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The Thermohydrogravidynamic Theory Concerning the Forthcoming Intensification of the Global Natural Processes from December 7, 2019 to April 18, 2020 AD

Sergey Victorovich Simonenko[1*]

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

Email Address

sergeysimonenko@mail.ru (Sergey V. Simonenko)
*Correspondence: sergeysimonenko@mail.ru

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Abstract:

The article presents (on December 9, 2019) the prediction of the thermohydrogravidynamic theory concerning the evaluated probabilities of the forthcoming intensification of the global seismotectonic, volcanic and climatic processes of the Earth during the evaluated beginning (from December 7, 2019 to April 18, 2020) of the established (in 2012 AD) and finally confirmed (in 2019 AD) "first forthcoming subrange 2020 ÷ 2026 AD of the increased intensification of the Earth" determined by the combined non-stationary cosmic energy gravitational influences on the Earth of the planets (Mercury, Venus, Mars and Jupiter) and the Sun (owing to the gravitational interaction of the Sun with Jupiter, Saturn, Uranus and Neptune).

Keywords:

Thermohydrogravidynamic Theory, Non-Stationary Cosmic Gravitation, Cosmic Geophysics, Cosmic Seismology, Cosmic Geology, Generalized First Law of Thermodynamics, Global Seismotectonic, Volcanic and Climatic Processes

1. Introduction

The problem of the long-term predictions of the strong earthquakes [1] is the significant problem of the modern geophysics [2]. It is well known that "the deterministic prediction of the time of origin, hypocentral (or epicentral) location, and magnitude of an impending earthquake is an open scientific problem" [2]. It was conjectured [2] that the possible earthquake prediction and warning must be carried out on a deterministic basis. However, it was pointed out [2] with some regret that the modern "study of the physical conditions that give rise to an earthquake and the processes that precede a seismic rupture of an ordinary event are at a very preliminary stage and, consequently, the techniques of prediction of time of origin, epicentre, and magnitude of an impending earthquake now available are below standard". In the special issue [3] of the International Journal of Geophysics, Rodolfo Console, Koshun Yamaoka, and Jiancang Zhuang assessed the status of the art of earthquake forecasts and their applicability. It was conjectured [3] that the recent destructive earthquakes occurred in Sichuan (China, 2008), Italy (2009), Haiti (2010), Chile (2010), New Zealand (2010), and Japan (2011) "have shown that, in present state, scientific researchers have achieved little or almost nothing in the implementation of short- and medium-term earthquake prediction, which would be useful for disaster mitigation measures".

In this article, the author presents to the Energy Research the predictions of the thermohydrogravidynamic theory concerning the evaluated probabilities of the strongest earthquakes during the established beginning (from December 7, 2019 to April 18, 2020) of the predicted [4,5] and confirmed [6] "first forthcoming subrange 2020 ÷ 2026 AD of the increased intensification of the Earth" determined by the combined non-stationary cosmic energy gravitational influences on the Earth of the system Sun-Moon, Mercury, Venus, Mars, Jupiter and the Sun (owing to the gravitational interaction of the Sun with Jupiter, Saturn, Uranus and Neptune).

The thermohydrogravidynamic theory is based on the established [7,8,9] equivalent generalized differential formulations (9) and (16) of the first law of thermodynamics (for moving rotating deforming compressible heat-conducting stratified individual finite continuum region τ subjected to the non-stationary Newtonian gravitational field) extending the classical formulation [10] by taking into account (along with the classical infinitesimal change of heat δQ [10] and the classical infinitesimal change of the internal energy dU_{τ} [10]) the established[7,9] significant differential (infinitesimal) energy gravitational influence dG (as the result of the Newtonian non-stationary cosmic and terrestrial gravitation) on the individual finite continuum region τ during the infinitesimal time interval dt.

Based on the established [7,8,9] significant differential (infinitesimal) energy gravitational influence dG (as the result of the Newtonian non-stationary cosmic gravitation) on the internal rigid core $\tau_{c,r}$ of the Earth (and on the individual finite continuum region τ) during the infinitesimal time interval dt, we established [4,5] the rigorous global and local (for the individual finite continuum region τ) prediction thermohydrogravidynamic principles determining the maximal temporal intensifications of the established [4,5] 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; in the individual finite continuum region τ) and related global and regional natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth.

Based on the rigorous global prediction thermohydrogravidynamic principle (22), we established the first confirmed validity [11] of the thermohydrogravidynamic theory concerning the predicted (on 31 August, 2016 [11] based on the real planetary configurations of the Earth and the planets of the Solar System) strongest (in 2016) intensifications of the global natural processes of the Earth since 1 September, 2016 and before 26 January, 2017. The article [11] presented the first confirmed validity of the established global prediction thermohydrogravidynamic principle (22) (of the developed thermohydrogravidynamic theory containing the cosmic geophysics and the cosmic seismology based on the generalization (16) of the first law of thermodynamics for non-stationary cosmic gravitation) concerning the predicted (in advance, on 31 August, 2016 [11]) strongest (in 2016) intensifications (since 1 September, 2016 and before 26 January, 2017) of the global seismotectonic, volcanic, climatic and magnetic processes of the Earth determined by the maximal combined integral energy gravitational influence (realized approximately on 6 October, 2016) on the internal rigid core $\tau_{c,r}$ 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.

Based on the rigorous global prediction thermohydrogravidynamic principle (23), we established [12] the second confirmed validity of the thermohydrogravidynamic theory concerning the first subrange of the strongest (in 2017) intensifications of the global natural processes of the Earth since 10 April, 2017 and before 6 August, 2017. The article [12] confirmed the validity of the established prognostications (made on 10 April, 2017 and on 16 July, 2016 based on the global prediction thermohydrogravidynamic principle (23) and on the real planetary configurations of the Earth and the planets of the Solar System) concerning the first subrange of the strongest (in 2017) intensifications of the global natural (seismotectonic, volcanic and climatic) processes of the Earth (since 10 April, 2017 and before 6 August, 2017) determined by the minimal (near the calculated numerical time moment $t_*(\tau_{c,r}, 2017) = 2017.3\,\mathrm{AD}$ corresponding approximately to 20 April, 2017) combined integral energy gravitational influence on the internal rigid core $\tau_{c,r}$ 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.

Based on the rigorous global prediction thermohydrogravidynamic principle (22), we established [13] the third confirmed validity of the prediction [14] of the thermohydrogravidynamic theory concerning the strongest intensifications of the seismotectonic and climatic processes in California (since 9 August, 2017 and before 3 March, 2018 [14]) induced by the combined non-stationary cosmic energy gravitational influences on the Earth of the planets (Mercury, Venus, Mars and Jupiter) and the Sun owing to the gravitational interaction of the Sun with Jupiter, Saturn, Uranus and Neptune.

