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# The Confirmed Validity of the Generalised Reduced Global Prediction Thermohydrogravidynamic Principles Concerning the Strongest Earthquakes of the Earth Occurred in Alaska, Canada, Chile, China, Ecuador, Indonesia, Japan, New Zealand, Russia, Turkey, and the Xizang-India border region

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Keywords: Cosmic Geophysics, Cosmic Seismology, Non-stationary Cosmic Gravitation, Natural Disasters, Strongest Earthquakes Occurred in Alaska, Canada, Chile, China, Ecuador, Indonesia, Japan, New Zealand, Russia, Turkey and Xizang-India border region

## Abstract

The confirmed validity of the established generalised reduced first global prediction thermohydrogravidynamic principle and the related necessary condition 1.1 is presented based on the analysis of the previous strongest (according to the U.S. Geological Survey). Earthquakes occurred in Alaska (1964), Japan (2011), Chile (2010), New Zealand (2021), and Turkey (2023). The confirmed validity of the established generalised reduced second global prediction thermohydrogravidynamic principle and the related necessary condition 2.1 is presented based on the analysis of the strongest previous earthquakes on Earth that occurred in Chile (1960), the eastern Xizang-India border region (1950), and Canada (1949). The confirmed validity of the established generalized reduced second global prediction thermohydrogravidynamicprinciple and the related necessary condition 2.2 is presented based on the analysis of the previous most strongest earthquakes of the Earth occurred in Indonesia (2004), Russia (1952), Ecuador (1906), Alaska (1965), Japan (1933), China (1920), New Zealand (1976) and Ecuador (1979).

## Introduction

The long-term predictions of the devastating earthquakes (Gutenberg, 1927; Richter, 1958; Simonenko, 2007, 2009, 2012-2024) and related climatic processes (Gutenberg, 1927; Simonenko, 2009, 2012) of the Earth are the notable (Simonenko, 2019) alerts for mankind.

It was founded (Simonenko, 2007, p. 155) in 2008 (1976+4×8) "of the new Chinese earthquake" occurred in eastern Sichuan on May 12, 2008. The strongest 9.0-magnitude Japanese 2011 Tohoku earthquake was predicted (Simonenko, 2009) also in advance during "the time range 20102011 AD (1927+83 1923+88) of the next sufficiently strong Japanese earthquake near the Tokyo region".

It was pointed out (Simonenko, 2013) that the realization (in eastern Sichuan) of the strongest 7.9-magnitude 2008 Chinese earthquake during the predicted (Simonenko, 2007) year 2008 and the realization of the strongest 9.0-magnitude 2011 Tohoku earthquake during the predicted (Simonenko, 2009) range 2010 2011 explained "the founded cosmic energy gravitational genesis of the strong Chinese 2008 and the strong Japanese 2011 earthquakes".

The evidence of the cosmic energy gravitational genesis of the forthcoming intensifications of the global seismotectonic, volcanic, climatic and magnetic activities since 2016 AD were already alerted (Simonenko, 2015). It was demonstrated (Simonenko, 2019a) that the global prediction based on thermohydrogravidynamic principles (used in the first approximation of the circular orbits of the planets around the Sun) is "the significant practical contribution to environmental science".

The founded (Simonenko, 2009, 2013) cosmic energy gravitational genesis of the strongest Japanese 2011 earthquake was confirmed additionally by the calculation, based on the established (Simonenko, 2012, 2014) first global prediction thermohydrogravidynamic principle (4) of the date (Simonenko, 2019b) corresponding to the local maximal combined planetary and solar integral energy gravitational influences (4) on the internal rigid core of the Earth. The strongest 9.0-magnitude Japanese 2011 Tohoku earthquake occurred on March 11, 2011, exactly 27.4 days

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before the calculated date, confirming the findings (Simonenko, 2009, 2013) of the cosmic energy gravitational genesis of the strongest Japanese 2011 earthquake.

The founded (Simonenko, 2007, 2013) cosmic energy gravitational genesis of the strongest 7.9-magnitude 2008 Chinese earthquake (realized on May 12, 2008 in eastern Sichuan) was confirmed additionally by the calculation (based on the established (Simonenko, 2012, 2014) second global prediction thermohydrogravidynamic principle (6)) of the date (Simonenko, 2024) corresponding to the local minimal combined planetary and solar integral energy gravitational influences (6) on the internal rigid core of the Earth. The strongest 7.9-magnitude 2008 Chinese earthquake occurred in eastern Sichuan on May 12, 2008, exactly 55.71 days before the calculated date, confirming the findings (Simonenko, 2007, 2013), cosmic energy gravitational genesis of the strongest 7.9-magnitude 2008 Chinese earthquake.

Considering the strongest temporal intensifications of the global and (simultaneously) Chinese seismotectonic processes, it was established (Simonenko, 2024) that the most strongest 9.2-magnitude American (Southern Alaska) earthquake, the most strongest 9.0-magnitude Japanese earthquake and the second strongest 8.8-magnitude Chilean earthquake satisfy perfectly (Simonenko, 2024) to the established necessary condition 1.1, which is necessary (but not sufficient) for realization of the most strongest earthquakes. It was established (Simonenko, 2024) that the strongest 8.6-magnitude Chinese-Indian earthquake (occurred on August 15, 1950) and the first strongest 9.5-magnitude Chilean earthquake (occurred on May 22, 1960) satisfy perfectly (Simonenko, 2024) to the established necessary condition 2.1, which is necessary (but not sufficient) for realization of the strongest earthquakes. It was established (Simonenko, 2024) that the most strongest 9.0-magnitude Russian earthquake (occurred on November 4, 1952), the most strongest 9.1-magnitude Indonesian earthquake (occurred on December 26, 2004) and the second most strongest 8.3-magnitude Chinese earthquakes (occurred on December 16, 1920) satisfy perfectly (Simonenko, 2024) to the established necessary condition 2.2, which is necessary (but not sufficient) for realization of the strongest earthquakes.

This article aims to present the total analysis of the established (Simonenko, 2024) generalised reduced first and second global prediction thermohydrogravidynamic principles (3) (and related necessary conditions 1.1 and 1.2)) and (5) (and related necessary conditions 2.1 and 2.2) concerning the strongest intensifications of the seismotectonic processes of the Earth occurredin Alaska, Canada, China, eastern Xizang-India border region, Ecuador, India, Nepal-India border region, Indonesia, New Zealand, Peru, Russia and Turkey. To do this, we consider (additionally along with the analyzed most strongest earthquakes (Simonenko, 2024)) the second most strongest earthquakes for Alaska (1965), Japan (1933), Russia (1923), Indonesia (012) and Canada (1949), and the first and second most strongest earthquakes occurred in India (1941), in Nepal-India border region (1934), in Peru (1940 & 2001), in New Zealand (1976 & 2021), in Turkey (1967 & 2023) and in Ecuador (1906 & 1979).

