A SPECIFIC MAGNITUDE BUDGET FOR THE DETECTION OF
30 NUCLEAR EARTHQUAKES IN URBAN AREAS SUBJECT
TO A NATURAL SEISMIC HAZARD.

ALEXIS ZAGANIDIS

ABSTRACT. Multiple underground nuclear explosions may trigger the rupture
of seismic faults and mimic a natural earthquake. Moreover, multiple nuclear
explosions can be spatially arranged (on a vertical line for instance) and tem-
porally synchronized in order to reduce significantly the P-waves (except inside
both spherical cones along the vertical line arrangement).

A Specific Magnitude Budget, with the relevant elementary approxima-
tions, is relatively enough accurate to compare unambiguously the energy of
the stress-drop from the fault rupture and the energy of the radiated seismic
waves.

Indeed, for the largest natural earthquakes ($M_w \geq 8.0$), we define very
conservatively their average seismic radiation efficiency to 0.5. It follows from
that definition, the natural seismic radiation efficiency ranges between 0.124
and 0.569 around the average 0.294 (the natural Specific Magnitude Budget
range between $\Delta_{\text{nat}}^{\text{min}} M_Z = -0.604$ and $\Delta_{\text{nat}}^{\text{max}} M_Z = -0.163$ around the aver-
age $\Delta_{\text{mean}}^{\text{nat}} M_Z = -0.354$).

On the other hand, the nuclear seismic radiation efficiency ranges between
1.297 and 2.18 around the average 1.954 (the nuclear Specific Magnitude Bud-
get range between $\Delta_{\text{nuc}}^{\text{max}} M_Z = 0.075$ and $\Delta_{\text{nuc}}^{\text{max}} M_Z = 2.057$ around the aver-
age $\Delta_{\text{mean}}^{\text{nuc}} M_Z = 1.320$).

In practice, the natural seismic radiation efficiency is always $2.278 \times$ smaller
than the nuclear seismic radiation efficiency (an artificial gap of the Specific
Magnitude Budget $\Delta_{\text{gap}} M_Z = 0.238$ is found). Indeed, to provoke a more
powerful stress-drop from the fault rupture with multiple underground explo-
sions, an accurate information about the future epicenters should be known
which is impossible in practice. Lowering too much the energy of the multiple
underground nuclear explosions would also increase the risk of not triggering
at all the rupture of a seismic fault.

A Specific Magnitude Budget for the detection of 30 giant nuclear earthquakes in
urban areas subject to an existing Natural Seismic Hazard is an extremely impor-
tant research task to do for the nuclear safety of the world.

Elementary approximations in the well established framework of the propagating
waves in continuous media are used for the Specific Magnitude Budget in the present
article.

1- The Kinetic energy of the propagating waves in continuous media is roughly
equal to the Potential energy of that ones.

Date: March 18, 2023.
2- If the seismic station is not far away from the seismic wave source ($\sqrt{x^2 + y^2} < 4 \times h$), the seismic waves come directly from the source itself. The Specific Energy/Magnitude Budget with this previous hypothesis are the following:

$$R_Z = \frac{E_R}{E_{\text{Work}}} = \frac{12\pi}{64} \times C_Z \times \rho \times PGV^2 \times d_e^2 \times V_S \times \Delta T_S / E_7$$

(1)

$$\Delta M_Z = \log (E_R) - \log E_{\text{Work}}$$

(2)

where:

$$C_Z \approx \frac{1}{16.819} \quad 7.0 \ M_w = 6.2844 \ M_{\text{Work}}$$

(4)

$$\rho \approx 2.650 \ \text{kg/m}^2 \quad V_S \approx 4.500 \ \text{m/s}^2$$

(5)

$$E_7 \approx 1.995 \times 10^{15} \ J \quad \bar{\sigma}_S \approx \log (31.62, e) \frac{2\pi \times \bar{f}_S}{Q_S \times V_S}$$

(6)

$$\bar{f}_S \approx 2 \ \text{Hz} \quad Q_S \approx 250$$

(7)

The mechanical magnitude $M_{\text{Work}}$ of the stress-drop from the fault rupture is closely related to the moment magnitude scale $M_w$ (Figure 1):

$$E_{\text{Work}} = \frac{\Delta \sigma \mu \bar{u} S}{G}$$

$$= \frac{\Delta \sigma M_0}{G}$$

$$\approx \beta (SR)^{-0.23} M_0$$

$$10^{1.5M_{\text{Work}} \approx (10)^{-0.23 \times M_w / 1.5} 10^{1.5M_w}}$$

(8)

$$M_{\text{Work}} \approx 0.898 \times M_w \pm 0.153$$

(9)
The factor $4\pi$ is the unit sphere surface. The factor $3/64$ come from a doubled amplitude of the seismic waves when they reflect to the Earth’s surface (factor $1/2^2$), a $\sin^2$ main envelop for the ground velocity (factor $3/8$) and a sinusoidal oscillation of the seismic wave (factor $1/2$).