Finally, based on the rigorous global prediction thermohydrogravidynamic principles (22) and (23), we presented [15] the confirmed validity of the cosmic energy gravitational genesis of the strongest Japanese, Italian, Greek, Chinese and Chilean earthquakes. The article [15] presented (on February 13, 2018) the confirmed validity of the cosmic energy gravitational genesis of the strongest Japanese (for 2015 and 2016), Italian (for 2016), Greek (for 2017), Chinese (for 2008 and 2017) and Chilean (for 2015 and 2016) earthquakes related with the extreme (maximal and minimal, respectively) combined integral energy gravitational influences (in accordance with the established [4,5] global prediction thermohydrogravidynamic principles (22) and (23) of the cosmic seismology) on the internal rigid core $\tau_{c,r}$ 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.

We evaluated [4,5] previously the first forthcoming [6] subrange $(2020 \div 2026)\,\mathrm{AD}$

(of the increased intensification of the global seismotectonic, volcanic, climatic and magnetic activity of the Earth) based on the founded [4,5] range $T_{tec, vol, clim, f} = 696 \div 708$ years of the fundamental global seismotectonic, volcanic and climatic periodicities and considering the date (1318 AD [16]) of the great earthquake occurred in England. We obtained [6] the rigorous mathematical evidence of the established [4,5] first forthcoming subrange $(2020 \div 2026)$ AD (of the increased intensification of the global seismotectonic, volcanic, climatic and magnetic activity of the Earth) based on the established [4,5] rigorously (mathematically) formulated global prediction thermohydrogravidynamic principles (22) and (23) used for the real planetary configurations of the Earth and the planets of the Solar System.

In this article, following the global prediction thermohydrogravidynamic principle (22) used for the real planetary configurations of the Earth and the planets of the Solar System, we present the predictions of the thermohydrogravidynamic theory concerning the evaluated probabilities of the strongest earthquakes during the beginning (from December 7, 2019 to April 18, 2020) of the established [4,5,6] first forthcoming subrange 2020 ÷ 2026 AD of the increased intensification of the Earth.

To do this, in Section 2.1 we present the established [7,8,9] equivalent generalized differential formulations (9) and (16) of the first law of thermodynamics (for moving rotating deforming compressible heat-conducting stratified individual finite continuum region τ subjected to the non-stationary Newtonian gravitational field) extending the classical formulation [10] by taking into account (along with the classical infinitesimal change of heat δQ and the classical infinitesimal change of the internal energy dU_τ) the infinitesimal increment dK_τ of the macroscopic kinetic energy K_τ, the infinitesimal increment $d\pi_\tau$ of the gravitational potential energy π_τ, the generalized expression for the infinitesimal work $\delta A_{np,\partial\tau}$ done by the non-potential terrestrial stress forces (determined by the symmetric stress tensor $\mathbf{T}$) acting on the boundary surface $\partial\tau$ of the continuum region τ, and the established [7,8,9] differential (infinitesimal) energy gravitational influence dG (as the result of the Newtonian non-stationary cosmic and terrestrial gravitation) on the individual finite continuum region τ during the infinitesimal time interval dt. In Section 2.2 we present the established [4,5,6,11,15] global prediction thermohydrogravidynamic principles (22) and (23) (of the cosmic seismology [4,5,11]) determining the maximal temporal intensifications of the global and regional natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth.

Using the global prediction thermohydrogravidynamic principle (22) based on the established [7,8,9] equivalent generalized differential formulations (9) and (16) of the first law of thermodynamics, we present in Section 3.1 the predictions of the thermohydrogravidynamic theory concerning the evaluated probabilities (33), (34), (35), (36), (37), (38), (39), (40), (41), (42), (43), (44), (45) and (46) of the strongest earthquakes during the beginning (from December 7, 2019 to April 18, 2020) of the established [4,5,6] first forthcoming subrange 2020 ÷ 2026 AD of the increased intensification of the Earth.

Taking into account the considered (on December 6, 2019 based on the Table 1) previous strongest (according to the U.S. Geological Survey) earthquakes of the Earth (from September 24, 2019 to December 6, 2019, we present in Section 3.2 the corrected probabilities (50), (51), (52), (53), (54), (55), (56), (57), (58), (59), (60), (61), (62) and (63) of the possible strongest (near the calculated numerical time moment (24) from December 7, 2019 to April 18, 2020) intensifications of the seismotectonic, volcanic, climatic and magnetic processes (during the corresponding ranges indicated in the round brackets of the probabilities (50), (51), …, and (63)) determined by the combined integral energy gravitational influences on the Earth 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.

In Section 4 we present the main results and conclusions.

2. Materials and Methods

2.1. The Generalized Differential Formulation of the First Law of Thermodynamics for Non-stationary Newtonian Gravitational Field

We shall assume that τ is an individual finite continuum region bounded by the closed continual boundary surface $\partial\tau$ considered in the three-dimensional Euclidean space with respect to a Cartesian coordinate system K . We shall consider the individual finite continuum region τ in a Galilean frame of reference with respect to a Cartesian coordinate system K centred at the origin O and determined by the axes X_1, X_2, X_3 (see Figure 1). The unit normal K -basis coordinate vectors triad $\boldsymbol{\mu}_1, \boldsymbol{\mu}_2, \boldsymbol{\mu}_3$ is taken in the directions of the axes X_1, X_2, X_3 , respectively. The K -basis vector triad is taken to be right-handed in the order $\boldsymbol{\mu}_1, \boldsymbol{\mu}_2, \boldsymbol{\mu}_3$, see Figure 1.

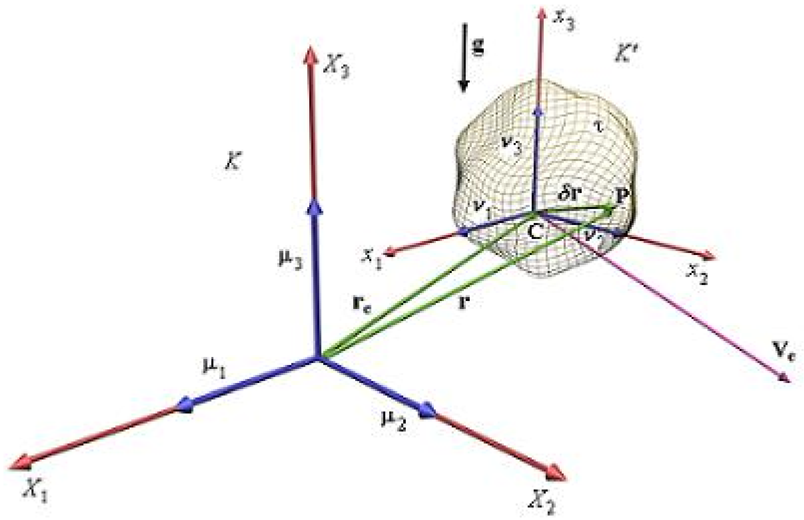

Figure 1. *Cartesian coordinate system K of a Galilean frame of reference and an individual finite continuum region τ subjected to the non-stationary combined (cosmic and terrestrial) Newtonian gravitation field and non-potential terrestrial stress forces.*