## The generalised formulation of the first law of thermodynamics for the Earth as a whole and the generalised reduced (first and second) global prediction thermohydrogravidynamic principles

Based on the general equation of continuum movement (Gyarmati, 1970), the classical differential formulation (De Groot & Mazur, 1962) of the first law of thermodynamics for the one-component macro differential continuum element with no chemical reactions, the decomposition (De Groot & Mazur, 1962) for the pressure tensor (Gyarmati, 1970) and the viscous-stress tensor, the generalized differentialformulation of the first law of thermodynamics was derived (Simonenko, 2024)for the Earth considered in a Galilean frame of reference with respect to a Cartesian coordinate system. The generalised differential formulation (Simonenko, 2024) is established for the whole material continuum of the Earth, subjected to the non-stationary potential cosmic and potential terrestrial Newtonian gravitational forces and non-potential terrestrial stress forces characterised by the symmetric stress tensor. Along with the classical terms (Gibbs, 1873; De Groot &Mazur, 1962; Landau&Lifshitz, 1976), the generalised differential formulation (Simonenko, 2024) contains the established (Simonenko, 2012-2014, 2024) differential(during the differential time interval ) combined cosmic (solar, planetary and lunar) non-stationary energy gravitational influence

$$dG_{cos}(\tau_3, t) = dt \iiint_{\tau_3} \frac{\partial \psi_{cos}}{\partial t} \rho dV \quad (1)$$

on the whole material continuum of the Earth as a result of the non-stationary cosmic gravitation. The relation (1) for $dG_{cos}(\tau_3, t)$ takes into account the partial derivative $\partial \psi_{cos}/\partial t$ of the cosmic potential $\psi_{cos}$ of the combined cosmic (solar, planetary and lunar) non-stationary gravitational field, the local mass density $\rho$ of the differential volume dV in the material continuum of the Earth $\tau_3$.

The generalised differential formulation (Simonenko, 2024) also contains the established (Simonenko, 2024) differential (during the differential time interval) increment $d\pi_{int}(\tau_3, t)$ of the terrestrial (internal) potential gravitational energy $\pi_{int}(\tau_3, t)$ (of the Earth $\tau_3$)

$$d\pi_{int}(\tau_3, t)d = d\frac{1}{2}\iiint_{\tau_3} \psi_{int} \rho dV \quad (2)$$

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related with the Newtonian potential $\psi_{int}$ of the terrestrial gravitational field (of the Earth $\tau_3$).

Based on the generalized differential formulation (Simonenko, 2024) of the first law of thermodynamicsused for the Earth $\tau_3$, the generalized reduced first global prediction thermohydrogravidynamic principle)

$$\{\Delta G_{cos}(\tau_3, t^*(\tau_3, i), t_0) - \pi_{int}(\tau_3, t^*(\tau_3, i))\} = \max_t \left\{ \int_{t_0}^{t} dt' \iiint_{\tau_3} \frac{\partial \psi_{cos}(t')}{\partial t'} \rho dV - \frac{1}{2} \iiint_{\tau_3} \psi_{int} \rho dV \right\} \quad (3)$$

was derived (Simonenko, 2024) for the Earth as a whole. The principle (3) means the local (in time) maximum of the function $\{\Delta G_{cos}(\tau_3, t, t_0) - \pi_{int}(\tau_3, t)\}$ for the time moment $t^*(\tau_3, i)$ determining the maximal temporal intensifications of the global seismotectonic, volcanic, climatic and magnetic processes of the Earth near the corresponding date $t^*(\tau_3, i)$ for the corresponding year i, AD. The principle (3) is the next generalisation of the first global prediction thermohydrogravidynamic principle (formulated by Simonenko, 2012, 2014) for the internal rigid core $\tau_{c,r}$ of the Earth)

$$\Delta G(\tau_{c,r}, t^*(\tau_{c,r}, i), t_0) = \max_t \int_{t_0}^{t} dt' \iiint_{\tau_{c,r}} \frac{\partial \psi_{cos}}{\partial t'} \rho_{c,r} dV \ \text{– local maximum for time moment } t^*(\tau_{c,r}, i) \quad (4)$$

determining the maximal temporal intensifications of the global natural seismotectonic, volcanic, climatic and magnetic processes of the Earth near the time moment $t = t^*(\tau_{c,r}, i)$ for the corresponding year i, AD. Here is the mass density (Alboussière *et al.*, 2010) of the internal rigid core of the Earth. Based on the generalised differential formulation (Simonenko, 2024) of the first law of thermodynamics used for the Earth, the generalised reduced second global prediction thermohydrogravidynamic principle.

$$\{\Delta G_{cos}(\tau_3, t_*(\tau_3, i), t_0) - \pi_{int}(\tau_3, t_*(\tau_3, i))\} = \min_t \left\{ \int_{t_0}^{t} dt' \iiint_{\tau_3} \frac{\partial \psi_{cos}(t')}{\partial t'} \rho dV - \frac{1}{2} \iiint_{\tau_3} \psi_{int} \rho dV \right\} \quad (5)$$

was deived (Simonenko, 2024) for the Earth as a whole. The principle (5) means the local (in time) minimum of the function $\{\Delta G_{cos}(\tau_3, t, t_0) - \pi_{int}(\tau_3, t)\}$ for the time moment $t_*(\tau_3, i)$ determining the maximal temporal intensifications of the global seismotectonic, volcanic, climatic and magnetic processes of the Earth near the corresponding date $t_*(\tau_3, i)$ for the corresponding year i, AD. The principle (5) is the next generalization of the second global prediction thermohydrogravidynamic principle (formulated (Simonenko, 2012, 2014) forthe internal rigid core $\tau_{c,r}$ of the Earth).

$$\Delta G(\tau_{c,r}, t_*(\tau_{c,r}, i), t_0) = \min_t \int_{t_0}^{t} dt' \iiint_{\tau_{c,r}} \frac{\partial \psi_{cos}}{\partial t'} \rho_{c,r} dV \ \text{– local minimum for time moment } t_*(\tau_{c,r}, i), \quad (6)$$

determining the maximal temporal intensifications of the global natural seismotectonic, volcanic, climatic and magnetic processes of the Earth near the time moment $t = t_*(\tau_3, i)$ for the corresponding year i, AD. of the strongest earthquake. Based on the generalized reduced first global prediction thermohydrogravidynamic principle (3), the necessary condition 1.1 (defined by the two necessary conditions for the dates $t_e(i, loc.max.)$ of the most strongest earthquakes and the calculated date $t^*(\tau_{c,r}, i)$ of the year i AD).

$$0.1 \le t_e(i, loc.max.) - i \le 0.3, \ 0.1 \le t^*(\tau_{c,r}, i) - i \le 0.3 \quad (7)$$

was derived (Simonenko, 2024) for the Earth as a whole.The two necessary conditions(7) are necessary (but not sufficient) for realization (according to the first variant of the established (Simonenko, 2024) first strong cosmic-terrestrial tendency) of the possible(but not obligatory) most strongest earthquakes of the Earth during the range $0.1 \le t_e(i, loc.max.) - i \le 0.3$ of the possible dates $t_e(i, loc.max.)$ for the year i AD. The established (Simonenko, 2024) first strong cosmic-terrestrial tendency is related with the local maximal combined planetary and solar integral energy gravitational influences $\Delta G_{cos}(\tau_3, t, t_0)$ on the Earth and the local minimal terrestrial potential gravitational energies $\pi_{int}(\tau_3, t)$ of the Earth. Based on the generalized reduced first global prediction thermohydrogravidynamic principle (3), the necessary condition 1.2 (defined by the two necessary conditions for the dates $t_e(i, loc.max.)$ of the most strongest earthquakes and the calculated date $t^*(\tau_{c,r}, i)$ of the year I AD).

