 for 2004, …., 2015), we have calculated in Section 3.3 the ranges (42), (43) and (44) of the probable (characterized by the probabilities $\Pr = 0.833$, $\Pr = 0.916$ and $\Pr = 0.99$, respectively) strongest (in 2016) intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth near the calculated [42] numerical time moment $t^*(\tau_{c,r}, 2016) = 2016.7666$ (for 2016). The ranges (42), (43) and (44) of the probable (characterized by the probabilities $\Pr = 0.833$, $\Pr = 0.916$ and $\Pr = 0.99$, respectively) strongest (in 2016) intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth (in 2016) were founded exceptionally (by eliminating the analysis of the strongest global climatic activity of the Earth during the range (2004 ÷2015)) based on the combined analysis of the dates of the previous strongest earthquakes occurred during the range (2004÷2015) near the calculated dates $t^*(\tau_{c,r}, (2004 + m))$ (m = 0, 1, …, 11) corresponding to the different local maxima (12) of the combined planetary and solar integral energy gravitational influences (related with the real planetary configurations during the range (2004 ÷2015)) on the internal rigid core $\tau_{c,r}$ of the Earth τ_3 and on the Earth τ_3 as a whole.

5. CONCLUSIONS

Analyzing (on 7 November, 2016, during the first correction of this article) the climatic activity of the Earth in 2016, we conclude that Hurricane Matthew produced the strongest devastating climatic (meteorological) activity during the predicted (in advance [42], on 31 August, 2016) range (19 September ÷ 23 October, 2016) of the probable strongest (in 2016 since 1 September, 2016) intensification (characterized by the probability $\Pr = 0.416$) of the global climatic (meteorological) activity of the Earth in 2016. According to the U.S. National Hurricane Center, Matthew was (on 30 September, 2016) the most powerful devastating hurricane in the Atlantic since the last Category 5 hurricane Felix observed in the Atlantic on September 2007. According to the U.S. National Hurricane Center, “Matthew's top sustained winds have risen from 115 mph (185 kph) to 125 mph (205 mph) in just a few hours early Thursday (on 6 October, 2016) as the storm continues to batter the central Bahamas” [43].

We have the first unquestionable fact that the date of 6 October, 2016 (when “Hurricane Matthew has gained new muscle over the Bahamas” [43]) is in the perfect agreement with the calculated (in advance [42], on 31 August,

2016) numerical time moment $t^{*}(\tau_{cr}, 2016) = 2016.76$ (corresponding approximately to 6 October, 2016) of the maximal combined planetary and solar integral energy gravitational influence (12) on the internal rigid core $\tau_{c,r}$ of the Earth (and on the Earth as a whole) in 2016.The probability of this perfect agreement (considered as a casual coincidence) is approximated by the obvious numerical value $(1/365)\cdot(1/365)$, which is very small number. It means that this perfect agreement is not a casual coincidence. Consequently, we can conclude that this perfect agreement may be considered as the convincing evidence of the validity of the established [15,16] global prediction thermohydrogravidynamic principle (12) concerning the maximal intensifications of the global and regional climatic activities of the Earth. This perfect agreement may be considered also as the convincing evidence of the cosmic (combined planetary and solar) energy gravitational genesis of the global and regional climatic (meteorological) activities of the Earth related with strong hurricanes.

We have the second unquestionable fact that the strongest (in 2016 since 1 September and before 7 November, 2016) climatic (meteorological) activity of the Earth (related with Hurricane Matthew) corresponds perfectly to the predicted (in advance [42], on 31 August, 2016) range (19 September ÷ 23 October, 2016) (based on the analysis of the previous strongest earthquakes during the range (2004 ÷ 2015)) of the probable strongest (in 2016 since 1 September, 2016) intensification (characterized by the probability $\Pr = 0.416$) of the global climatic (meteorological) activity of the Earth. This second unquestionable fact may be considered as the convincing evidence of the Gutenberg's [44] idea that the seismic activity of the Earth is closely related with the climatic (meteorological) activity of the Earth.