An arbitrary point P in three-dimensional physical space will be uniquely defined by the position-vector $\mathbf{r} = X_i\boldsymbol{\mu}_i \equiv (X_1, X_2, X_3)$ originating at the point O and terminating at the point P . The continuum region-affixed Lagrangian coordinate system K' (with the axes x_1, x_2, x_3) is centered to the mass center C of the individual finite continuum region τ . The axes x_1, x_2, x_3 are taken parallel to the axes X_1, X_2, X_3 , respectively: the axis x_i is parallel to the axis X_i , where i = 1, 2, 3. The unit normal $K'-$ basis coordinate vector triad $\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3$ is taken in the directions of the axes x_1, x_2, x_3, respectively. The K' – basis vector triad is taken to be right-handed in the order $\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3$. The mathematical differential of the position-vector $\mathbf{r}$, $\delta\mathbf{r} \equiv x_i \mathbf{v}_i \equiv (x_1, x_2, x_3)$, expressed in terms of the coordinates x_i (i = 1, 2, 3) in the K' - coordinate system, originates at the mass centre C of the individual finite continuum region τ and terminates at the arbitrary point P of the individual finite continuum region τ. $\mathbf{g} = \mathbf{g}(\mathbf{r}, t)$ is the local gravity acceleration considered as a vector function [17,18] of variables $\mathbf{r}$ and the time t .

The position-vector $\mathbf{r_c}$ of the mass center C of the individual finite continuum region τ in the K - coordinate system is given by the following expression.

$$\mathbf{r_c} = \frac{1}{m_\tau} \iiint_\tau \mathbf{r}\, \rho\, dV, \tag{1}$$

where

$$m_\tau = \iiint_\tau \rho dV \tag{2}$$

is the mass of the individual finite continuum region τ, dV is the mathematical differential of the physical volume of the individual finite continuum region τ, $\rho \equiv \rho(\mathbf{r}, t)$ is the local macroscopic density of mass distribution, $\mathbf{r}$ is the position-vector of the continuum volume dV . The speed of the mass centre C of the individual finite continuum region τ is defined by the following expression

$$\mathbf{V}_c = \frac{d\mathbf{r_c}}{dt} = \frac{\iiint_\tau \mathbf{v}\rho dV}{m_\tau}, \tag{3}$$

where $\mathbf{v} = \frac{d\mathbf{r}}{dt}$ is the hydrodynamic velocity vector, the operator $d/dt = \partial/\partial t + \mathbf{v} \cdot \nabla$ denotes the total derivative [7, 17,18,19,20,21,22] following the continuum substance. The relevant three-dimensional fields such as the velocity and the local mass density (and also the first and the second derivatives of the relevant fields) are assumed to vary continuously throughout the entire continuum bulk of the individual finite continuum region τ.

We shall use the differential formulation of the first law of thermodynamics [23] for the specific volume $\vartheta = 1/\rho$ of the one-component deformed continuum with no chemical reactions:

$$\frac{du}{dt} = \frac{dq}{dt} - p\frac{d\vartheta}{dt} - \vartheta\mathbf{\Pi} : \mathrm{Grad}\,\mathbf{v}, \tag{4}$$

where u is the specific (per unit mass) internal thermal energy, p is the thermodynamic pressure, $\mathbf{\Pi}$ is the viscous-stress tensor, $\mathbf{v}$ is the hydrodynamic velocity of the continuum macrodifferential element [23], dq is the differential change of heat across the boundary of the continuum region (of unit mass) related with the thermal molecular conductivity described by the heat equation [23]:

$$\rho\frac{dq}{dt} = -\mathrm{div}\,\mathbf{J}_q, \tag{5}$$

where $\mathbf{J}_q$ is the heat flux [23]. The viscous-stress tensor $\mathbf{\Pi}$ is taken from the decomposition $\mathbf{P} = p\boldsymbol{\delta} + \mathbf{\Pi}$ of the pressure tensor $\mathbf{P}$ [23], where $\boldsymbol{\delta}$ is the Kronecker delta-tensor. The macroscopic local mass density ρ of mass distribution and the local hydrodynamic velocity $\mathbf{v}$ of the macroscopic velocity field are determined by the classical hydrodynamic continuity equation [18,19,20]:

$$\frac{\partial \rho}{\partial t} + \mathrm{div}(\rho \mathbf{v}) = 0 \tag{6}$$

under the absence of distributed space-time sources of mass output.

Using the differential formulation (4) of the first law of thermodynamics [23] for the total derivative du/dt (following the continuum substance) of the specific (per unit mass) internal thermal energy u of the one-component deformed continuum with no chemical reactions, the heat equation (5) [23], the decomposition $\mathbf{P} = p\boldsymbol{\delta} + \boldsymbol{\Pi}$ of the pressure tensor $\mathbf{P}$, the hydrodynamic continuity equation (6), the classical equation [17-20] for each variable f (such as $\mathbf{v}^2/2$, u and ψ):

$$\frac{d}{dt}\iiint_{\tau} f\, \rho dV = \iiint_{\tau} \frac{d}{dt} f\, \rho dV, \tag{7}$$

and the general equation of continuum movement [20]:

$$\frac{d\mathbf{v}}{dt} = \frac{1}{\rho}\mathrm{div}\,\mathbf{T} + \mathbf{g} \tag{8}$$

for the deformed continuum characterized by the symmetric [17,18] stress tensor $\mathbf{T} = -\mathbf{P}$ [20] of a general form and taking into account the time variations of the potential ψ of the non-stationary gravitational field (characterized by the local gravity acceleration vector $\mathbf{g} = -\nabla\psi$) inside of the individual finite continuum region τ, we derived [4,5,6,7,8,9,24] the generalized differential formulation (for the Galilean frame of reference) of the first law of thermodynamics (for moving rotating deforming heat-conducting stratified individual finite one-component continuum region τ subjected to the non-stationary Newtonian gravitational field and to non-potential stress forces characterized by the symmetric stress tensor $\mathbf{T}$):

$$\frac{dE_{\tau}}{dt} = \frac{d}{dt}\left(K_{\tau} + U_{\tau} + \boldsymbol{\pi}_{\tau}\right) = \frac{d}{dt}\iiint_{\tau}\left(\frac{1}{2}\mathbf{v}^2 + u + \psi\right)\rho dV$$

$$= \iint_{\partial\tau}\left(\mathbf{v}\cdot\left(\mathbf{n}\cdot\mathbf{T}\right)\right) d\Omega_{\mathbf{n}} - \iint_{\partial\tau}\left(\mathbf{J}_q \cdot \mathbf{n}\right) d\Omega_{\mathbf{n}} + \iiint_{\tau}\frac{\partial\psi}{\partial t}\rho dV, \tag{9}$$

where

$$\delta A_{np,\partial\tau} = dt\iint_{\partial\tau}\left(\mathbf{v}\cdot\left(\mathbf{n}\cdot\mathbf{T}\right)\right) d\Omega_{\mathbf{n}} \tag{10}$$