$$0.7 \le t_e(i, loc.max.) - i \le 0.9, \ 0.7 \le t^*(\tau_{c,r}, i) - i \le 0.9 \quad (8)$$

was derived (Simonenko, 2024) for the Earth as a whole.The two necessary conditions (8) are necessary (but not sufficient) for realization (according to the second variant of the established (Simonenko, 2024) first strong cosmic-terrestrial tendency) of the possible (but not obligatory) most strongest earthquakes of the Earth during the range $0.7 \le t_e(i, loc.max.) - i \le 0.9$ of the possible dates $t_e(i, loc.min.)$ for the year i AD. Based on the generalized reduced second global prediction thermohydrogravidynamic principle (5), the necessary condition 2.1 (defined by the two necessary conditions for the dates of the most strongest earthquakes and the calculated date $t_*(\tau_{c,r}, i)$ of the year i AD).

$$0.35 \le t_e(i, loc.min.) - i \le 0.65, \ 0.35 \le t_*(\tau_{c,r}, i) - i \le 0.65 \quad (9)$$

was derived (Simonenko, 2024) for the Earth as a whole.The two necessary conditions (9) are necessary (but not sufficient) for realization (according to the first variant of the established (Simonenko, 2024) second strong cosmic-terrestrial tendency) of the possible (but not obligatory) most strongest earthquakes of the Earth during the range $0.35 \le t_e(i, loc.min.) - i \le 0.65$ of the possible dates $t_e(i, loc.min.)$ for theyear i AD.The established (Simonenko, 2024) second strong cosmic-terrestrial tendency is related with the local minimal combined planetary and solar integral energy gravitational influences $\Delta G_{cos}(\tau_3, t, t_0)$ on the Earth and the local maximal terrestrial potential gravitational energies $\pi_{int}(\tau_3, t)$ of the Earth. Based on the generalized reduced second global prediction thermohydrogravidynamic principle (5), the necessary condition 2.2.

$$\begin{cases} 0.8 \le t_e(i, loc.min.) - i \le 1, \ \text{for year } i \text{ AD}; \ 0 \le t_e(i+1, loc.min.) - (i+1) \le 0.25, \ \text{for year } i+1 \text{ AD}, \\ 0.8 \le t_*(\tau_{c,r}, i) - i \le 1, \ \text{for year } i \text{ AD}; \ 0 \le t_*(\tau_{c,r}, i+1) - (i+1) \le 0.25, \ \text{for year } i+1 \text{ AD} \end{cases} \quad (10)$$

was derived (Simonenko, 2024) for the Earth as a whole.The necessary condition 2.2 is defined by the four necessary conditions (given by four possible combinations) for the dates $t_e(\mathrm{i,loc.\,min.})$ and $t_e(\mathrm{i+1,loc.\,min.})$ of the possible (but not obligatory) most strongest earthquakes of the Earth near the calculated date $t_*(\tau_{c,r}, \mathrm{i})$ of the year i AD and near the calculated date $t_*(\tau_{c,r}, \mathrm{i+1})$of the year (i+1) AD. The fournecessary conditions(10) are necessary (but not sufficient) for realization (according to the second variant of the established (Simonenko, 2024) second strong cosmic-terrestrial tendency) of the possible (but not obligatory) most strongest earthquakes of the Earth during the range $0.8 \le t_e(\mathrm{i,loc.\,min.}) - \mathrm{i} \le 1$ of the dates $t_e(\mathrm{i,loc.\,min.})$ for the year i AD and during the range $0 \le t_e(\mathrm{i+1,loc.\,min.}) - (\mathrm{i}+1) \le 0.25$ of the dates $t_e(\mathrm{i+1,loc.\,min.})$ for the year (i+1) AD.

**Total Validity of the Generalized Reduced First Global Prediction Thermohydrogravidynamic Principle and Related Necessary Condition 1.1Concerning the Most Strongest Earthquakes Occurred in Alaska, Japan Chile, New Zealand and Turkey:**

Table 1 presents the analysis of the previous most strongest (since 1900 to 2024) earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Alaska (i = 1964), Japan (i = 2011), Chile (i = 2010), Indonesia (i = 2012), Peru (i = 1940), New Zealand (i = 2021), Turkey (i = 2023), India (i = 1941) and Turkey(i = 1967) on the dates $t_e(\mathrm{i,loc.\,max.})$ (i = 1964, 2011, 2010, 2012, 1940, 2021, 2023, 1941, 1967) near the calculated dates $t^*(\tau_{c,r}, \mathrm{i})$(I = 1964, 2011, 2010, 2012, 1940, 2021, 2023, 1941, 1967) of the local maximal combined planetary and solar integral energy gravitational influences (4) on the internal rigid core $\tau_{c,r}$of the Earth.

| Magnitude , $M(\mathrm{i,loc.\,max.})$ Region of State | Date $t_e(\mathrm{i,loc.\,max.})$ in year I of earth-quake, in yr | The realized necessary condition 1.1 or 1.2 | $\Delta^*(\mathrm{i})$ in days |
|---|---|---|---|
| M(1964, loc. max.) =9.2, Southern Alaska, USA 1. | March 28, 1964 = 1964. 24093 | 1.1 perfectly | 15.4 days before the calculated date $t^*(\tau_{c,r}, 1964) = 1964.28333$ |
| M(2011, loc. max.) =9.0, near the east coast of Honshu, Japan | March 11, 2011 =2011. 19164 | 1.1 perfectly | 27.4 days before the calculated date $t^*(\tau_{c,r}, 2011) = 2011.26666$ |
| M(2010, loc. max.) =8.8, offshore Bio-Bio, Chile | February 27, 2010 = 2010. 15879 | 1.1 perfectly | 2.8 days before the calculated date $t^*(\tau_{c,r}, 2010) = 2010.16666$ |
| M(2012, loc. max.) = 8.6, off the west coast of northern Sumatra, Indonesia | April 11, 2012 =2012.27926 | 1.1 partly | 31.9 days before the calculated date $t^*(\tau_{c,r}, 2012) = 2012.36666$ |
| M (1940, loc. max.) = 8.2, near the coast of central Peru | May 24, 1940 =1940.39698 | 1.1 partly | 35.4 days after the calculated date $t^*(\tau_{c,r}, 1940) = 1940.3$ |
| M (2021, loc. max.)= 8.1, Kermadec Islands, New Zealand 1. | March 4, 2021 = 2021. 17248 | 1.1 perfectly | 26.4 days after the calculated date $t^*(\tau_{c,r}, 2021) = 2021.1$ |
| M(2023, loc. max.) =7.8, Pazarcik earth-quake,Kahramanmaras earthquake sequence, Turkey 2. | February 6, 2023 = 2023. 10130 | 1.1 perfectly | 60.3 days before the calculated date $t^*(\tau_{c,r}, 2023) = 2023.26666$ |
| M(1941, loc. max.) =7.6, Andaman Islands, India region 3. | June 26, 1941 =1941. 48459 | no 1.1, no 1.2 | 36.9 days after the calculated date $t^*(\tau_{c,r}, 1941) = 1941.38333$ |
| M(1967, loc. max.) =7.4, western Turkey | July 22, 1967 = 1967.55578 | no 1.1, no 1.2 | 2.1 days after the calculated date $t^*(\tau_{c,r}, 1967) = 1967.55$ |