We have the third unquestionable fact (which confirms the Gutenberg's [44] idea about the global seismic-climatic relation) that the powerful 6.5-magnitude (according to the Japan Meteorological Agency) earthquake (occurred on 23 September, 2016 southeast of Tokyo) and the powerful 6.6-magnitude earthquake (occurred on 21 October, 2016 in Tottori, a prefecture in western Japan about 430 miles west of Tokyo) were realized during the predicted range (24) "of the possible intensification of the Japanese seismic activity (including the Tokyo region)" [3] and during the predicted (in advance [42], on 31 August, 2016) range (19 September ÷ 23 October, 2016) of the probable strongest intensifications (characterized by the corresponding probability $\Pr = 0.416$) of the global seismotectonic and climatic processes of the Earth in 2016 since 1 September, 2016.

We have the fourth unquestionable fact that the powerful 6.6-magnitude (according to the U.S. Geological Survey) earthquake (which is the strongest Italian devastating earthquake in nearly 40 years) rocked central Italy (near the Umbrian town of Norcia) on 30 October, 2016 confirming the validity of the predicted (in advance [42], on 31 August, 2016) range (1 September ÷ 10 November, 2016) of the probable strongest intensifications (characterized by the corresponding probability $\Pr = 0.75$) of the global seismotectonic and climatic processes of the Earth in 2016 since 1 September, 2016.

Analyzing (on 18 December, 2016, during the second correction of this article) the seismotectonic activity of the Earth in 2016 since 1 September, 2016 (by considering the significant earthquakes according to the U.S. Geological Survey), we have the fifth unquestionable fact that the powerful 7.8-magnitude (according to the U.S. Geological Survey) earthquake struck central New Zealand (near the city of Christchurch in the South Island) on 13 November, 2016 confirming the validity of the predicted (in advance, on 7 November, 2016 during the first correction of this article) range $(10 \text{ August} \div 30 \text{ November}, 2016)$ of the probable strongest intensifications (characterized by the corresponding probability $\Pr = 0.833$) of the global seismotectonic and climatic processes of the Earth in 2016 since 1 September, 2016. The date (13 November, 2016) of the powerful 7.8-magnitude earthquake (occurred near the Full Moon on 14 November, 2016) confirmed the validity of the established [15,32] significance of the Moon as the predominant cosmic trigger mechanism of the prepared earthquakes.

Analyzing (on 18 December, 2016) the seismotectonic activity of the Earth in 2016 since 1 September, 2016 (by considering the significant earthquakes according to the U.S. Geological Survey), we have the sixth unquestionable fact that the powerful 7.8-magnitude (according to the U.S. Geological Survey) earthquake struck near the Solomon Islands on 8 December, 2016 confirming the validity of the predicted (in advance, on 7 November, 2016 during the first correction of this article) range $(28 \text{ June}, 2016 \div 13 \text{ January}, 2017)$

of the probable strongest intensifications (characterized by the corresponding probability $\Pr = 0.916$) of the global seismotectonic and climatic processes of the Earth in 2016 since 1 September, 2016.

Thus, we see (on 18 December, 2016) that the strongest 7.8-magnitude (according to the U.S. Geological Survey) earthquakes (occurred on 13 November, 2016 and on 8 December, 2016 since 1 September, 2016) have confirmed the validity of the established [15,16] global prediction thermohydrogravidynamic principle (12) concerning the strongest intensification of the global seismotectonic processes of the Earth (in 2016 since 1 September, 2016) during the predicted (in advance, during the first correction of this article on 7 November, 2016) ranges $(10\ \text{August} \div 30\ \text{November},\ 2016)$ and $(28\ \text{June},\ 2016 \div 13\ \text{January},\ 2017)$ of the forthcoming strongest intensifications (characterized by the corresponding probabilities $\Pr = 0.833$ and $\Pr = 0.916$, respectively) of the global seismotectonic and climatic processes of the Earth in 2016 since 1 September, 2016.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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