is the differential work done during the infinitesimal time interval dt by non-potential stress forces (pressure, compressible and viscous forces for Newtonian continuum) acting on the boundary surface $\partial\tau$ of the individual finite continuum region τ ; $d\Omega_{\mathbf{n}}$ is the differential element (of the boundary surface $\partial\tau$ of the individual finite continuum region τ) characterized by the external normal unit vector $\mathbf{n}$; $\mathbf{t} = \mathbf{n}\cdot\mathbf{T}$ is the stress vector [20];

$$\delta Q = -dt\iint_{\partial\tau}\left(\mathbf{J}_q \cdot \mathbf{n}\right) d\Omega_{\mathbf{n}} \tag{11}$$

is the differential change of heat of the individual finite continuum region τ related with the thermal molecular conductivity of heat across the boundary $\partial\tau$ of the individual finite continuum region τ , $\mathbf{J}_q$ is the heat flux [23] (across the element $d\Omega_{\mathbf{n}}$ of the continuum boundary surface $\partial\tau$);

$$dG = dt\iiint_{\tau}\frac{\partial\psi}{\partial t}\rho dV \tag{12}$$

is the established [4-6,8,9,24] differential (infinitesimal) energy gravitational influence dG (as the result of the Newtonian non-stationary gravitation) on the individual finite continuum region τ (during the infinitesimal time interval dt);

$$\pi_{\tau} = \iiint_{\tau}\psi\rho dV \tag{13}$$

is the established [4-9,24] macroscopic potential energy (of the individual finite continuum region τ) related with the non-stationary potential ψ of the gravitational field;

$$U_{\tau} = \iiint_{\tau}u\rho dV \tag{14}$$

is the classical [10,22,25] microscopic internal thermal energy of the individual finite continuum region τ ;

$$K_{\tau} = \iiint_{\tau}\frac{\rho\mathbf{v}^2}{2}dV \tag{15}$$

is the established [4-9, 22, 24] instantaneous macroscopic kinetic energy of the individual finite continuum region τ .

The generalized differential formulation (9) extends the formulation ((4.28) in monograph [22]) of the first law of thermodynamics by taking into account (along with the classical [10, 22, 25] internal thermal energy $U_{\tau} \equiv U$ and the established [4-9,22,24] macroscopic kinetic energy K_{τ}) the established [4,5,6,7,8,9,24] gravitational potential energy π_{τ} (given by (13)) and the established [4-9,24] differential energy gravitational influence dG (given by (12)) on the individual finite continuum region τ (during the infinitesimal time interval dt) as the result of the Newtonian non-stationary gravitation.

The generalized differential formulation (9) of the first law of thermodynamics can be rewritten as follows [4,5,6,7,8,9,24]:

$$dU_{\tau} + dK_{\tau} + d\pi_{\tau} = \delta Q + \delta A_{np,\partial\tau} + dG \tag{16}$$

extending the classical [10,25] formulations

$$dU = \delta Q - pdV, \ (d\varepsilon \equiv dU, -\delta W = -pdV) \tag{17}$$

by taking into account (along with the classical [10,25] infinitesimal change of heat δQ and the classical [10,25] infinitesimal change of the internal energy $dU_{\tau} \equiv dU$) the infinitesimal increment dK_{τ} of the macroscopic kinetic energy K_{τ} , the infinitesimal increment $d\pi_{\tau}$ of the gravitational potential energy π_{τ} , the generalized

[4,5,6,7,8,9,24] infinitesimal work $\delta A_{np,\partial\tau}$ done on the individual finite continuum region τ by the surroundings of τ, and the differential (infinitesimal) energy gravitational influence dG [4,5,6,7,8,9,24] on the individual finite continuum region τ during the infinitesimal time interval dt.

2.2. The Global Prediction Thermohydrogravidynamic Principles Determining the Maximal Temporal Intensifications of the Global Seismotectonic, Volcanic, and Climatic Processes of the Earth Subjected to Non-stationary Cosmic Gravitation

To determine the forthcoming date $t^*(\tau_{c,r}, 2020)$ corresponding to the first maximal combined planetary and solar integral energy gravitational influence on the internal rigid core $\tau_{c,r}$ of the Earth (and on the Earth as a whole) during the established first forthcoming subrange (2023 ± 3) AD of the increased intensification of the global seismotectonic, volcanic, climatic and magnetic activity of the Earth, we use the global prediction thermohydrogravidynamic principles [4,5] determining the maximal temporal intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth. Taking into account the general relation (12) for the infinitesimal energy gravitational influence dG on the individual finite continuum region τ, we obtained [5, 6] 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 owing to the gravitational interaction of the Sun with Jupiter, Saturn, Uranus and Neptune) on the internal rigid core $\tau_{c,r}$ of the Earth:

$$dG(\tau_{c,r}) = dt \iiint_{\tau_{c,r}} \frac{\partial \psi_{comb}}{\partial t} \rho_{c,r} dV, \qquad (18)$$

where $\rho_{c,r} = 12800 \, kg \cdot m^{-3}$ [26] 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 [5, 6]

$$\frac{\partial \psi_{comb}(\tau_{c,r}, t)}{\partial t} = \frac{\partial \psi_{3MOON}(C_3, t)}{\partial t} + \sum_{i=1, i\neq 3}^{9} \frac{\partial \psi_{3i}(C_3, t)}{\partial t} + \sum_{j=5}^{8} \frac{\partial \psi_{3j}^{S}(C_3, t)}{\partial t}, \qquad (19)$$

where $\partial\psi_{3MOON}(C_3, t)/\partial t$ is the partial derivative [24,27,28] 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 [24,27,28] 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 established [4,6] partial derivative (given by the relation (48) in [6]) of the gravitational potential $\psi_{3j}^{S}(C_3, t)$ created by the Sun (due to the gravitational interaction of the Sun with the outer large planet τ_j, j =5, 6, 7, 8) at the mass center C_3 of the Earth.

We established [5] 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:

$$\frac{dG(\tau_{c,r})}{dt\iiint\limits_{\tau_{c,r}} dV} = \frac{dG(\tau_{c,r})}{dtV(\tau_{c,r})} = \frac{\partial \psi_{comb}}{\partial t}\rho_{c,r} \tag{20}$$

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

$$\frac{|dG(\tau_{c,r})|}{dtV(\tau_{c,r})} = \left|\frac{\partial \psi_{comb}}{\partial t}\right|\rho_{c,r} \tag{21}$$

since the mass density $\rho_{c,r} = 12800\,kg \cdot m^{-3}$ [26] (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 all interior of the Earth [27,28]. Taking into account this fact, we concluded [5] 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.

Based on the generalization (16) of the first law of thermodynamics (used for the internal rigid core $\tau_{c,r}$ of the Earth), we formulated [4,5] the global prediction thermohydrogravidynamic principles determining the maximal temporal intensifications of the established 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 considered as a whole) 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 [5] (based on the generalization (16) of the first law of thermodynamics 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 [5,6]:

$$\Delta G(\tau_{c,r}, t^*(\tau_{c,r})) = \max_t \int_{t_0}^{t} dt' \iiint\limits_{\tau_{c,r}} \frac{\partial \psi_{comb}}{\partial t'}\rho_{c,r} dV - \text{local maximum for time moment } t^*(\tau_{c,r}), \tag{22}$$

and

$$\Delta G(\tau_{c,r}, t_*(\tau_{c,r})) = \min_t \int_{t_0}^{t} dt' \iiint_{\tau_{c,r}} \frac{\partial \psi_{comb}}{\partial t'} \rho_{c,r} dV \ - \text{local minimum for time moment } t_*(\tau_{c,r}). \quad (23)$$

The global prediction thermohydrogravidynamic principles (22) and (23) define the maximal and minimal combined cosmic integral energy gravitational influences (22) and (23), 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).