We used the first global prediction thermohydro-gravidynamic principle (4) to calculate (in the first approximation of the circular orbits of the planets around the Sun) the numerical time moments $t^*(\tau_{c,r}, 1964) = 1964.28333$ (Simonenko, 2024), $t^*(\tau_{c,r}, 2011) = 2011.26666$ (Simonenko, 2019), $t^*(\tau_{c,r}, 2010) = 2010.16666$ (Simonenko, 2024), $t^*(\tau_{c,r}, 2012) = 2012.36666$, $t^*(\tau_{c,r}, 1940) = 1940.3$, $t^*(\tau_{c,r}, 2021) = 2021.1$ (Simonenko, 2019), $t^*(\tau_{c,r}, 2023) = 2023.26666$(Simonenko, 2022-2024), $t^*(\tau_{c,r}, 1941) = 1941.38333$ and $t^*(\tau_{c,r}, 1967) = 1967.55$. Table 1 presents the calculated values $\Delta^*(\mathrm{i}) = \left|t_e(\mathrm{i,loc.\,max.}) - t^*(\tau_{c,r}, \mathrm{i})\right|$ (for i =2012, 1940, 2021, 1941, 1967) and the previously calculated values $\Delta^*(1964) =$ 15.4 days (Simonenko, 2024), $\Delta^*(2011) =$ 27.4 days (Simonenko, 2019, 2024),$\Delta^*(2010) = 2.8$ days (Simonenko, 2024) and $\Delta^*(2023) =$ 60.3 days (Simonenko, 2024). The closeness (as it is evident from the column for the difference $\Delta^*(\mathrm{i})$ in Table 1) of the dates $t_e(\mathrm{i,loc.\,max.})$ and $t^*(\tau_{c,r}, \mathrm{i})$ (for i = 1964, 2011, 2010, 2012, 1940, 2021, 2023, 1941 and 1967) gives the convincing evidence of the cosmic energy gravitational genesis of themoststrongest (according to the U.S. Geological Survey) earthquakes of the Earth (during the range 1900÷2024 AD) occurred in Alaska (i =1964), Japan (i =2011), Chile (i =2010), Indonesia (i = 2012), Peru (i =1940), New Zealand (i =2021), Turkey (i =2023), India region (i =1941) and Turkey (i =1967)near the calculated dates $t^*(\tau_{c,r}, \mathrm{i})$ (for i =1964, 2011, 2010, 2012, 1940, 2021, 2023, 1941 and 1967) corresponding to the local maximal combined cosmic (planetary and solar) integral energy gravitational influences (4) on the internal rigid core $\tau_{c,r}$ of the Earth. Based on the all differences $\Delta^*(\mathrm{i})$ in Table 1, we calculate the small mean difference - $\left\langle \Delta^* \right\rangle = \frac{1}{9}\sum_{i=1}^{9} \Delta^*(\mathrm{i}) = -4.11$ days denoting the convincing evidence of the maincosmic energy gravitational genesis of themost strongest (according to the U.S. Geological Survey) earthquakes of the Earth occurred in Alaska (i = 1964), Japan (i =2011), Chile (i =2010), Indonesia (i =2012), Peru (i =1940), New Zealand (i =2021), Turkey (i =2023), India region (i =1941) and Turkey (i =1967).

We see (based on Table 1) for the previous most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Alaska (i =1964), Japan (i =2011), Chile (i =2010),New Zealand (i =2021) and Turkey (i = 2023) that the calculated non-dimensional numerical dates (i =1964, 2011, 2010, 2021, 2023) and the non-dimensional numerical dates $t^*(\tau_{c,r}, \mathrm{i})$(i =1964, 2011, 2010, 2021, 2023)satisfy perfectlythe necessary condition 1.1 defined by two necessary combined conditions (7).We calculate the mean

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magnitude $(9.2+9.0+8.8+8.1+7.8)/5=8.58$ for these five most strongest earthquakes. Table 1presents the convincing evidence of the established (Simonenko, 2024) cosmic-terrestrial energy gravitational genesis of the most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Alaska (i = 1964), Japan (i = 2011), Chile (i = 2010), New Zealand (i = 2021) and Turkey (i = 2023) during the range 1900÷2024 AD near the calculated non-dimensional numerical dates $t^*(\tau_{c,r}, i)$ (I = 1964, 2011, 2010, 2021, 2023) according to the established (Simonenko, 2024) first strong cosmic-terrestrial tendency (for creation of the strongest earthquakes of the Earth) related with the local maximal combined planetary and solar integral energy gravitational influences $\Delta G_{cos}(\tau_3, t, t_0)$ on the Earth and the local minimal terrestrial potential gravitational energies $\pi_{int}(\tau_3, t)$ of the Earth. But it does not means that the necessary condition 1.1 is the necessary and (simultaneously) sufficient condition for realization of the strongest earthquakes of the Earth. Considering the strongest temporal intensifications of the global and (similtaneously) Chinese seismotectonic processes, we established (Simonenko, 2024) that the necessary condition 1.1 is the necessary but not sufficient for realization of the strongest earthquakes of the Earth. Nevertheless, it was concluded (Simonenko, 2024) that the perfect satisfaction of the established necessary condition 1.1 for the maximal magnitudes $8.8 \le M(i, loc.max.) \le 9.2$ (corresponding to i =1964, 2010 and 2011) explains of the most strongest earthquakes of the Earth (presented in Table 1) characterized by the mean magnitude $(9.2+9.0+8.8)/3=9.0$ for these three most strongest earthquakes.

Based on the analysis (given in Table 1) of the previous most strongest earthquakes (which are not consistent perfectly with the necessary condition 1.1) occurred in Indonesia (i =2012), Peru (i =1940), India region (i = 1941) and Turkey(i =1967) on the dates $t_e(i, loc.max.)$ (i =2012, 1940, 1941 and 1967) near the calculated dates $t^*(\tau_{c,r}, i)$ (I =2012, 1940, 1941 and 1967) of the local maximal combined planetary and solar integral energy gravitational influences (4) on the internal rigid core $\tau_{c,r}$ of the Earth, we calculate for these four most strongest earthquakes the mean magnitude $(8.6+8.2+7.6+7.4)/4=7.95$, which is significantly smaller than the calculated mean magnitude for five most strongest earthquakes characterized by the perfect satisfaction of the necessary condition 1.1.Considering the previous most strongest earthquakes (characterized by the partial satisfaction of the necessary condition 1.1) occurred in Indonesia (i = 2012) and Peru (i = 1940), we calculate the mean magnitude $(8.6+8.2)/2=8.4$, which is significantly larger than the calculated mean magnitude $(7.6+7.4)/2=7.5$ for the previous most strongest earthquakes (characterized by the absent satisfaction of the necessary conditions 1.1 and 1.2) occurred in Andaman Islands, India region (i = 1941) and western Turkey (i = 1967).

Despite of physically consistent presented results of the logical monotonous reduction of the calculated mean magnitudes (of the most strongest earthquakes) related with the different degree of deviations from the perfect necessary condition 1.1, we see the possibility to define more precisely the derived necessary condition 1.1 (Simonenko, 2024)by taking into account (along with thesolar and planetary non-stationary energy gravitational influences) the lunar non-stationary energy gravitational influences on the Earth.