$C_Z$ is a universal constant for every earthquakes. $PGV$ is the maximum of the main envelop of the ground velocity at the seismic station. $d_e$ is the effective hypocentral distance depending on the eccentricity of the isoseisms of the shake map ($d_e = \sqrt{x^2 + y^2 + h^2}$ for a null eccentricity of the isoseisms of the shake map).

$\rho$ is the density of the rocks at the recording seismic station. $V_S$ is the speed of the S-waves at the recording seismic station. $\Delta T_S$ is the time duration of the main envelop of the S-waves. $E_7$ is the energy of a $7.0 \ M_w$ magnitude earthquake. $f_S$ is the most representative frequency of the S-Waves. $Q_S$ is the maximal quality factor of the S-waves through the seismic attenuation.

\[
\begin{align*}
(10) \quad x_h &= x/h \\
(11) \quad l_h &= l/h \\
(12) \quad f(x_h, y_h, l_h) &= \frac{1}{l_h} \int_{-l_h/2}^{+l_h/2} \frac{dx'_h}{(x_h - x'_h)^2 + y_h^2 + 1} \\
(13) \quad \frac{1}{\sqrt{1 - \varepsilon^2}} &= \frac{a}{b} = \frac{\partial^2 f(0,0,l_h)}{\partial^2 f(0,0,l_h)} \\
(14) \quad d_e &= \frac{h}{\sqrt{f(x_h, y_h, l_h)}}
\end{align*}
\]

$x, y, h, l$ are the coordinates of the seismic station with respect to the isoseisms orientations, the hypocentral depth and the horizontal length of the fault rupture. $a, b$ are the ellipse parameters of the isoseisms.

3- If the seismic station is far away from the seismic wave source ($\sqrt{x^2 + y^2} > 4 \times h$), the seismic waves are guided between the Earth’s surface and the deeper layers of the Earth’s crust. We neglect the seismic waves with an upward angle larger than $45^\circ$ and with a downward angle smaller than $0^\circ$ because of a much larger seismic attenuation. The Specific Energy &
Magnitude Budget with this previous hypothesis are the following:

\[
R_Z = \frac{E_R}{E_{Work}} = \frac{12\pi \sqrt{2}}{64(\sqrt{2} - 1)} \times C_Z \times \rho \times PGV^2 \times d_e \times h \times V_S \times \Delta T_S/E_7
\]

\[
\times \exp(\bar{\alpha}S \times d_e/\cos(\pi/8)/\log(31.62,e))/31.62^{M_{Work} - 6.2844}
\]

\[
\Delta M_Z = \log(E_R) - \log(E_{Work})
\]

\[
= \log \left( \frac{31.62}{64(\sqrt{2} - 1)} \times C_Z \times \rho \times PGV^2 \times d_e \times h \times V_S \times \Delta T_S/E_7 \right)
\]

\[
+ \bar{\alpha}S \times d_e/\cos(\pi/8) - (M_{Work} - 6.2844)
\]

(17)

where:

\[
C_Z \equiv 1/16.819
\]

\[
\rho \equiv 2 650 \text{ kg/m}^2
\]

\[
E_7 \equiv 1.995 \times 10^{15} \text{ J} \quad \bar{\alpha}_S \equiv \log(31.62,e) \frac{2\pi \times \bar{f}_S}{Q_S \times V_S}
\]

\[
\bar{f}_S \equiv 2 \text{ Hz} \quad Q_S \equiv 250
\]

The factor \(\sqrt{2}/(\sqrt{2} - 1)(h/d_e)\) is the ratio between the cylinder surface of radius \(d_e\) and height \(h\) and the cone surface with the angle lying between 0° and +45°. For the seismic attenuation, we used the approximate average length path \(d_e/\cos(\pi/8)\) with an upward angle of +22.5°.