3. Results and Discussion

3.1. The Forthcoming Date $t^*(\tau_{c,r}, 2020) = 2020.01666\,6667$ AD *Corresponding to the First Maximal (During the Range* $(2020 \div 2026)$ AD*) Combined Planetary and Solar Integral Energy Gravitational Influence on the Earth*

Based on the global prediction thermohydrogravidynamic principle (22) and considering the real planetary configurations of the Earth and the planets of the Solar System, we obtain (on December 4, 2019) the forthcoming date (corresponding approximately to January 6, 2020):

$$t^*(\tau_{c,r}, 2020) = 2020.01666\,6667 \text{ AD} \quad (24)$$

corresponding to the first maximal (during the range $(2020 \div 2026)$ AD) combined planetary and solar integral energy gravitational influence (22) on the internal rigid core $\tau_{c,r}$ (and on the Earth as a whole).

Considering the range $(1960 \div 2018)$ AD and analyzing the previous strongest earthquakes (occurred near the calculated dates $t^*(\tau_{c,r}, (1960 + m))$, m= 0, 1, …, 58), we calculate (on December 4, 2019) the following probabilities of the possible (near the calculated numerical time moment (24) from September 24, 2019 to April 18, 2020) strongest earthquakes (and related [4,5,9,29] strongest volcanic, climatic and magnetic processes) during the corresponding ranges (indicated in the round brackets):

$$Pr_1 \{t_{e,max,2020} \in (\text{September } 24 \div \text{September } 27, 2019)\} = 0, \quad (25)$$

$$Pr_2 \{t_{e,max,2020} \in (\text{September } 28 \div \text{October } 7, 2019)\} = \frac{5}{55} = 0.090909, \quad (26)$$

$$Pr_3 \{t_{e,max,2020} \in (\text{October } 8 \div \text{October } 17, 2019)\} = \frac{2}{55} = 0.036363, \quad (27)$$

$$Pr_4 \{t_{e,max,2020} \in (\text{October } 18 \div \text{October } 27, 2019)\} = \frac{1}{55} = 0.018181, \quad (28)$$

$$Pr_5 \{t_{e,max,2020} \in (\text{October } 28 \div \text{November } 6, 2019)\} = \frac{2}{55} = 0.036363, \quad (29)$$

$$\Pr_6\{t_{e,\max,2020} \in (\text{November } 7 \div \text{November } 16, 2019)\} = \frac{4}{55} = 0.072727, \quad (30)$$

$$\Pr_7\{t_{e,\max,2020} \in (\text{November } 17 \div \text{November } 26, 2019)\} = \frac{2}{55} = 0.036363, \quad (31)$$

$$\Pr_8\{t_{e,\max,2020} \in (\text{November } 27 \div \text{December } 6, 2019)\} = \frac{4}{55} = 0.072727, \quad (32)$$

$$\Pr_9\{t_{e,\max,2020} \in (\text{December } 7 \div \text{December } 16, 2019)\} = \frac{3}{55} = 0.054545, \quad (33)$$

$$\Pr_{10}\{t_{e,\max,2020} \in (\text{December } 17 \div \text{December } 26, 2019)\} = \frac{3}{55} = 0.054545, \quad (34)$$

$$\Pr_{11}\{t_{e,\max,2020} \in (\text{December } 27, 2019 \div \text{January } 5, 2020)\} = \frac{3}{55} = 0.054545, \quad (35)$$

$$\Pr_{12}\{t_{e,\max,2020} \in (\text{January } 6 \div \text{January } 15, 2020)\} = \frac{5}{55} = 0.090909, \quad (36)$$

$$\Pr_{13}\{t_{e,\max,2020} \in (\text{January } 16 \div \text{January } 25, 2020)\} = \frac{2}{55} = 0.036363, \quad (37)$$

$$\Pr_{14}\{t_{e,\max,2020} \in (\text{January } 26 \div \text{February } 4, 2020)\} = \frac{1}{55} = 0.018181, \quad (38)$$

$$\Pr_{15}\{t_{e,\max,2020} \in (\text{February } 5 \div \text{February } 14, 2020)\} = \frac{2}{55} = 0.036363, \quad (39)$$

$$\Pr_{16}\{t_{e,\max,2020} \in (\text{February } 15 \div \text{February } 24, 2020)\} = \frac{3}{55} = 0.054545, \quad (40)$$

$$\Pr_{17}\{t_{e,\max,2020} \in (\text{February } 25 \div \text{March } 5, 2020)\} = \frac{4}{55} = 0.072727, \quad (41)$$

$$\Pr_{18}\{t_{e,\max,2020} \in (\text{March } 6 \div \text{March } 15, 2020)\} = \frac{3}{55} = 0.054545, \quad (42)$$

$$\Pr_{19}\{t_{e,\max,2020} \in (\text{March } 16 \div \text{March } 25, 2020)\} = \frac{3}{55} = 0.054545, \quad (43)$$

$$\Pr_{20}\{t_{e,\max,2020} \in (\text{March } 26 \div \text{April } 4, 2020)\} = \frac{1}{55} = 0.018181, \quad (44)$$

$$\Pr_{21}\{t_{e,\max,2020} \in (\text{April } 5 \div \text{April } 14, 2020)\} = \frac{1}{55} = 0.018181, \quad (45)$$

$$\Pr_{22}\{t_{e,\max,2020} \in (\text{April } 15 \div \text{April } 18, 2020)\} = \frac{1}{55} = 0.018181\ . \quad (46)$$

It means that the dates $t_{e,\max,2020}$ of the realized (for December 6, 2019) and forthcoming strongest earthquakes (and related [4,5,9,29] strongest volcanic, climatic and magnetic processes of the Earth from September 24, 2019 to April 18, 2020) are characterized by the probabilities (25)-(46) for the corresponding time ranges (indicated in the round brackets).

3.2. The Prediction of the Thermohygrogravidynamic Theory Concerning the Strongest (from September 24, 2019 to April 18, 2020) Intensification of the Seismotectonic, Volcanic, Climatic and Magnetic Processes of the Earth Near the Forthcoming Date $t^*(\tau_{c,r}, 2020) = 2020.01666\,6667$ AD

Table 1 presents the analysis (for December 6, 2019) of the previous strongest (according to the U.S. Geological Survey) earthquakes (during the considered time ranges i (i =1, 2, …, 8) characterized by the corresponding evaluated probabilities Pr_i given by the relations (25)-(32)) of the Earth occurred on dates $t_{e,i}$ near the calculated date $t^*(\tau_{c,r}, 2020) = 2020.01666\,6667$ AD from September 24, 2019 to December 6, 2019. Table 1 demonstrates the maximal magnitudes $M_{max,i}$ of strongest earthquakes (in the time ranges from i =1 to i = 8) and the corresponding dates $t_{e,i}$ of strongest earthquake in the time ranges (from i =1 to i = 8) occurred in different regions of the Earth.

