

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

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Abstract

We present the confirmed validity of the prediction (made in unpublished article (Simonenko, 2019b) presented on December 9, 2019 to the journal Energy Research) of the thermohydrogravodynamic theory (Simonenko, 2014) concerning the evaluated probabilities of the forthcoming intensification of the global seismotectonic, volcanic, climatic and magnetic processes of the Earth during the evaluated beginning (from December 7, 2019 to April 18, 2020) of the established in 2012 AD (Simonenko, 2012a) and finally confirmed in 2019 AD (Simonenko, 2019a) "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

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

1. Introduction

The problem of the long-term predictions of the strong earthquakes (Richter,

1958) is the significant problem of the modern geophysics (Sgrigna & Conti, 2012). It is well known (Sgrigna & Conti, 2012) that “the deterministic prediction of the time of origin, hypocentral (or epicentral) location, and magnitude of an impending earthquake is an open scientific problem”. It was pointed out (Sgrigna & Conti, 2012) 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 is 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 (Console, Yamaoka, & Zhuang, 2012) 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 (Console, Yamaoka, & Zhuang, 2012) 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, following the global prediction thermohydrogravidynamic principle (11) used for the real planetary configurations of the Earth and the planets of the Solar System, the author presents the confirmed validity of the prediction (of the unpublished article (Simonenko, 2019b) presented on December 9, 2019 to the journal Energy Research) 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 (Simonenko, 2012a, 2014) and confirmed (Simonenko, 2019a) “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).

To do this, in Section 2.1 we present the established (Simonenko, 2006, 2007a) generalized differential formulation (7) 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 identical formulation (Gibbs, 1873; Landau & Lifshitz, 1976) by taking into account (along with the classical infinitesimal change of heat δQ and the classical infinitesimal change of the internal energy dU_i) the established (Simonenko, 2006, 2007a) 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 (Simonenko, 2006, 2007a) differential energy gravitational influence dG , in Section 2.2 we

present the established (Simonenko, 2012a, 2014) global prediction thermohydrogravidynamic principles (11) and (12) 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 (11), we present in Section 3.1 the prediction of the thermohydrogravidynamic theory concerning the evaluated probabilities (14), (15), (16), (17), (18), (19), (20), (21), (22), (23), (24), (25), (26), (27), (28), (29), (30), (31), (32), (33), (34) and (35) of the strongest earthquakes during the beginning (from September 24, 2019 to April 18, 2020) of the established (Simonenko, 2012a, 2014, 2019a) first forthcoming subrange 2020 ÷ 2026 AD of the increased intensification of the Earth.

Taking into account the considered (on December 6, 2019 based on **Table 1** (Simonenko, 2019b)) 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 $Pr_{cor,i}$ (given by (37) for i from $i = 9$ to $i = 22$) of the possible strongest (near the calculated numerical time moment (13) 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 $Pr_{cor,i}$) 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.

Based on the corrected probabilities $Pr_{cor,i}$ (given by (37) for i from $i = 9$ to $i = 22$) of the possible strongest (near the calculated numerical time moment (13) from December 7, 2019 to April 18, 2020) intensifications of the seismotectonic, volcanic, climatic and magnetic processes of the Earth (Simonenko, 2019b), we present in Section 3.3 the calculation of the mean date $\bar{t}(2019,2020)$ of the probable most strongest earthquake of the Earth during the considered (Simonenko, 2019b) range December 7, 2019 ÷ April 18, 2020.

In Section 4 we present the main results and conclusions.

2. The Thermohydrogravidynamic Technology of the Short-Range Prediction of the Global Intensifications of the Seismotectonic and Magnetic Processes of the Earth Subjected to Non-Stationary Cosmic Gravitation of the Solar System

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**. $\mathbf{g} = \mathbf{g}(\mathbf{r}, t)$ is the local gravity acceleration considered as a vector function (Simonenko, 2007a, 2012a) 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_τ 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 expression $\mathbf{V}_c = \frac{d\mathbf{r}_c}{dt}$.