**Total Validity of the Generalized Reduced Second Global Prediction Thermohydrogravidynamic Principle and Related Necessary Conditions 2.1 and 2.2 Concerning the Most Strongest Earthquakes Occurred in Chile, Indonesia, Russia, Ecuador, Alaska, Xizang-India border region, Japan, China, Canada and New Zealand:**

Table 2 presents the analysis of the previous most strongest (since 1900 to 2024) earthquakes of the Earth (according to the U.S. Geological Survey) occurred in Chile(i =1960), Indonesia (i =2004), Russia (i =1952), Ecuador (i =1906), Alaska (i =1965), Xizang-India border region (i =1950), Japan (i =1933), Russia (i =1923), Peru (i =2001), China (i =1920), Canada (1949), New Zealand (1976), Nepal-India border region (1934) & Ecuador (1979) on the dates $t_e(i, loc.min.)$ (I =1960, 2004, 1952, 1906, 1965, 1950, 1933, 1923, 2001, 1920, 1949, 1976, 1934 & 1979) near the calculated dates $t_*(\tau_{c,r}, i)$ (I =1960, 2004, 1952, 1906, 1965, 1950, 1933, 1923, 2001, 1920, 1949, 1976, 1934 & 1979) of the local minimal combined planetary and solar integral energy gravitational influences (6) on the internal rigid core $\tau_{c,r}$ of the Earth.

| Magnitude, $M(i, loc. min.)$ Region of State | Date $t_e(i, loc. min.)$ in year I of earthquake, in yr | The realized necessary condition 2.1 or 2.2 | $\Delta^*(i)$ in days |
|---|---|---|---|
| M(1960,loc.min.) =9.5, Bio-Bio, Chile | May 22, 1960 = 1960.39151 | 2.1 perfectly | 33.5 days before the calculated date $t_*(\tau_{c,r}, 1960) = 1960.48333$ |
| M(2004, loc. min.) = 9.1, off the west coast of northern Sumatra, Indonesia | December 26, 2004 = 2004.98836 | 2.2 perfectly | 89.4 days before the calculated date $t_*(\tau_{c,r}, 2005) = 2005.23333$ |
| M(1952, loc. min.) =9.0, off the east coast of the Kamchatka, Peninsula, Russia | November 4, 1952 = 1952.84599 | 2.2 perfectly | 7.5 days before the calculated date $t_*(\tau_{c,r}, 1952) = 1952.86666$ |
| M(1906, loc. min.) =8.8, near the coast of Ecuador | January 31, 1906 =1906.08487 | 2.2 perfectly | 79.7 days after the calculated date $t_*(\tau_{c,r}, 1905) = 1905.86666$ |
| M(1965, loc. min.) =8.7, Rat Islands, Aleutian Islands, Alaska, USA | February 4, 1965 = 1965.09582 | 2.2 perfectly | 95.8 days after the calculated date $t_*(\tau_{c,r}, 1964) = 1964.83333$ |
| M(1950, loc. min.) =8.6, eastern Xizang-India border region | August 15, 1950 = 1950.62149 | 2.1 perfectly | 4.3 days before the calculated date $t_*(\tau_{c,r}, 1950) = 1950.63333$ |

| | | | |
|---|---|---|---|
| M(1933, loc. min.) =8.4, of the east coast of Honshu, Japan | March 2, 1933 =1933.16700 | 2.2 perfectly | 12 days before the calculated date $t_*(\tau_{c,r}, 1933) = 1933.2$ |
| M(1923, loc. min.) =8.4, near the east coast of the Kamchatka Peninsula, Russia | February 2, 1923 = 1923.09308 | 2.2 perfectly | 87.7 days before the calculated date $t_*(\tau_{c,r}, 1923) = 1923.33333$ |
| M(2001, loc. min.) =8.4, near the coast of southern Peru | June 23, 2001 = 2001.47638 | 2.2 partly no 2.1, no 2.2 | 15.7 days after the calculated date $t_*(\tau_{c,r}, 2001) = 2001.43333$ |
| M(1920, loc. min.) =8.3, Gansu-Ningxia border region, China | December 16, 1920 = 1920.96098 | 2.2 perfectly | 81.2 days before the calculated date $t_*(\tau_{c,r}, 1921) = 1921.18333$ |
| M(1949, loc. min.) =8.2, HaidaGwaii, Canada | August 22, 1949 =1949.64065 | 2.1 perfectly | 39.2 days after the calculated date $t_*(\tau_{c,r}, 1949) = 1949.53333$ |
| M(1976, loc. min.) =8.0, Kermadec Islands, New Zealand | January 15, 1976 = 1976.03832 | 2.2 perfectly | 87 days after the calculated date $t_*(\tau_{c,r}, 1975) = 1975.8$ |
| M(1934, loc. min.) = 8.0, Nepal-India border region between Nepal and India | January 15, 1934 = 1934.04106 | 2.2 partly | 94.5 days before the calculated date $t_*(\tau_{c,r}, 1934) = 1934.3$ |
| M(1979, loc. min.) =7.7, near the coast of Ecuador | December 12, 1979 =1979. 94729637 | 2.2 perfectly | 80.1 days before the calculated date $t_*(\tau_{c,r}, 1980) = 1980.16666666$ |

We used the first global prediction thermohydrogravi dynamic principle (4) to calculate (in the first approximation of the circular orbits of the planets around the Sun) the numerical time moments $t^*(\tau_{c,r}, 1964) = 1964.28333$ (Simonenko, 2024), $t^*(\tau_{c,r}, 2010) = 2010.16666$ (Simonenko, 2019), (Simonenko, 2024), $t^*(\tau_{c,r}, 2010) = 2010.16666$ $t^*(\tau_{c,r}, 1940) = 1940.3$, $t^*(\tau_{c,r}, 2021) = 2021.1$ (Simonenko, 2019), $t^*(\tau_{c,r}, 2023) = 2023.26666$ (Simonenko, 2022-2024), $t^*(\tau_{c,r}, 1941) = 1941.38333$ and $t^*(\tau_{c,r}, 1967) = 1967.55$. Table- 1presents the calculated values $\Delta^*(i) = |t_e(i, \text{loc. max.}) - t^*(\tau_{c,r}, i)|$ (for i = 2012, 1940, 2021, 1941, 1967) and the previously calculated values $\Delta^*(1964) =$ 15.4 days (Simonenko, 2024), $\Delta^*(2011) =$ 27.4 days (Simonenko, 2019, 2024), $\Delta^*(2010) =$ 2.8 days (Simonenko, 2024) and $\Delta^*(2023) =$60.3 days (Simonenko, 2024). The closeness (as it is evident from the column for the difference in $\Delta^*(i)$ Table 1) of the dates $t_e(i, \text{loc. max.})$ and $t^*(\tau_{c,r}, i)$ (for i = 1964, 2011, 2010, 2012, 1940, 2021, 2023, 1941 and 1967) gives the convincing evidence of the cosmic energy gravitational genesis of the most strongest (according to the U.S. Geological Survey) earthquakes of the Earth (during the range 1900÷2024 AD) occurred in Alaska (i = 1964), Japan (i = 2011), Chile (i = 2010), Indonesia (i = 2012), Peru (i = 1940), New Zealand (i = 2021), Turkey (i = 2023), India region (i = 1941) and Turkey (i = 1967) near the calculated dates $t^*(\tau_{c,r}, i)$ (for i = 1964, 2011, 2010, 2012, 1940, 2021, 2023, 1941 and 1967) corresponding to the local maximal combined cosmic (planetary and solar) integral energy gravitational influences (4) on the internal rigid core $\tau_{c,r}$ of the Earth. Based on the all differences $\Delta^*(i)$ in Table 1, we calculate the small mean difference $\langle \Delta^* \rangle = \frac{1}{9}\sum_{i=1}^{9} \Delta^*(i) = -4.11$ days denoting the convincing evidence of the maincosmic energy gravitational genesis of themost strongest (according to the U.S. Geological Survey) earthquakes of the Earthoccurred in Alaska (i = 1964), Japan (i = 2011), Chile (i = 2010), Indonesia (i = 2012), Peru (i = 1940), New Zealand (i = 2021), Turkey (i = 2023), Indiaregion (i = 1941) and Turkey (i = 1967).