We see (on December 6, 2019) that the considered (in the Table 1) time ranges i (i =1, 2, …, 8) are not characterized (definitely, with the probability equal to 1) by the strongest earthquakes (and related [4,5,9,29] strongest volcanic, climatic and magnetic processes of the Earth) from September 24, 2019 to April 18, 2020. Consequently, we have the total probability equal to 1 that the strongest earthquake (near the calculated numerical time moment (24) from September 24, 2019 to April 18, 2020) will realize during the time ranges i (i =9, …, 22) in the time range from December 7, 2019 (the beginning of the time range i = 9) to April 18, 2020 (the end of the time range i = 22).

Table 1. *The analysis (for December 6, 2019) of the previous strongest (according to the U.S. Geological Survey) earthquakes (during the considered time ranges i (i =1, 2, …, 8) characterized by the corresponding evaluated probabilities* Pr_i *) of the Earth occurred on dates* $t_{e,i}$ *near the calculated date* $t^*(\tau_{c,r}, 2020) = 2020.01666\,6667$ AD *from September 24, 2019 to December 6, 2019.*

Magnitude $M_{max,i}$ of strongest earthquake in range i, Region of the Earth	Date $t_{e,i}$ of strongest earthquake in range i, in yr	The time range i	The probability Pr_i of strongest earthquake in the range i	$\Delta_i = \lvert t_{e,i} - t^*(\tau_{c,r}, 2020)\rvert$, in days
$M_{max,8} = 6.0$, 41km NW of Platanos, Greece	November 27, 2019 $= 2019.907255$	November 27, 2019 ÷ December 6, 2019	$\frac{4}{55}$	39.96 days before the date $t^*(\tau_{c,r}, 2020)$
$M_{max,7} = 6.4$, 16km WSW of Mamurras, Albania	November 26, 2019 $= 2019.904517$	November 17, 2019 ÷ November 26, 2019	$\frac{2}{55}$	40.96 days before the date $t^*(\tau_{c,r}, 2020)$
$M_{max,6} =$ **7.1**, 138km E of Bitung,	November 14, 2019 $= 2019.871663$	November 7, 2019 ÷ November 16,		52.96 days before the date

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Indonesia		2019	$\frac{4}{55}$	$t^*(\tau_{c,r}, 2020)$
$M_{max,5} = 6.6$, 136km W of Neiafu, Tonga	November 4, 2019 $= 2019.844284$	October 28, 2019 ÷ November 6, 2019	$\frac{2}{55}$	62.96 days before the date $t^*(\tau_{c,r}, 2020)$
$M_{max,5} = 6.6$, 14km E of Bual, Philippines	October 29, 2019 $= 2019.829397$	October 28, 2019 ÷ November 6, 2019	$\frac{2}{55}$	68.4 days before the date $t^*(\tau_{c,r}, 2020)$
$M_{max,4} = 6.4$, 63km NNE of Isangel, Vanuatu	October 21, 2019 $= 2019.807494$	October 18, 2019 ÷ October 27, 2019	$\frac{1}{55}$	76.4 days before the date $t^*(\tau_{c,r}, 2020)$
$M_{max,3} = 6.4$, 7km ENE of Columbio, Philippines	October 16, 2019 $= 2019.793805$	October 8, 2019 ÷ October 17, 2019	$\frac{2}{55}$	81.4 days before the date $t^*(\tau_{c,r}, 2020)$
$M_{max,2} = \mathbf{6.7}$, 69km WSW of Constitucion, Chile	September 29, 2019 $= 2019.746064$	September 28, 2019 ÷ October 7, 2019	$\frac{5}{55}$	98.83 days before the date $t^*(\tau_{c,r}, 2020)$
$M_{max,1} = 6.5$, 11km S of Kairatu, Indonesia	September 25, 2019 $= 2019.735113$	September 24, 2019 ÷ September 27, 2019	0	102.83 days before the date $t^*(\tau_{c,r}, 2020)$

It means that we have the total corrected probability

$$Pr_{cor}\{t_{e,max,2020} \in (\text{December } 7, 2019 \div \text{April } 18, 2020)\} = \sum_{i=9}^{22} Pr_{cor,i} = 1 \tag{47}$$

of realization of the strongest (from September 24, 2019 to April 18, 2020) earthquake in the range from December 7, 2019 (the beginning of the time range i=9) to April 18, 2020 (the end of the range i=22). Assuming the obvious proportionalities for the time ranges i from i=9 to i=22:

$$Pr_{cor,i} \sim Pr_i, \tag{48}$$

we calculate (on December 6, 2019) the corrected probabilities

$$Pr_{cor,i} = \frac{55}{55-20} Pr_i = \frac{55}{35} Pr_i \tag{49}$$

of realization of the strongest (from September 24, 2019 to April 18, 2020) earthquake during the ranges i from $i = 9$ to $i = 22$ (instead of the probabilities (33)-(46)):

$$Pr_{cor,9}\{t_{e,max,2020} \in (\text{December } 7 \div \text{ December } 16, 2019)\} = \frac{55}{35} \cdot \frac{3}{55} = \frac{3}{35}, \tag{50}$$

$$Pr_{cor,10}\{t_{e,max,2020} \in (\text{December } 17 \div \text{ December } 26, 2019)\} = \frac{55}{35} \cdot \frac{3}{55} = \frac{3}{35}, \tag{51}$$

$$\Pr_{cor,11}\{t_{e,max,2020} \in (\text{December } 27, 2019 \div \text{January } 5, 2020)\} = \frac{55}{35}\cdot\frac{3}{55} = \frac{3}{35}, \quad (52)$$

$$\Pr_{cor,12}\{t_{e,max,2020} \in (\text{January } 6 \div \text{January } 15, 2020)\} = \frac{55}{35}\cdot\frac{5}{55} = \frac{5}{35} = \frac{1}{7}, \quad (53)$$

$$\Pr_{cor,13}\{t_{e,max,2020} \in (\text{January } 16 \div \text{January } 25, 2020)\} = \frac{55}{35}\cdot\frac{2}{55} = \frac{2}{35}, \quad (54)$$

$$\Pr_{cor,14}\{t_{e,max,2020} \in (\text{January } 26 \div \text{February } 4, 2020)\} = \frac{55}{35}\cdot\frac{1}{55} = \frac{1}{35}, \quad (55)$$

$$\Pr_{cor,15}\{t_{e,max,2020} \in (\text{February } 5 \div \text{February } 14, 2020)\} = \frac{55}{35}\cdot\frac{2}{55} = \frac{2}{35}, \quad (56)$$

$$\Pr_{cor,16}\{t_{e,max,2020} \in (\text{February } 15 \div \text{February } 24, 2020)\} = \frac{55}{35}\cdot\frac{3}{55} = \frac{3}{35}, \quad (57)$$