We shall use the differential formulation of the first law of thermodynamics (De Groot & Mazur, 1962) for the specific volume $\vartheta = 1/\rho$ of the one-component deformed continuum with no chemical reactions:

$$\frac{du}{dt} = \frac{dq}{dt} - p \frac{d\vartheta}{dt} - \vartheta \boldsymbol{\Pi} : \text{Grad } \mathbf{v}, \tag{2}$$

where u is the specific (per unit mass) internal thermal energy, p is the thermodynamic pressure, $\boldsymbol{\Pi}$ is the viscous-stress tensor, \mathbf{v} is the hydrodynamic

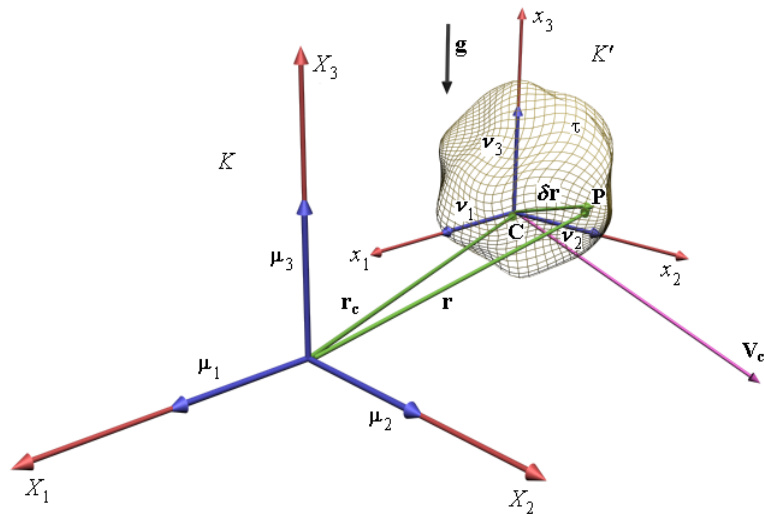


Figure 1. Cartesian coordinate system K of a Galilean frame of reference and an individual finite continuum region τ subjected to the non-stationary combined (cosmic and terrestrial) Newtonian gravitation field and non-potential terrestrial stress forces.

velocity of the continuum macrodifferential element (De Groot & Mazur, 1962), the operator $d/dt = \partial/\partial t + \mathbf{v} \cdot \nabla$ denotes the total derivative (De Groot & Mazur, 1962; Batchelor, 1967; Gyarmati, 1970; Landau & Lifshitz, 1988) following the continuum substance, 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 (De Groot & Mazur, 1962):

$$\rho \frac{dq}{dt} = -\text{div } \mathbf{J}_q, \quad (3)$$

where \mathbf{J}_q is the heat flux. The viscous-stress tensor $\mathbf{\Pi}$ is taken from the decomposition $\mathbf{P} = p\delta + \mathbf{\Pi}$ of the pressure tensor \mathbf{P} (De Groot & Mazur, 1962), where δ 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 is determined by the classical hydrodynamic continuity equation (De Groot & Mazur, 1962; Batchelor, 1967; Landau & Lifshitz, 1988):

$$\frac{\partial \rho}{\partial t} + \text{div}(\rho \mathbf{v}) = 0 \quad (4)$$

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

Using the differential formulation (2) for the specific (per unit mass) internal thermal energy u of the one-component deformed continuum with no chemical reactions, the heat equation (3), the decomposition $\mathbf{P} = p\delta + \mathbf{\Pi}$ of the pressure tensor \mathbf{P} , the hydrodynamic continuity equation (4), the classical equation (Batchelor, 1967; Gyarmati, 1970) for each variable f (such as $\mathbf{v}^2/2$, u and ψ):

$$\frac{d}{dt} \iiint_{\tau} f \rho dV = \iiint_{\tau} \frac{d}{dt} f \rho dV, \quad (5)$$

and the general equation of continuum movement (Gyarmati, 1970):

$$\frac{d\mathbf{v}}{dt} = \frac{1}{\rho} \text{div } \mathbf{T} + \mathbf{g} \quad (6)$$

for the deformed continuum characterized by the symmetric stress tensor $\mathbf{T} = -\mathbf{P}$ (Gyarmati, 1970) 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 (Simonenko, 2006, 2007a) 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}):

$$dU_{\tau} + dK_{\tau} + d\pi_{\tau} = \delta Q + \delta A_{np, \hat{c}\tau} + dG \quad (7)$$

where $\delta A_{np, \hat{c}\tau}$ is the established generalized (Simonenko, 2006, 2007a) 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 ; δQ is the classical (Gibbs, 1873; Landau and Lifshitz, 1976) 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 ;

$$dG = dt \iiint_{\tau} \frac{\partial \Psi}{\partial t} \rho dV \quad (8)$$

is the established (Simonenko, 2007a, 2007b) differential (infinitesimal) energy gravitational influence (as the result of the Newtonian non-stationary gravitation) on the individual finite continuum region τ (during the infinitesimal time interval dt); π_{τ} is the established (Simonenko, 2006, 2007a) macroscopic potential energy (of the individual finite continuum region τ) related with the non-stationary potential ψ of the gravitational field; U_{τ} is the classical (Gibbs, 1873; Landau & Lifshitz, 1976) microscopic internal thermal energy of the individual finite continuum region τ ; K_{τ} is the established (Simonenko, 2006, 2007a) instantaneous macroscopic kinetic energy of the individual finite continuum region τ .