We see (based on Table 1) for the previous most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Alaska (i = 1964), Japan (i = 2011), Chile (i = 2010), New Zealand (i = 2021) and Turkey (i = 2023) that the calculated non-dimensional numerical dates $t^*(\tau_{c,r}, i)$(i = 1964, 2011, 2010, 2021, 2023) and the non-dimensional numerical dates $t_e(i, \text{loc. max.})$(i = 1964, 2011, 2010, 2021, 2023) satisfy perfectly the necessary condition 1.1 defined by two necessary combined conditions (7). We calculate the mean magnitude $(9.2 + 9.0 + 8.8 + 8.1 + 7.8)/5 = 8.58$ for these five strongest earthquakes. Table 1presents the convincing evidence of the established (Simonenko, 2024) cosmic-terrestrial energy gravitational genesis of the most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Alaska (i = 1964), Japan (i = 2011), Chile (i = 2010), New Zealand (i = 2021) and Turkey (i = 2023) during the range 1900÷2024 AD near the calculated non-dimensional numerical dates $t^*(\tau_{c,r}, i)$ (i = 1964, 2011, 2010, 2021, 2023) according to the established (Simonenko, 2024) first strong cosmic-terrestrial tendency (for creation of the strongest earthquakes of the Earth) related with the local maximal combined planetary and solar integral energy gravitational influences $\Delta G_{cos}(\tau_3, t, t_0)$ on the Earth and the local minimal terrestrial potential gravitational energies $\pi_{int}(\tau_3, t)$ of the Earth. But it does not mean that the necessary condition 1.1 is the necessary and (simultaneously) sufficient condition for realization of the strongest earthquakes on Earth. Considering the strongest temporal intensifications of the global and (simultaneously) Chinese seismotectonic processes, we established (Simonenko, 2024) that the necessary condition 1.1 is necessary but not sufficient for realization of the strongest earthquakes of the Earth. Nevertheless, it was concluded (Simonenko, 2024) that the perfect satisfaction of the established necessary condition 1.1 for the maximal magnitudes $8.8 \le M(i, \text{loc. max.}) \le 9.2$ (corresponding to i = 1964, 2010 and 2011) explains the strongest earthquakes of the Earth (presented in Table 1), characterised by the mean magnitude $(9.2 + 9.0 + 8.8)/3 = 9.0$ for these three strongest earthquakes.

Based on the analysis(given in Table 1) of the previous most strongest earthquakes (which are not consistent perfectly with the necessary condition 1.1) occurred in Indonesia (i = 2012), Peru (i = 1940), Indiaregion (i = 1941) and Turkey(i = 1967) on the dates $t_e(i, \text{loc. max.})$(I = 2012, 1940,

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1941 and 1967) near the calculated dates $t^*(\tau_{c,r}, i)$ (i = 2012, 1940, 1941 & 1967) of the local maximal combined planetary and solar integral energy gravitational influences (4) on the internal rigid core $\tau_{c,r}$ of the Earth, we calculate for these four most strongest earthquakes the mean magnitude, $(8.6+8.2+7.6+7.4)/4 = 7.95$ which is significantly smaller than the calculated mean magnitude 8.58 for five most strongest earthquakes characterized by the perfect satisfaction of the necessary condition 1.1. Considering the previous most strongest earthquakes (characterizedby the partial satisfaction of the necessary condition 1.1) occurred in Indonesia (i = 2012) and Peru (i = 1940), we calculatethe mean magnitude, which is significantly larger than the calculated mean magnitude for the previous most strongest earthquakes (characterized by the absent satisfaction of the necessary conditions 1.1 and 1.2) occurred in Andaman Islands, India region (i = 1941) and western Turkey (i = 1967).

Despite physically consistent presented results of the logical monotonous reduction of the calculated mean magnitudes (of the most strongest earthquakes) related with the different degree of deviations from the perfectnecessary condition 1.1, we see the possibilityto define more precisely the derived necessary condition 1.1 (Simonenko, 2024)by taking into account (along with the solar and planetary non-stationary energy gravitational influences) the lunar non-stationary energy gravitational influences on the Earth.

**Total Validity of the Generalised Reduced Second Global Prediction Thermohydrogravidynamic Principle and Related Necessary Conditions 2.1 and 2.2, Concerning the Strongest Earthquakes Occurred in Chile, Indonesia, Russia, Ecuador, Alaska, Xizang-India border region, Japan, China, Canada and New Zealand:**

Table 2 presents the analysis of the previous most strongest (since 1900 to 2024) earthquakes of the Earth (according to the U.S. Geological Survey) occurred in Chile(i =1960), Indonesia (i =2004), Russia (i =1952), Ecuador (i =1906), Alaska (i =1965), Xizang-India border region (i =1950), Japan (i =1933), Russia (i =1923), Peru (i =2001), China (i =1920), Canada (1949), New Zealand (1976), Nepal-India border region (1934) and Ecuador (1979) on the dates $t_e(i, \text{loc. min.})$ (i =1960, 2004, 1952, 1906, 1965, 1950, 1933, 1923, 2001, 1920, 1949, 1976, 1934 & 1979) near the calculated dates $t_*(\tau_{c,r}, i)$ (i =1960, 2004, 1952, 1906, 1965, 1950, 1933, 1923, 2001, 1920, 1949, 1976, 1934 & 1979) of the local minimal combined planetary and solar integral energy gravita-tional influences (6) on the internal rigid core of the Earth.

Table 2. The analysis of the previous most strongest earthquakes of the Earth (according to the U.S. Geological Survey) occurred in Chile(i =1960), Indonesia (i =2004), Russia (i =1952), Ecuador (i =1906), Alaska (i =1965), eastern Xizang-India border region (i =1950 ), Japan (i =1933), Russia (i =1923), Peru(i =2001), China(i =1920), Canada (1949), New Zealand (1976), Nepal-India border region (1934) and Ecuador (1979) on the dates $t = t^*(\tau_{c,r}, i)$ (i =1960, 2004, 1952, 1906, 1965, 1950, 1933, 1923, 2001, 1920, 1949, 1976, 1934 and 1979) near the calculated dates $t_*(\tau_{c,r}, i)$ (i =1960, 2004, 1952, 1906, 1965, 1950, 1933, 1923, 2001, 1920, 1949, 1976, 1934 and 1979) of the local minimal combined planetary and solar integral energy gravitational influences (6)on the internal rigid core $\tau_{c,r}$ of the Earth.