$$\Pr_{cor,17}\{t_{e,max,2020} \in (\text{February } 25 \div \text{March } 5, 2020)\} = \frac{55}{35}\cdot\frac{4}{55} = \frac{4}{35}, \quad (58)$$

$$\Pr_{cor,18}\{t_{e,max,2020} \in (\text{March } 6 \div \text{March } 15, 2020)\} = \frac{55}{35}\cdot\frac{3}{55} = \frac{3}{35}, \quad (59)$$

$$\Pr_{cor,19}\{t_{e,max,2020} \in (\text{March } 16 \div \text{March } 25, 2020)\} = \frac{55}{35}\cdot\frac{3}{55} = \frac{3}{35}, \quad (60)$$

$$\Pr_{cor,20}\{t_{e,max,2020} \in (\text{March } 26 \div \text{April } 4, 2020)\} = \frac{55}{35}\cdot\frac{1}{55} = \frac{1}{35}, \quad (61)$$

$$\Pr_{cor,21}\{t_{e,max,2020} \in (\text{April } 5 \div \text{April } 14, 2020)\} = \frac{55}{35}\cdot\frac{1}{55} = \frac{1}{35}, \quad (62)$$

$$\Pr_{cos,22}\{t_{e,max,2020} \in (\text{April } 15 \div \text{April } 18, 2020)\} = \frac{55}{35}\cdot\frac{1}{55} = \frac{1}{35}\cdot \quad (63)$$

Taking into account the corrected (for December 6, 2019) probabilities (50) - (63) of the possible (near the calculated numerical time moment (24) from December 7, 2019 to April 18, 2020) strongest earthquakes (and related [4,5,9,29] strongest intensification of volcanic, climatic and magnetic processes of the Earth from September 24, 2019 to April 18, 2020) during the corresponding ranges (indicated in the round brackets), we obtain the maximal probability (given by (53)) $\Pr_{cor,12} = \frac{1}{7}$ (of realization of the strongest earthquake and related [4,5,9,29] strongest volcanic, climatic and magnetic processes of the Earth from September 24, 2019 to April 18, 2020) for the corresponding range

$$(\text{January } 6 \div \text{January } 15, 2020) \quad (64)$$

numbered by i = 12. Thus, we see (on December 6, 2019) that the most probable (strongest from September 24, 2019 to April 18, 2020) intensification of the seismotectonic, volcanic, climatic and magnetic processes of the Earth may occur during the evaluated range $(\text{January } 6 \div \text{January } 15, 2020)$ adjoining to the time moment $t^*(\tau_{c,r}, 2020) = 2020.01666\ 6667\ \text{AD}$ (given by (24) and corresponding approximately to January 6, 2020) related with the first maximal (during the range $(2020 \div 2026)\ \text{AD}$) combined planetary and solar integral energy gravitational influence (22) on the internal rigid core $\tau_{c,r}$ and on the Earth as a whole. This result is in agreement with the physical essence [5,6] of the global prediction thermohydrogravidynamic principles (22) and (23) 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. This result is in accordance with the established [11] first unquestionable fact that the date of 6 October, 2016 (of the strong intensification of Hurricane Matthew [11]) is in the perfect agreement with the calculated (in advance [30], on 31 August, 2016) numerical time moment $t^*(\tau_{c,r}, 2016) = 2016.7666$ (corresponding approximately to 6 October, 2016) of the maximal (in 2016) combined planetary and solar integral energy gravitational influence (22) on the internal rigid core $\tau_{c,r}$ of the Earth (and on the Earth as a whole). However, we not take into account (in this research) the established partial derivative $\partial\psi_{3MOON}(C_3, t)/\partial t$ [24,27,28] of the gravitational potential $\psi_{3MOON}(C_3, t)$ created by the Moon at the mass center C_3 of the Earth. This gravitational potential $\psi_{3MOON}(C_3, t)$ is the significant component [4,6] to 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) represented in the global prediction thermohydrogravidynamic principles (22) and (23).

We established [4,6] the predominant significance of the Sun (owing to the gravitational interactions of the Sun with Jupiter and Saturn) and the Moon as the predominant cosmic trigger mechanism (along with the minor significance of the Sun (owing to the gravitational interactions of the Sun with Uranus and Neptune), Venus, Jupiter and Mercury) of earthquakes prepared by the combined integral energy gravitational influences on the Earth of the Sun (owing to the gravitational interactions of the Sun with Jupiter, Saturn, Uranus, and Neptune), Venus, Jupiter, the Moon, Mars, and Mercury. Taking into account the established numerical coefficients ($e_S(5) = 313.5305$ [4,5,6] for the Sun owing to the gravitational interaction of the Sun with Jupiter, $e_S(6) = 69.3047$ [4-6] for the Sun owing to the gravitational interaction of the Sun with Saturn τ_6 and $s(\text{Moon, second approx.}) = 13.0693$ [4,5,6,24,27,28] for the Moon), it is possible the minor change of the range (64) due to the Moon not taken into account in this research.

Based on the founded [4,5] range $T_{tec,vol,clim,f} = 696 \div 708$ years of the fundamental global seismotectonic, volcanic and climatic periodicities and considering the date (1318 AD [16]) of the great earthquake occurred in England, we evaluated [4, 6] previously the mean date

$$(1318 + 702)\ \text{AD} = (2014 + 2026\ \text{AD})/2 = 2020\ \text{AD} \qquad (65)$$

"of the initial phase of the rapid increase of the global seismotectonic and volcanic activities and the climate variability of the Earth in the 21st century" [6]. The mean date $2020\,\mathrm{AD}$ (given by (65)) is the beginning of the established [4, 5, 6, 11] first forthcoming subrange

$$(2020 \div 2026)\,\mathrm{AD} \tag{66}$$

of the increased intensification of the global seismotectonic, volcanic, climatic and magnetic activity of the Earth. We see that the obtained range (64) (of the most probable realization of the strongest earthquake and related [4,5,9,29] strongest volcanic, climatic and magnetic processes of the Earth from September 24, 2019 to April 18, 2020) is the significant elaboration of the evaluated [4, 6] previously mean date (65) "of the initial phase of the rapid increase of the global seismotectonic and volcanic activities and the climate variability of the Earth in the 21st century" [6].