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

Taking into account the general relation (8) for the infinitesimal energy gravitational influence dG on the individual finite continuum region τ , we obtained (Simonenko, 2014, 2019) 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:

$$dG(\tau_{c,r}) = dt \iiint_{\tau_{c,r}} \frac{\partial \Psi_{\text{comb}}}{\partial t} \rho_{c,r} dV, \quad (9)$$

where $\rho_{c,r}$ is the mass density of the internal rigid core $\tau_{c,r}$, $\partial \Psi_{\text{comb}} / \partial t \equiv \partial \Psi_{\text{comb}}(\tau_{c,r}, t) / \partial t$ is the partial derivative (of the combined cosmic gravitational potential $\Psi_{\text{comb}} \equiv \Psi_{\text{comb}}(\tau_{c,r}, t)$ in the internal rigid core $\tau_{c,r}$ of the Earth) approximated as follows (Simonenko, 2014, 2019)

$$\frac{\partial \Psi_{\text{comb}}(\tau_{c,r}, t)}{\partial t} = \sum_{i=1, i \neq 3}^9 \frac{\partial \Psi_{3i}(C_3, t)}{\partial t} + \sum_{j=5}^8 \frac{\partial \Psi_{3j}^S(C_3, t)}{\partial t} + \frac{\partial \Psi_{3\text{MOON}}(C_3, t)}{\partial t}, \quad (10)$$

where $\partial \Psi_{3i}(C_3, t) / \partial t$ is the partial derivative (Simonenko, 2009, 2012a, 2013) of the gravitational potential $\Psi_{3i}(C_3, t)$ created by the planet τ_i (of the Solar System) at the mass center C_3 of the Earth; $\partial \Psi_{3j}^S(C_3, t) / \partial t$ is the established (Simonenko, 2012a, 2019a) partial derivative 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 $\tau_j, j = 5, 6, 7, 8$) at the mass center C_3 of the Earth; $\partial\Psi_{3\text{MOON}}(C_3, t)/\partial t$ is the partial derivative (Simonenko, 2009, 2012a, 2013) of the gravitational potential $\Psi_{3\text{MOON}}(C_3, t)$ created by the Moon at the mass center C_3 of the Earth.

Based on the generalization (7) of the first law of thermodynamics (used for the internal rigid core $\tau_{c,r}$ of the Earth), we formulated (Simonenko, 2012a, 2014) the global prediction thermohydrogravodynamic principles determining the maximal temporal intensifications of the established thermohydrogravodynamic processes (in the internal rigid core $\tau_{c,r}$ and in the boundary region $\tau_{r,f}$ 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 Sun (owing to the gravitational interaction of the Sun with the outer large planets) and the Moon. We concluded (Simonenko, 2012a, 2014) (based on the generalization (7) 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 thermohydrogravodynamic processes are related with the corresponding maximal intensifications of the global and regional natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth.

The rigorous global prediction thermohydrogravodynamic principles (determining the maximal temporal intensifications near the time moments $t = t^*(\tau_{c,r})$ and $t = t_*(\tau_{c,r})$, respectively, of the thermohydrogravodynamic processes in the internal rigid core $\tau_{c,r}$ and in the boundary region $\tau_{r,f}$ between the internal rigid core $\tau_{c,r}$ and the fluid core $\tau_{c,f}$ of the Earth) are formulated as follows (Simonenko, 2012a, 2014):

$$\Delta G(\tau_{c,r}, t^*(\tau_{c,r})) = \max_t \int_{t_0}^t dt' \iiint_{\tau_{c,r}} \frac{\partial \Psi_{\text{comb}}}{\partial t'} \rho_{c,r} dV - \text{local maximum for time moment } t^*(\tau_{c,r}), \quad (11)$$

and

$$\Delta G(\tau_{c,r}, t_*(\tau_{c,r})) = \min_t \int_{t_0}^t dt' \iiint_{\tau_{c,r}} \frac{\partial \Psi_{\text{comb}}}{\partial t'} \rho_{c,r} dV - \text{local minimum for time moment } t_*(\tau_{c,r}). \quad (12)$$

The global prediction thermohydrogravodynamic principles (11) and (12) define the maximal and minimal combined cosmic integral energy gravitational influences ((11) and (12), 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 Sun (owing to the gravitational interaction of the Sun with the outer large planets) and the Moon.