| Magnitude, $M(i, \text{loc. min.})$ Region of State | Date $t_e(i, \text{loc. min.})$ in year i of earth-quake, in yr | The realized necessary condition 2.1 or 2.2 | $\Delta^*(i)$ in days |
|---|---|---|---|
| M(1960,loc.min.) =9.5, Bio-Bio, Chile | May 22, 1960 = 1960.39151 | 2.1 perfectly | 33.5 days before the calculated date $t_*(\tau_{c,r}, 1960) = 1960.48333$ |
| M(2004, loc. min.) = 9.1, off the west coast of northern Sumatra, Indonesia | December 26, 2004 = 2004.98836 | 2.2 perfectly | 89.4 days before the calculated date $t_*(\tau_{c,r}, 2005) = 2005.23333$ |
| M(1952, loc. min.) =9.0, off the east coast of Kamchatka Peninsula, Russia | November 4, 1952 = 1952.84599 | 2.2 perfectly | 7.5 days before the calculated date $t_*(\tau_{c,r}, 1952) = 1952.86666$ |
| M(1906, loc. min.) =8.8, near the coast of Ecuador | January 31, 1906 =1906.08487 | 2.2 perfectly | 79.7 days after the calculated date $t_*(\tau_{c,r}, 1905) = 1905.86666$ |
| M(1965, loc. min.) =8.7, Rat Islands, Aleutian Islands, Alaska, USA | February 4, 1965 = 1965.09582 | 2.2 perfectly | 95.8 days after the calculated date $t_*(\tau_{c,r}, 1964) = 1964.83333$ |
| M(1950, loc. min.) =8.6, eastern Xizang-India border region | August 15, 1950 = 1950.62149 | 2.1 perfectly | 4.3 days before the calculated date $t_*(\tau_{c,r}, 1950) = 1950.63333$ |
| M(1933, loc. min.) =8.4, of the east coast of Honshu, Japan | March 2, 1933 = 1933.16700 | 2.2 perfectly | 12 days before the calculated date $t_*(\tau_{c,r}, 1933) = 1933.2$ |
| M(1923, loc. min.) =8.4, near the east coast of Kamchatka Peninsula, Russia | February 2, 1923 = 1923.09308 | 2.2 partly | 87.7 days before the calculated date $t_*(\tau_{c,r}, 1923) = 1923.33333$ |
| M(2001, loc. min.) =8.4, near the coast of southern Peru | June 23, 2001 = 2001.47638 | no 2.1, no 2.2 | 15.7 days after the calculated date $t_*(\tau_{c,r}, 2001) = 2001.43333$ |
| M(1920, loc. min.) =8.3, Gansu-Ningxia border region, China | December 16, 1920 = 1920.96098 | 2.2 perfectly | 81.2 days before the calculated date $t_*(\tau_{c,r}, 1921) = 1921.18333$ |
| M(1949, loc. min.) =8.2, Haida Gwaii, Canada | August 22, 1949 =1949.64065 | 2.1 perfectly | 39.2 days after the calculated date $t_*(\tau_{c,r}, 1949) = 1949.53333$ |
| M(1976, loc. min.) =8.0, Kermadec Islands, New Zealand | January 15, 1976 = 1976.03832 | 2.2 perfectly | 87 days after the calculated date $t_*(\tau_{c,r}, 1975) = 1975.8$ |
| M(1934, loc. min.) = 8.0, Nepal-India border region between Nepal- India | January 15, 1934 = 1934.04106 | 2.2 partly | 94.5 days before the calculated date $t_*(\tau_{c,r}, 1934) = 1934.3$ |
| M(1979, loc. min.) =7.7, near the coast of Ecuador | December 12, 1979 =1979.947296 | 2.2 perfectly | 80.1 days before the calculated date $t_*(\tau_{c,r}, 1980) = 1980.16666666$ |

$t_e(i, lo$

We used the second global prediction thermohydrogravidynamic principle (6) to calculate (in the first approximation of the circular orbits of the planets around the Sun) the numerical time moments $t_*(\tau_{c,r},1960)=1960.48333$ (Simonenko, 2024), $t_*(\tau_{c,r},2005)=2005.23333$ (Simonenko, 2024), $t_*(\tau_{c,r},1952)=1952.86666$ (Simonenko, 2024), $t_*(\tau_{c,r},1905)=1905.86666$, $t_*(\tau_{c,r},1964)=1964.83333$, $t_*(\tau_{c,r},1950)=1950.63333$ (Simonenko, 2024), $t_*(\tau_{c,r},1933)=1933.2$, $t_*(\tau_{c,r},1923)=1923.33333$, $t_*(\tau_{c,r},2001)=2001.43333$, $t_*(\tau_{c,r},1921)=1921.18333$ (Simonenko, 2024), $t_*(\tau_{c,r},1949)=1949.53333$, $t_*(\tau_{c,r},1975)=1975.8$, $t_*(\tau_{c,r},1934)=1934.3$ and $t_*(\tau_{c,r},1980)=1980.16666666$

Table 2 presents the calculated values $\Delta_*(i)=|t_e(i,\text{loc. min.})-t_*(\tau_{c,r},i)|$ (for i=1906, 1965, 1933, 1923, 2001, 1949, 1976, 1934 and 1979) and the previously calculated values $\Delta_*(1960)=33.5$ days (Simonenko, 2024), $\Delta_*(2004)=$ 89.4 days (Simonenko, 2024), $\Delta_*(1952)=$ 7.5 days (Simonenko, 2024), $\Delta_*(1950)=$ 4.3 days (Simonenko, 2024) and $\Delta_*(1920)=$ 81.2 days (Simonenko, 2024). The closeness (as it is evident from the column for the difference $\Delta_*(i)$ in Table 2) of the dates $t_e(i,\text{loc. min.})$ and $t_*(\tau_{c,r},i)$ (for i = 1960, 2004, 1952, 1906, 1965, 1950, 1933, 1923, 2001, 1920, 1949, 1976, 1934 and 1979) gives the convincing evidence of the main cosmic (solar and planetary) energy gravitational genesis of themost strongest (according to the U.S. Geological Survey) earthquakes of the Earth (during the range 1900÷2024 AD) occurred in Chile (i =1960), Indonesia (i = 2004), Russia (i =1952), Ecuador (i =1906), Alaska (i =1965), Xizang-India border region (i =1950), Japan (i = 1933), Russia (i =1923), Peru (i =2001), China (i =1920), Canada (1949), New Zealand (1976), Nepal-India border region (1934) and Ecuador (1979) near the calculated dates $t_*(\tau_{c,r},i)$ (for i = 1960, 2004, 1952, 1906, 1965, 1950, 1933, 1923, 2001, 1920, 1949, 1976, 1934 and 1979) corresponding to the local minimal combined cosmic (planetary and solar) integral energy gravitational influences (6) on the internal rigid core $\tau_{c,r}$ of the Earth.

Based on the all differences $\Delta^*(i)$ in Table 2, we calculate the small mean difference $\langle\Delta_*\rangle=\frac{1}{14}\sum_{i=1}^{14}\Delta_*(i)=-12.34$ days denoting the convincing evidence of the main cosmic (solar and planetary) energy gravitational genesis of the most strongest (according to the U.S. Geological Survey) earthquakes of the Earth occurred in Chile (i =1960), Indonesia (i = 2004), Russia (i =1952), Ecuador (i =1906), Alaska (i =1965), Xizang-India border region (i =1950), Japan (i = 1933), Russia (i =1923), Peru (i =2001), China (i =1920), Canada (1949), New Zealand (1976), Nepal-India border region (1934) and Ecuador (1979).

Table 2 presents the convincing evidence of the established (Simonenko, 2024)cosmic-terrestrial energy gravitational genesis of the most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Chile (i =1960), Indonesia (i = 2004), Russia (i =1952), Ecuador (i =1906), Alaska (i =1965), eastern Xizang-India border region between China and India (i =1950 ), Japan (i = 1933), China (i =1920), Canada (1949), New Zealand (1976) and Ecuador (1979) on the dates $t_e(i,\text{loc. min.})$ (I =1960, 2004, 1952, 1906, 1965, 1950, 1933, 1920, 1949, 1976 and 1979) near the calculated dates $t_*(\tau_{c,r},i)$ (i =1960, 2004, 1952, 1906, 1965, 1950, 1933, 1920, 1949, 1976 and 1979) of the local minimal combined planetary and solar integral energy gravitational influences (6) on the internal rigid core $\tau_{c,r}$ of the Earth according to the established (Simonenko, 2024) second strong cosmic-terrestrial tendency (for creation of the strongest earthquakes of the Earth) related with the local minimal combined planetary and solar integral energy gravitational influences $\Delta G_{cos}(\tau_3,t,t_0)$ on the Earth and the local maximal terrestrial potential gravitational energies $\pi_{int}(\tau_3,t)$ of the Earth.