We established [15] that the first direct detection [31] of gravitational waves (on September 14, 2015 [31]) was located between the calculated date $t^*(\tau_{c,r}, 2015) = 2015.6833\,\mathrm{AD}$ (corresponding approximately to September 6, 2015 of the maximal (in 2015) combined planetary and solar integral energy gravitational influence (22) on the internal rigid core $\tau_{c,r}$ of the Earth) and the date (September 16, 2015 according to the U.S. Geological Survey) of the strongest (in 2015 according to the U.S. Geological Survey) 8.3-magnitude Chilean earthquake (occurred near 9.92 days after the date $t^*(\tau_{c,r}, 2015) = 2015.6833\,\mathrm{AD}$). We founded [15] the real possibility of influence of the cosmic planetary configuration (on September 14, 2015 during the first direct detection [31] of gravitational waves) on the realization of the first direct detection [31] of gravitational waves. Taking into account this conclusion [15] and the obtained range (64), there is the real probability (and the corresponding opportunity) to detect the gravitational waves near the range (64) directly adjacent to the time moment $t^*(\tau_{c,r}, 2020) = 2020.01666\ 6667\,\mathrm{AD}$ (corresponding approximately to January 6, 2020) of the first maximal (during the range $(2020 \div 2026)\,\mathrm{AD}$) combined planetary and solar integral energy gravitational influence (22) on the internal rigid core $\tau_{c,r}$ and on the Earth as a whole.

4. Conclusions

We have presented in Section 2.1 the established [4,5,6,8,9] equivalent generalized differential formulations (9) and (16) (given for the Galilean frame of reference) of the first law of thermodynamics deduced rigorously based on the postulates of the non-equilibrium thermodynamics [20,23], continuum mechanics [17,18,32] and hydrodynamics [19,21]. The equivalent generalized differential formulations (9) and (16) are valid for moving rotating deforming heat-conducting stratified individual finite one-component continuum region τ (characterized by the symmetric [17,18,20] stress tensor $\mathbf{T}$) subjected to the non-stationary gravitational field. The generalized [4-6, 8, 9] differential formulation (16) generalizes the classical [10,25] formulations (17) by taking into account (along with the classical [10,20,22,25] infinitesimal change of heat δQ and the classical [10,20,22,25] infinitesimal change of the internal energy $dU_\tau \equiv dU$) the established [4-9] infinitesimal increment dK_τ of the macroscopic kinetic energy K_τ [7,8,22], the established [4-9] infinitesimal increment

$d\pi_\tau$ of the gravitational potential energy π_τ, the established [4,5,6,7,8,9] generalized expression (10) for the infinitesimal work $\delta A_{np,\partial\tau}$ done (during the infinitesimal time interval dt) by non-potential stress forces acting on the boundary surface $\partial\tau$ of the individual finite continuum region τ, and the established [4,5,6,8,9] infinitesimal energy gravitational influence (due to the Newtonian non-stationary gravitation) dG (given by the expression (12)) on the continuum region τ during the infinitesimal time interval dt.

We have presented in Section 2.2 the established [4,5,6,11,15] global prediction thermohydrogravidynamic principles (22) and (23) (of the cosmic seismology [4,5,11]) determining the maximal temporal intensifications of the global and regional natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth.

Based on the global prediction thermohydrogravidynamic principle (22) and considering the real planetary configurations of the Earth and the planets of the Solar System, we have obtain in Section 3.1 the forthcoming date $t^*(\tau_{c,r}, 2020) = 2020.01666\,6667$ AD (corresponding approximately to January 6, 2020) related with the first maximal (during the range $(2020 \div 2026)$ AD) combined planetary and solar integral energy gravitational influence (22) on the internal rigid core $\tau_{c,r}$ and on the Earth as a whole. Based on the global prediction thermohydrogravidynamic principle (22) and analyzing the previous strongest earthquakes (occurred near the calculated dates $t^*(\tau_{c,r}, (1960 + m))$, m= 0, 1, …, 58) during the considered range $(1960 \div 2018)$, we have calculated (on December 4, 2019) the probabilities (25), (26), (26), (27), (28), (29), (30), (31), (32), (33), (34), (35), (36), (37), (38), (39), (40), (41), (42), (43), (44), (45) and (46) of the possible strongest (near the calculated numerical time moment (24) from September 24, 2019 to April 18, 2020) intensifications of the seismotectonic, volcanic, climatic and magnetic processes (during the corresponding ranges indicated in the round brackets of the probabilities (25), (26), …, and (46)) determined by the combined integral energy gravitational influences on the Earth 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.

Taking into account that the considered (on December 6, 2019 based the Table 1) previous strongest (according to the U.S. Geological Survey) earthquakes of the Earth (from September 24, 2019 to December 6, 2019 during the considered time ranges i (i =1, 2, …, 8) cannot be (definitely, with the probability equal to 1) considered as the strongest (from September 24, 2019 to April 18, 2020), we have corrected in Section 3.2 the obtained (in Section 3.1) probabilities (33), (34), (35), (36), (37), (38), (39), (40), (41), (42), (43), (44), (45) and (46) by evaluating the corrected probabilities (50), (51), (52), (53), (54), (55), (56), (57), (58), (59), (60), (61), (62) and (63) of the possible strongest (near the calculated numerical time moment (24) from December 7, 2019 to April 18, 2020) intensifications of the seismotectonic, volcanic, climatic and magnetic processes (during the corresponding time ranges indicated in the round brackets in the probabilities (50), (51), …, and (63)) determined by the combined integral energy gravitational influences on the Earth 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.

Taking into account the corrected (for December 6, 2019) probabilities (50), (51), …, and (63) of the possible (near the calculated numerical time moment (24) from December 7, 2019 to April 18, 2020) strongest earthquakes (and related [4,5,9,29] strongest intensification of volcanic, climatic and magnetic processes of the Earth from September 24, 2019 to April 18, 2020) during the corresponding time ranges (indicated in the round brackets of the probabilities (50), (51), …, and (63)), we have obtain the maximal probability (given by (53)) $\Pr_{cor,12} = \frac{1}{7}$ (of realization of the strongest earthquake and related [4,5,9,29] strongest volcanic, climatic and magnetic processes of the Earth from September 24, 2019 to April 18, 2020) for the time range $(\text{January } 6 \div \text{January } 15, 2020)$ (given by (64)). Taking into account the conclusion [15] (about the possible influence of the cosmic planetary configuration (on September 14, 2015 during the first direct detection [31] of gravitational waves) on the realization of the first direct detection [31] of gravitational waves) and the obtained range (64), we have established (on December 9, 2019) the real probability (and the corresponding opportunity) to detect the gravitational waves near the range (64) directly adjacent to the time moment $t^{*}(\tau_{c,r}, 2020) = 2020.01666\ 6667\ \text{AD}$ (corresponding approximately to January 6, 2020) of the first maximal (during the range $(2020 \div 2026)\ \text{AD}$) combined planetary and solar integral energy gravitational influence (22) on the internal rigid core $\tau_{c,r}$ and on the Earth as a whole.

We have obtained (on January 16, 2020 during the final minor correction of this article related mainly with the corrections of the used references) the partial confirmation of this conclusion related with the observed (on January 6, 2020 [33]) “unexpected electrical surge and magnetic anomaly reported in Norway” [33]. It was pointed out [33] that “the magnetic shockwave was captured by sensors of the Polarlightcenter geophysical observatory in Lofoten around 7:30 p.m. UT”. This magnetic anomaly (observed on January 6, 2020 in Norway [33] in accordance with the predicted date (24) corresponding approximately to January 6, 2020) is the real confirmation of the conclusion [6,11] that the magnetic processes of the Earth are determined by the combined integral energy gravitational influences on the Earth 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.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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