3. Results and Discussion

3.1. The Date 2020.01666667 AD Corresponding to the First Maximal (during the Subrange 2020 ÷ 2026 AD) Combined Planetary and Solar Integral Energy Gravitational Influence on the Earth

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 (Simonenko, 2012a, 2014, 2019a) of the increased intensification of the global seismotectonic, volcanic, climatic and magnetic activity of the Earth, we use the global prediction thermohydrogravidynamic principle (11) determining the maximal temporal intensifications of the global natural (seismotectonic, volcanic, climatic and magnetic) processes of the Earth. Based on the global prediction thermohydrogravidynamic principle (11) and considering the real planetary configurations of the Earth and the planets of the Solar System, we obtained on December 4, 2019 (Simonenko, 2019b) the forthcoming date (corresponding approximately to January 6, 2020):

$$t^*(\tau_{c,r}, 2020) = 2020.016666667 \text{ AD} \quad (13)$$

related with the first maximal (during the range $(2020 \div 2026)$ AD) combined planetary and solar integral energy gravitational influence (11) 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 $t^*(\tau_{c,r}, (1960 + m))$ corresponding for $m = 0, 1, \dots, 58$ to the maximal combined planetary and solar integral energy gravitational influences (11) on the internal rigid core $\tau_{c,r}$ of the Earth), we calculated on December 4, 2019 (Simonenko, 2019b) the following probabilities of the possible (near the calculated numerical time moment (13) from September 24, 2019 to April 18, 2020) strongest earthquakes and related (Simonenko, 2007b, 2009, 2012a, 2013, 2014, 2016, 2019a) strongest volcanic, climatic and magnetic processes) during the corresponding ranges (indicated in the round brackets):

$$\text{Pr}_1 \{t_{e,\max,2020} \in (\text{September } 24 \div \text{September } 27, 2019)\} = 0, \quad (14)$$

$$\text{Pr}_2 \{t_{e,\max,2020} \in (\text{September } 28 \div \text{October } 7, 2019)\} = \frac{5}{55} = 0.090909, \quad (15)$$

$$\text{Pr}_3 \{t_{e,\max,2020} \in (\text{October } 8 \div \text{October } 17, 2019)\} = \frac{2}{55} = 0.036363, \quad (16)$$

$$\text{Pr}_4 \{t_{e,\max,2020} \in (\text{October } 18 \div \text{October } 27, 2019)\} = \frac{1}{55} = 0.018181, \quad (17)$$

$$\text{Pr}_5 \{t_{e,\max,2020} \in (\text{October } 28 \div \text{November } 6, 2019)\} = \frac{2}{55} = 0.036363, \quad (18)$$

$$\text{Pr}_6 \{t_{e,\max,2020} \in (\text{November } 7 \div \text{November } 16, 2019)\} = \frac{4}{55} = 0.072727, \quad (19)$$

$$\text{Pr}_7 \{t_{e,\max,2020} \in (\text{November } 17 \div \text{November } 26, 2019)\} = \frac{2}{55} = 0.036363, \quad (20)$$

$$\text{Pr}_8 \{t_{e,\max,2020} \in (\text{November } 27 \div \text{December } 6, 2019)\} = \frac{4}{55} = 0.072727, \quad (21)$$

$$\Pr_9 \{t_{e,\max,2020} \in (\text{December } 7 \div \text{December } 16, 2019)\} = \frac{3}{55} = 0.054545, \quad (22)$$

$$\Pr_{10} \{t_{e,\max,2020} \in (\text{December } 17 \div \text{December } 26, 2019)\} = \frac{3}{55} = 0.054545, \quad (23)$$

$$\Pr_{11} \{t_{e,\max,2020} \in (\text{December } 27, 2019 \div \text{January } 5, 2020)\} = \frac{3}{55} = 0.054545, \quad (24)$$

$$\Pr_{12} \{t_{e,\max,2020} \in (\text{January } 6 \div \text{January } 15, 2020)\} = \frac{5}{55} = 0.090909, \quad (25)$$

$$\Pr_{13} \{t_{e,\max,2020} \in (\text{January } 16 \div \text{January } 25, 2020)\} = \frac{2}{55} = 0.036363, \quad (26)$$

$$\Pr_{14} \{t_{e,\max,2020} \in (\text{January } 26 \div \text{February } 4, 2020)\} = \frac{1}{55} = 0.018181, \quad (27)$$

$$\Pr_{15} \{t_{e,\max,2020} \in (\text{February } 5 \div \text{February } 14, 2020)\} = \frac{2}{55} = 0.036363, \quad (28)$$