4- We also used a fitted model for the \(PGV\) with respect to the \(PGA\) (Figures 1, 2 and 3).

\[\text{Figure 2. MMI Legend of Shake Maps.}\]

Wikipedia provide the list of the costliest earthquakes. We add to that list, the earthquakes in San Fernando 1971, in Coalinga 1983, in Borah Peak 1983, in Whittier Narrows 1987, in Landers 1992, in Kushiro 1993, in Geiyo 2001, in Southern Peru 2001, in Kaohsiung 2010, in Chiapas 2017, in Ridgecrest 2019 and in Taitung 2022. We removed from the costliest earthquake list, the earthquakes too far from a reliable recording seismic station. The earthquakes in Tangshan 1976 and in San Francisco 1906 have a great historical importance but there are no reliable recording seismic station close to both earthquakes. Therefore, we study separately the earthquake in Tangshan 1976 and the earthquake in San Francisco 1906.

We googled ”location name + year + ground acceleration” to get the FULL ground acceleration plots of the earthquake. We googled ”seismic station name + latitude” to get the recorded acceleration data.
Figure 3. Estimate, Standard Error and Confidence Interval of the Fitted Model’s Parameters for the $\text{PGV}$ with respect to the $\text{PGA}$.

![Fitted Model](image)

<table>
<thead>
<tr>
<th>Estimate</th>
<th>Standard Error</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>-0.00915972</td>
<td>(-0.573033, 0.554713)</td>
</tr>
<tr>
<td>b</td>
<td>1.2185</td>
<td>(0.652222, 1.78477)</td>
</tr>
<tr>
<td>c</td>
<td>1.17218</td>
<td>(1.08696, 1.25739)</td>
</tr>
</tbody>
</table>

Figure 4. Plot of the Fitted Model for the $\text{PGV}$ with respect to the $\text{PGA}$.

+ longitude” to get the latitude and the longitude of the recording seismic station corresponding to the ground acceleration plots found. The magnitude of the energy of the stress-drop from the fault rupture ($M_{\text{W/terms}}$), the hypocentral depth, the GPS coordinates of the epicenter, the UTC, the local time and the Shaking Map are given by the corresponding Wikipedia pages.

We define the Specific Magnitude Budget $\Delta M_Z$ as the following:

$$\Delta M_Z = \log (31.62, E_R/E_W) - \log \left(31.62, <E_R/E_W>_{M_{\text{W/terms}} \geq 8.0}\right)$$

where

$$<E_R/E_W>_{M_{\text{W/terms}} \geq 8.0} := 0.5$$

It may be the most useful scientific discovery: differentiating unambiguously nuclear earthquakes to natural earthquakes with a Specific Magnitude Budget $\Delta M_Z$ (Figure 4, 5, 6 and 7). It was not expected being discovered so late.
Multiple underground nuclear explosions may trigger the rupture of seismic faults and mimic a natural earthquake. Moreover, multiple nuclear explosions can be spatially arranged (on a vertical line for instance) and temporally synchronized in order to reduce significantly the P-waves (except inside both spherical cones along the vertical line arrangement).
A Specific Magnitude Budget, with the relevant elementary approximations, is relatively enough accurate to compare unambiguously the energy of the stress-drop from the fault rupture and the energy of the radiated seismic waves.

Indeed, for the largest natural earthquakes \((M_w \geq 8.0)\), we define very conservatively their average seismic radiation efficiency to 0.5. It follows from that definition, the natural seismic radiation efficiency ranges between 0.124 and 0.569 around the average 0.294 (the natural Specific Magnitude Budget range between \(\Delta_{\text{min}}^{\text{nat}} M_Z = -0.604\) and \(\Delta_{\text{max}}^{\text{nat}} M_Z = -0.163\) around the average \(\Delta_{\text{mean}}^{\text{nat}} M_Z = -0.354\)).

On the other hand, the nuclear seismic radiation efficiency ranges between 1.297 and 1.218 around the average 0.954 (the nuclear Specific Magnitude Budget range between \(\Delta_{\text{min}}^{\text{nuc}} M_Z = 0.075\) and \(\Delta_{\text{max}}^{\text{nuc}} M_Z = 2.057\) around the average \(\Delta_{\text{mean}}^{\text{nuc}} M_Z = 1.320\)).

In practice, the natural seismic radiation efficiency is always 2.278 times smaller than the nuclear seismic radiation efficiency (an artificial gap of the Specific Magnitude Budget \(\Delta_{\text{gap}} M_Z = 0.238\) is found). Indeed, to provoke a more powerful stress-drop from the fault rupture with multiple underground explosions, an accurate information about the future epicenters should be known which is impossible in practice. Lowering too much the energy of the multiple underground nuclear explosions would also increase the risk of not triggering at all the rupture of a seismic fault.