We see (based on Table 2) for the previous most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Chile (i =1960), eastern Xizang-India border region (i =1950) and Canada (1949)that the calculated non-dimensional numerical dates $t_*(\tau_{c,r},i)$ (I= 1960, 1950 and 1949)and the non-dimensional numerical dates $t_e(i,\text{loc. min.})$ (I= 1960, 1950 and 1949)satisfy perfectly the necessary (but not sufficient)condition 2.1 defined by two necessary combined conditions (9). It means that the previous most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Chile (i =1960), eastern Xizang-India border region between China and India (i =1950) and Canada (1949) were realized according to the established first variant of the established (Simonenko, 2024) second strong cosmic-terrestrial tendency, which is necessary (but not sufficient)for creation of the strongest earthquakes of the Earth. But it does not mean that the necessary condition 2.1 is the necessary and (simultaneously) sufficient condition for realization of the strongest earthquakes on Earth. Considering the strongest temporal intensifications of the global and (simultaneously) Chinese seismotectonic processes, we established (Simonenko, 2024) that the necessary condition 2.1 is necessary but not sufficient for realization of the strongest earthquakes of the Earth.

We see (based on Table 2) for the previous most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Indonesia (i = 2004), Russia (i =1952), Ecuador (i =1906), Alaska (i =1965), Japan (i = 1933), China (i =1920), New Zealand (1976) and Ecuador (1979) that the calculated non-dimensional numerical dates $t_*(\tau_{c,r},i)$ (i =2004, 1952, 1906, 1965, 1933, 1920, 1976 and 1979) and the non-dimensional numerical dates $t_e(i,\text{loc. min.})$ $t_*(\tau_{c,r},i)$ ,(i =2004, 1952, 1906, 1965, 1933, 1920, 1976 and 1979)satisfy perfectly the necessary (but not sufficient)condition 2.2defined by the four necessary conditions(10). It means that the previous most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Indonesia (i = 2004), Russia (i =1952), Ecuador (i =1906), Alaska (i =1965), Japan (i = 1933), China (i

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=1920), New Zealand (1976) and Ecuador (1979)were realized according to the established second variant of the established (Simonenko, 2024) second strong cosmic-terrestrial tendency, which is necessary (but not sufficient)for creation of the strongest earthquakes of the Earth. But it does not mean that the necessary condition 2.2 is the necessary and (simultaneously) sufficient condition for realization of the strongest earthquakes on Earth. Considering the strongest temporal intensifications of the global and (simultaneously) Chinese seismotectonic processes, we established (Simonenko, 2024) that the necessary condition 2.2 is necessary but not sufficient for realization of the strongest earthquakes of the Earth.

Based on the analysis (given in Table 2) of of the previous most strongest (since 1900 to 2024) earthquakes occurred in Russia (i = 1923), Peru (2001) and Nepal-India border region between Nepal and India (1934) on the dates $t_e(i, \text{loc. min.})$ (i = 1923, 2001 and 1934) near the calculated dates $t_*(\tau_{c,r}, i)$ (i = 1923, 2001 and 1934) of the local minimal combined planetary and solar integral energy gravitational influences (6) on the internal rigid core $\tau_{c,r}$ of the Earth, we see the need to define more precisely the derived necessary condition 2.2 (Simonenko, 2024) by taking into account (along with the solar and planetary non-stationary energy gravitational influences) the lunar non-stationary energy gravitational influences on the Earth.

## Conclusion

We have presented the confirmed validity(based on Table 1)of the established (Simonenko, 2024) generalized reduced first global prediction thermohydrogravidynamic principle (3) and the related necessary condition 1.1 by analyzing the previous most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Alaska (i = 1964), Japan (i = 2011), Chile (i = 2010), New Zealand (i = 2021) and Turkey (i = 2023), for which the calculated non-dimensional numerical dates(of the local maximal combined planetary and solar integral energy gravitational influences (4) on the internal rigid core $\tau_{c,r}$ of the Earth) $t^*(\tau_{c,r}, i)$ and the calculated non-dimensional numerical dates (i = 1964, 2011, 2010, 2021, 2023)of the the most strongest earthquakes satisfy perfectly the necessary condition 1.1 defined by two necessary combined conditions (7). We have presented the confirmed validity(based on Table 2)of the established (Simonenko, 2024) generalized reduced second global prediction thermohydrogravidynamic principle (5)and the related necessarycondition 2.1 by analyzing the previous most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Chile (i =1960), eastern Xizang-India border region (i =1950) and Canada (1949), for which the calculated non-dimensional numerical dates(of the local minimal combined planetary and solarp integral energy gravitational influences (6)on the internal rigid core $\tau_{c,r}$ of the Earth) $t_*(\tau_{c,r}, i)$ and the calculated non-dimensional numerical dates $t_e(i, \text{loc. min.})$ (I = 1960, 1950 and 1949)of the most strongest earthquakes satisfy perfectly the necessary condition 2.1 defined by two necessary combined conditions (9). We have presented the confirmed validity(based on Table 2)of the established (Simonenko, 2024) generalized reduced second global prediction thermohydrogravidynamic principle (5) and the related necessary condition 2.2by analyzing the previous most strongest earthquakes (according to the U.S. Geological Survey) of the Earth occurred in Indonesia (i = 2004), Russia (i =1952), Ecuador (i =1906), Alaska (i =1965), Japan (i = 1933), China (i =1920), New Zealand (1976) and Ecuador (1979), for which the calculated non-dimensional numerical dates(of the local minimal combined planetary and solar integral energy gravitational influences (6) on the internal rigid core $\tau_{c,r}$ of the Earth) $t_*(\tau_{c,r}, i)$ and the calculated non-dimensional numerical dates $t_e(i, \text{loc. min.})$ (I = 2004, 1952, 1906, 1965, 1933, 1920, 1976 and 1979) of the most strongest earthquakes satisfy perfectly the necessary condition 2.2defined by the four necessary conditions(10). Taking into account the presented results, we conclude that it is reasonably (for the practical application of the established (Simonenko, 2024) generalized reduced first and second global prediction thermohydrogravidynamic principles) to define more precisely the derived necessary conditions 1.1, 2.1 and 2.2 (Simonenko, 2024) by taking into account (along with the solar and planetary non-stationary energy gravitational influences) the lunar non-stationary energy gravitational influences on the Earth. It is possible to do this based on the differential combined cosmic (solar, planetary and lunar) non-stationary energy gravitational influence $dG_{cos}(\tau_3, t)$ (given by relation (1)) on the Earth and based on the differential increment $d\pi_{int}(\tau_3, t)$ (given by relation (2)) of the terrestrial (internal) potential gravitational energy $\pi_{int}(\tau_3, t)$ of the Earth $\tau_3$ considered in the system Sun-Earth-Moon. We also see the need to derive the general necessary and (simultaneously) sufficient condition needed for the reliable predictions of the strongest earthquakes of the Earth. It is possible to do this based on all differential terms (along with the terms $dG_{cos}(\tau_3, t)$ and $d\pi_{int}(\tau_3, t)$) in the established generalised differential formulation (Simonenko, 2024) of the first law of thermodynamics.

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