$$\Pr_{16} \{t_{e,\max,2020} \in (\text{February } 15 \div \text{February } 24, 2020)\} = \frac{3}{55} = 0.054545, \quad (29)$$

$$\Pr_{17} \{t_{e,\max,2020} \in (\text{February } 25 \div \text{March } 5, 2020)\} = \frac{4}{55} = 0.072727, \quad (30)$$

$$\Pr_{18} \{t_{e,\max,2020} \in (\text{March } 6 \div \text{March } 15, 2020)\} = \frac{3}{55} = 0.054545, \quad (31)$$

$$\Pr_{19} \{t_{e,\max,2020} \in (\text{March } 16 \div \text{March } 25, 2020)\} = \frac{3}{55} = 0.054545, \quad (32)$$

$$\Pr_{20} \{t_{e,\max,2020} \in (\text{March } 26 \div \text{April } 4, 2020)\} = \frac{1}{55} = 0.018181, \quad (33)$$

$$\Pr_{21} \{t_{e,\max,2020} \in (\text{April } 5 \div \text{April } 14, 2020)\} = \frac{1}{55} = 0.018181, \quad (34)$$

$$\Pr_{22} \{t_{e,\max,2020} \in (\text{April } 15 \div \text{April } 18, 2020)\} = \frac{1}{55} = 0.018181. \quad (35)$$

3.2. The Prediction of the Thermohydrogravodynamic 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 Date 2020.01666667 AD

Table 1 presents the analysis (made on December 6, 2019) of the previous strongest (according to the U.S. Geological Survey) earthquakes (during the considered time ranges i ($i = 1, 2, \dots, 8$) characterized by the corresponding evaluated probabilities \Pr_i given by the relations (14)-(21) of the Earth occurred on dates $t_{e,i}$ near the calculated date $t^*(\tau_{e,r}, 2020) = 2020.01666667$ 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 $i=$

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 ($i = 1, 2, \dots, 8$) characterized by the corresponding evaluated probabilities $t_{e,i}$ of the strongest earthquake in the range i) of the Earth occurred on dates $t_{e,i}$ from September 24, 2019 to December 6, 2019 near the calculated date $t^*(2020) \equiv t^*(\tau_{e,t}, 2020) = 2020.016666667$ AD .

| 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 | $\Delta_i = t_{e,i} - t^*(\tau_{e,t}, 2020) $ in days |
|---|---|--|------------------------|--|
| $M_{\max,8} = 6.0$, 41 km NW of Platanos, Greece | November 27, 2019 = 2019.907255 | November 27, 2019 ÷ December 6, 2019 | $\frac{4}{55}$ | 39.96 days before the date $t^*(2020)$ |
| $M_{\max,7} = 6.4$, 16 km WSW of Mamurras, Albania | November 26, 2019 = 2019.904517 | November 17, 2019 ÷ November 26, 2019 | $\frac{2}{55}$ | 40.96 days before the date $t^*(2020)$ |
| $M_{\max,6} = 7.1$, 138 km E of Bitung, Indonesia | November 14, 2019 = 2019.871663 | November 7, 2019 ÷ November 16, 2019 | $\frac{4}{55}$ | 52.96 days before the date $t^*(2020)$ |
| $M_{\max,5} = 6.6$, 136 km W of Neiafu, Tonga | November 4, 2019 = 2019.844284 | October 28, 2019 ÷ November 6, 2019 | $\frac{2}{55}$ | 62.96 days before the date $t^*(2020)$ |
| $M_{\max,5} = 6.6$, 14 km E of Bual, Philippines | October 29, 2019 = 2019.829397 | October 28, 2019 ÷ November 6, 2019 | $\frac{2}{55}$ | 68.4 days before the date $t^*(2020)$ |
| $M_{\max,4} = 6.4$, 63 km NNE of Isangel, Vanuatu | October 21, 2019 = 2019.807494 | October 18, 2019 ÷ October 27, 2019 | $\frac{1}{55}$ | 76.4 days before the date $t^*(2020)$ |
| $M_{\max,3} = 6.4$, 7 km ENE of Columbio, Philippines | October 16, 2019 = 2019.793805 | October 8, 2019 ÷ October 17, 2019 | $\frac{2}{55}$ | 81.4 days before the date $t^*(2020)$ |
| $M_{\max,2} = 6.7$, 69 km WSW of Constitucion, Chile | September 29, 2019 = 2019.746064 | September 28, 2019 ÷ October 7, 2019 | $\frac{5}{55}$ | 98.83 days before the date $t^*(2020)$ |
| $M_{\max,1} = 6.5$, 11 km S of Kairatu, Indonesia | September 25, 2019 = 2019.735113 | September 24, 2019 ÷ September 27, 2019 | 0 | 102.83 days before the date $t^*(2020)$ |