Japan was hit 10 times, United States were hit 4 times, Mexico was hit 4 times, New Zealand was hit 3 times, Italy was hit 2 times. Peru, Turkey, Croatia, Haiti, Chile, Algeria and Taiwan were hit once time.

The direct costs of the earthquake damages was increased by +380% because of the nuclear earthquakes (1,666 G$ in total instead of 345 G$ for the natural earthquakes only). The indirect costs of the more expensive buildings, with respect to the stronger safety standards induced by the 30 giant nuclear earthquakes, are about 50,000 G$ over the last 30 years.

There is a year anomaly, the nuclear earthquakes does not occurred on a gap of 80.4 days over 365. The probability of that anomaly is 2.1% about. (The nuclear earthquakes occurred only between the day 12.9 and the day 297.3 of the year with UTC).

There is also a day anomaly, 4 nuclear earthquakes have an UTC or a local time extremely close to midnight. The probability of that anomaly is 1.2% about.

The Energy Budget may have been used Indeed, near the Earth’s poles, the ice erosion is much larger and there is no high mountains.tly in the following article: "Observational constraints on the fracture energy of subduction zone earthquakes" written by Venkataraman, Anupama and Kanamori, Hiroo in 2004 (Figure 16).

Characteristic damages of the 30 giant nuclear earthquakes (Fig. 8, 9, 10, 12, 13 and 14).
Figure 8. Earthquake in Tangshan 1976 and the Nevada test site with underground nuclear tests. The crater in Tangshan 1976 could be a crater from the collapse of a very deep and very large cavity formed by an underground nuclear explosion in Tangshan 1976.

A list of comments about the historical political context of the 30 giant nuclear earthquakes:

1. The art of terrorism is tenfold: 1) Doing actions that seem impossible to do with catastrophic & strategic consequences, 2) Passing actions off as accidental and/or from external causes, 3) Appearing incompetent/unprofessional and/or Appearing subject to external constraints and/or Appearing suffering from terrorism, 4) Choosing the critical timing, 5) Choosing the critical location, 6) Keeping action information secret and/or spreading popular/viral/confusing/subtle disinformation, 7) Identity change of the terrorist organization and/or disguise the terrorist organization purge as an accidental/natural disaster, 8) Organizing major/spectacular actions that take a lot of investigations resources with minor consequences. 9) Create global disasters that reduce the investigation intelligence, 10) Terrorism by reproducing/amplifying previous known natural disasters to double down the terror about it and complaining about other irrelevant terrorists attacks.
Figure 9. Characteristic building damages from a suspected nuclear earthquake in Tangshan 1976 and two other nuclear earthquakes in Northridge 1994 and in Hanshin 1995.

2- The first nuclear earthquake in San Fernando 1971 happened within the Vietnam war context and the Laos war context:

Because of significant logistical stockpiling by PAVN in the Laotian Panhandle, South Vietnam launched Operation Lam Son 719, a military thrust on 8 February 1971. Its goals were to cross into Laos toward the city of Tchepone and cut the Ho Chi Minh Trail, hopefully thwarting a planned North Vietnamese offensive. Aerial support by the U.S. was massive since no American ground units could participate in the operation. On 25 February, PAVN launched a counterattack, and in the face of heavy opposition, the South Vietnamese force withdrew from Laos after losing approximately a third of its men.

The 1971 San Fernando earthquake (also known as the 1971 Sylmar earthquake) occurred in the early morning of February 9 in the foothills of the San Gabriel Mountains in southern California. The event affected a number of health-care facilities in Sylmar, San Fernando, and other densely populated areas north of central Los Angeles. The Olive View Medical Center and Veterans Hospital both experienced very heavy damage, and buildings collapsed at both sites, causing the majority of deaths that occurred. The buildings at both facilities were constructed with mixed styles,
Figure 10. It could be a crater from the collapse of a very deep and very large cavity formed by an underground nuclear explosion in Nisqually 2001. The last plot show some initial anomalous strong P-waves of the 2001 Nisqually earthquake at a distance of 1 917 km recorded at the Seismic Station IU ANMO Albuquerque, New Mexico, USA. Since the epicenter was relatively deep (57 km), a smaller nuclear pre-explosions (with a small horizontal alignment) may have been done in order to reduce the first P-waves around the epicenter and the S-waves of the smaller pre-explosions mask the P-waves of the main nuclear explosions (with a vertical line alignment). However, the P-wave of the smaller nuclear pre-explosions are relatively strong far way of the epicenter (horizontal plane) and the seismic attenuation is larger far away for the S-waves than the strong P-waves. Therefore, there is a strong initial peak of the P-waves of the smaller nuclear pre-explosions.

but engineers were unable to thoroughly study the buildings’ responses because they were not outfitted with instruments for recording strong ground motion, and this prompted the Veterans Administration to later install seismometers at its high-risk sites.