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 saw on December 6, 2019 (Simonenko, 2019b) that the considered (in **Table 1**) time ranges i ($i = 1, 2, \dots, 8$) are not characterized (definitely, with the probability equal to 1) by the strongest earthquakes (and related strongest volcanic, climatic and magnetic processes of the Earth) from September 24, 2019 to April 18, 2020. Consequently, we obtained (Simonenko, 2019b) the total probability equal to 1 that the strongest earthquake (near the calculated numerical time moment (13) from September 24, 2019 to April 18, 2020) will realize during the time ranges i ($i = 9, \dots, 22$) 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 $i = 22$). It means that we have the total corrected probability

$$Pr_{\text{cor}} \{t_{e,\max,2020} \in (\text{December 7, 2019} \div \text{April 18, 2020})\} = \sum_{i=9}^{22} Pr_{\text{cor},i} = 1 \quad (36)$$

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 proportionalities $\Pr_{\text{cor},i} \sim \Pr_i$ for the time ranges i from $i = 9$ to $i = 22$, we calculated on December 6, 2019 (Simonenko, 2019b) the corrected probabilities (instead of the probabilities (22)-(35)) for i from $i = 9$ to $i = 22$

$$\Pr_{\text{cor},i} = \frac{55}{55-20} \Pr_i = \frac{55}{35} \Pr_i \quad (37)$$

of realization of the strongest (from September 24, 2019 to April 18, 2020) earthquake during the ranges i from $i = 9$ to $i = 22$.

Taking into account the corrected (on December 6, 2019) probabilities (37) (for i from $i = 9$ to $i = 22$) of the possible (near the calculated numerical time moment (13) from December 7, 2019 to April 18, 2020) strongest earthquakes (and related 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 obtained on December 7, 2019 (Simonenko, 2019b) the maximal probability (for $i = 12$):

$$\Pr_{\text{cor},12} \{t_{\text{e,max},2020} \in (\text{January } 6 \div \text{January } 15, 2020)\} = \frac{55}{35} \cdot \frac{5}{55} = \frac{5}{35} = \frac{1}{7} \quad (38)$$

of realization of the strongest earthquake and related (Simonenko, 2007b, 2009, 2012a, 2013, 2014, 2019a) strongest volcanic, climatic and magnetic processes of the Earth from September 24, 2019 to April 18, 2020) during the corresponding range (January 6 ÷ January 15, 2020) numbered by $i = 12$. We saw (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 (January 6 ÷ January 15, 2020) adjoining to the time moment $t^*(\tau_{\text{c,r}}, 2020) = 2020.016666667$ AD (given by (13) and corresponding approximately to January 6, 2020) related with the first maximal (during the subrange (2020 ÷ 2026) AD) combined planetary and solar integral energy gravitational influence (11) on the internal rigid core $\tau_{\text{c,r}}$ of the Earth. This result is in agreement with the physical essence (Simonenko, 2012a, 2014, 2019a) of the global prediction thermohydrogravodynamic principle (11) determining the maximal temporal intensifications near the time moment $t = t^*(\tau_{\text{c,r}})$ of the thermohydrogravodynamic processes in the internal rigid core $\tau_{\text{c,r}}$ and in the boundary region τ_{rf} between the internal rigid core τ_{rf} and the fluid core $\tau_{\text{c,f}}$ of the Earth.

3.3. The Calculation of the Mean Date of the Probable Most Strongest Earthquake of the Earth during the Considered Range December 7, 2019 ÷ April 18, 2020

Using the probabilities $\Pr_{\text{cor},i}$ (given by (37) for i from $i = 9$ to $i = 22$), we calculate (on October 6, 2020, especially for the presentation on the 10th International Conference on Geology and Geophysics) the mean date $\bar{t}(2019,2020)$ (in yr) of the probable most strongest earthquake during the considered (Simonenko, 2019b) range (from December 7, 2019 to April 18, 2020):

$$\bar{t}(2019, 2020) = \Pr_{\text{cor},9} t_{e,\text{max},9} + \Pr_{\text{cor},10} t_{e,\text{max},10} + \dots + \Pr_{\text{cor},22} t_{e,\text{max},22} = \sum_{i=9}^{22} \Pr_{\text{cor},i} t_{e,\text{max},i}, \quad (39)$$

where $t_{e,\text{max},i}$ is the mean date of the corresponding ranges in the probabilities (22)-(35). Using the formula (39), we calculate the mean date $\bar{t}(2019, 2020)$ (in yr) of the probable most strongest earthquake during the considered (Simonenko, 2019b) range (from December 7, 2019 to April 18, 2020):

$$\bar{t}(2019, 2020) = \sum_{i=9}^{22} \Pr_{\text{cor},i} t_{e,\text{max},i} = 2020.0995139. \quad (40)$$

which corresponds to the theoretical date

$$\bar{t}(2019, 2020) = \text{February 5, 2020 AD} \quad (41)$$

According to the U.S. Geological Survey, the most strongest (during the considered range from December 7, 2019 to April 18, 2020) earthquake (characterized by the maximal 7.7-magnitude) of the Earth occurred 123 km NNW of Lucea, Jamaica on

$$\text{January 28, 2020 AD.} \quad (42)$$

We obtain the difference of 8 days between the calculated theoretical date $\bar{t}(2019, 2020)$ (given by (41)) and the real date (42).

4. Conclusions

We have presented in Section 2.1 the established (Simonenko, 2006, 2007a, 2009, 2012a, 2013) generalized differential formulation (7) (given for the Galilean frame of reference) of the first law of thermodynamics deduced rigorously based on the postulates of the non-equilibrium thermodynamics (De Groot & Mazur, 1962; Gyarmati, 1970) and hydrodynamics (Batchelor, 1967; Landau & Lifshitz, 1988). The generalized differential formulation (7) is valid for moving rotating deforming heat-conducting stratified individual finite one-component continuum region τ (characterized by the symmetric stress tensor \mathbf{T}) subjected to the non-stationary gravitational field. The generalized differential formulation (7) of the first law of thermodynamics extends the classical (Gibbs, 1873; Landau & Lifshitz, 1976) identical formulation 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 established (Simonenko, 2004, 2006, 2007a) infinitesimal increment dK_τ of the macroscopic kinetic energy K_τ , the established (Simonenko, 2006, 2007a) infinitesimal increment $d\pi_\tau$ of the gravitational potential energy π_τ , the established generalized (Simonenko, 2006, 2007a) infinitesimal work $\delta A_{\text{np},\partial\tau}$ done on the individual finite continuum region τ by the surroundings of τ , and the established (Simonenko, 2007a) differential energy gravitational influence dG on the individual finite continuum region τ during the infinitesimal time interval dt due to the non-stationary gravitational field.

We have presented in Section 2.2 the established (Simonenko, 2012a, 2014, 2019a) global prediction thermohydrogravodynamic principles (11) and (12) de-

termining 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 (11) and considering the real planetary configurations of the Earth and the planets of the Solar System, we have presented in Section 3.1 the obtained on December 7, 2019 (Simonenko, 2019b) the forthcoming date

$t^*(\tau_{c,r}, 2020) = 2020.016666667$ AD (corresponding approximately to January 6, 2020) related with the first maximal (during the subrange $(2020 \div 2026)$ AD) combined planetary and solar integral energy gravitational influence (11) on the internal rigid core $\tau_{c,r}$ and on the Earth as a whole. Based on the global prediction thermohydrogravidynamic principle (11) and analyzing the previous strongest earthquakes (occurred near the calculated dates $t^*(\tau_{c,r}, (1960+m))$ corresponding for $m = 0, 1, \dots, 58$ to the maximal combined planetary and solar integral energy gravitational influences (11) on the internal rigid core $\tau_{c,r}$ of the Earth) during the considered range $(1960 \div 2018)$, we calculated on December 7, 2019 (Simonenko, 2019b) the probabilities (14), (15), (15), (16), (17), (18), (19), (20), (21), (22), (23), (24), (25), (26), (27), (28), (29), (30), (31), (32), (33), (34) and (35) of the possible strongest (near the calculated numerical time moment (13) 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 (14), (15), ..., and (35)) 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 (Simonenko, 2019b) based on **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 ($i = 1, 2, \dots, 8$) cannot be (definitely, with the probability equal to 1) considered as the strongest (from September 24, 2019 to April 18, 2020), we have presented in Section 3.2 the corrected on December 7, 2019 (Simonenko, 2019b) probabilities (37) (for i from $i = 9$ to $i = 22$) of the possible strongest (near the calculated numerical time moment (13) 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 of the probabilities (22), (23), ..., and (35)) 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 (on December 7, 2019) probabilities (37) (for i from $i = 9$ to $i = 22$) of the possible (near the calculated numerical time moment (13) from December 7, 2019 to April 18, 2020) strongest (from September 24, 2019 to April 18, 2020) intensification of the seismotectonic, volcanic, climatic and

magnetic processes of the Earth, we have presented in Section 3.2 the obtained on December 7, 2019 (Simonenko, 2019b) maximal probability (given by (38)) $\Pr_{\text{cor},12} = 1/7$ (of realization of the strongest seismotectonic, volcanic, climatic and magnetic processes of the Earth from September 24, 2019 to April 18, 2020) during the time range (January 6 ÷ January 15, 2020). We obtained on January 16, 2020 (Simonenko, 2019b) the partial confirmation of this conclusion related with the observed (Strange Sounds, 2020a) on January 6, 2020 “unexpected electrical surge and magnetic anomaly reported in Norway”. Venice canals became shallow extremely (Strange Sounds, 2020b) during the time range (January 6 ÷ January 15, 2020). The most strongest ebb-tide in Venice occurred (Strange Sounds, 2020b) on January 11, 2020, which is the center of this range. It was pointed out (Strange Sounds, 2020a) that “the magnetic shockwave was captured by sensors of the Polarlightcenter geophysical observatory in Lofoten around 7:30 p.m. UT” on January 6, 2020. The magnetic anomaly (observed on January 6, 2020 in Norway in accordance with the predicted date (13) corresponding approximately to January 6, 2020) and the strongest ebb-tide in Venice (Strange Sounds, 2020b) during the predicted (Simonenko, 2019b) time range (January 6 ÷ January 15, 2020) (characterized by maximal probability $\Pr_{\text{cor},12} = 1/7$ (given by (38)) of realization of the strongest seismotectonic, volcanic, climatic and magnetic processes of the Earth) are the real confirmations of the conclusion (Simonenko, 2016, 2019a) that the magnetic and climatic 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.

We have presented in Section 3.3 the calculated (on October 6, 2020, especially for the presentation on the 10th International Conference on Geology and Geophysics) the mean date $\bar{t}(2019,2020)$ (given by (41)) of the probable most strongest earthquake of the Earth during the considered range December 7, 2019 ÷ April 18, 2020. We have obtained the reasonably small difference of 8 days between the calculated theoretical date $\bar{t}(2019,2020)$ (given by (41)) and the real date January 28, 2020 AD (given by (42)) of the most strongest earthquake (characterized by the maximal 7.7-magnitude) of the Earth occurred 123 km NNW of Lucea, Jamaica during the established (Simonenko, 2019b) range from December 7, 2019 to April 18, 2020. We can conclude that the reasonably small difference of 8 days is based on the used simple approximation of the circular orbits (Simonenko, 2007b, 2012a, 2013) of the planets around the Sun and by disregarding the established partial derivative $\partial\psi_{3\text{MOON}}(C_3,t)/\partial t$ (Simonenko, 2009, 2012a, 2013) of the gravitational potential $\psi_{3\text{MOON}}(C_3,t)$ created by the Moon at the mass center C_3 of the Earth.

Taking into account the prediction (Simonenko, 2012a, 2014, 2019a) of the thermohydrogravidynamic theory (Simonenko, 2006, 2007b, 2009, 2012a, 2013, 2014, 2016, 2019a) concerning the first forthcoming subrange 2020 ÷ 2026 AD

of the increased intensification of the Earth and taking into account especially that the calculated (Simonenko, 2019a) date

$$2021.1 \text{ AD} \quad (43)$$

is related with maximal (during the all first subrange 2020 ÷ 2026 AD) energy gravitational influence 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), we have concluded (on October 6, 2020 as the main conclusion for the presentation on the 10th International Conference on Geology and Geophysics) that it is very important to make in the near future the urgent identical calculations (of the probabilities of the possible strongest intensifications of the seismotectonic, volcanic, climatic and magnetic processes for the time range containing the calculated date 2021.1 AD) for Japan (Simonenko, 2018), Italy (Simonenko, 2018), Greece (Simonenko, 2018), China (Simonenko, 2018) and Chile (Simonenko, 2018), for which we have established (Simonenko, 2018) the confirmed cosmic energy gravitational genesis of the strongest earthquakes.

The validity of this main conclusion (of the author's presentation on the 10th International Conference on Geology and Geophysics) is supported also by the fact that the previous prediction (Simonenko, 2017) of the thermohydrogravodynamic theory (Simonenko, 2006, 2007b, 2009, 2012a, 2013, 2014, 2016, 2019a) concerning the strongest intensifications of the seismotectonic and climatic processes in California (since 9 August, 2017 and before 3 March, 2018) was confirmed really (Simonenko, 2019c).

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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