3- With a 90%-95% confidence level, the earthquake in Tangshan 1976 is also a nuclear earthquake with a Specific Energy Budget between $2.17 \times 10^{-6} - 6.23 \times 10^{-6}$ (1-sigma interval about) or a Specific Magnitude Budget $\Delta M_Z$ between 0.22 - 0.53 (1-sigma interval about).
Figure 11. Port-au-Prince is located inside a double seismic strike-slip fault system. Therefore, the stress energy accumulated in that seismic system is released more easily and more frequently BUT at a smaller powerful level. Therefore, it is very unlikely that there will be an earthquake as strong as the one that hit Port-au-Prince in 2010.

Like the other 30 giant nuclear earthquakes, there was a large ratio between the vertical ground acceleration and the horizontal acceleration:

Strong motion records obtained on ground during the main shock in Tangshan 1976 show a rather strong vertical component, with max. vertical acceleration about 50%-100% of that of the horizontal even at epicenter distance more than 100 km, and a long duration nearly 100 seconds at that distance.

Like the other 30 giant nuclear earthquakes, there was that characteristic infrastructure damage at the Figure 10 of the page 17 of the article ”1976 Tangshan, China Earthquake” written by J. A. Blume (Figure 9).

4- Very probably, that giant human resource removal was done for of a giant top secret military Nuclear-Powered Subterrene program in Russia : Khrushchev withdrew 1,400 Soviet technicians from the PRC, which canceled some 200 joint scientific projects. In response, Mao justified his belief that Khrushchev had somehow caused China’s great economic failures and the famines that occurred in the period of the Great Leap Forward.

5- The soviet propaganda about the Kola Superdeep Borehole was intended to give the impression that there were completely abnormal, mysterious and unknown phenomena at depths beyond 8 km. The Soviet propaganda was also intended to give the impression it was much more complicate and extremely hard to reach depths beyond 8 km by not reaching at all the official target depth (15 000 meters). The official drilling of the the Kola Superdeep Borehole started less than a year before the first nuclear earthquake in San Fernando 1971.
6- April 29 1976 – Sino-Soviet split: A concealed bomb explodes at the gates of the Soviet embassy in China, killing four Chinese. The targets were embassy employees, returning from lunch, but on this day they had returned to the embassy earlier. That event took place exactly 3 months before the suspected nuclear earthquake in Tangshan 1976.

7- ONLY 4 days after the USSR made the big Helsinki Accords with the western countries, the worst 1975 Banqiao Dam failure in human history occurred. Few weeks before the nuclear earthquake in Turkey-Syria 2023: Ankara asked Damascus in Moscow to recognize the YPG as a “terrorist” organization. Two months before that nuclear earthquake: Turkey has threatened to send group troops into northeastern Syria in retaliation for a deadly Istanbul bombing on November 13 that President Recep Tayyip Erdogan attributes to the Syrian Kurdish YPG (strongly supported by the Turkish Marxist-Leninist Communist Party). Dugin has killed his own journalist daughter to keep some secrets about Sars-Cov-2 or nuclear earthquakes?

8- The 11/09/2001 attacks in New York City occurred EXACTLY 30 years after the death of Nikita Sergeyevich Khrushchev. The Gyrotron, the Nuclear-Powered Subterrene program, the Kola Superdeep Borehole, the Soviet space program, the nuclear Kyshtym disaster, the Cuban Missile Crisis and the Sino-Soviet split started under the Khrushchev’s leadership or very soon after it (Figure 15). Napoleon, Mussolini, Kruchnev, Medvedev and Putin may had the Napoleon-complex: little men may try to compensate a lack of physical strength by displaying an extreme drive, ambition, and self-confidence (Figure 15). The Napoleon-complex suggests that shorter men are more likely to have megalomania feelings, initiate conflicts more frequently and respond aggressively to any threat or provocation. Khrushchev was one of the most watched and isolated rulers during his whole retirement. Khrushchev was almost under a regime of semi-liberty during his whole retirement. Probably, that forced and watched isolation during the Khrushchev’s retirement was the consequence of a giant top secret military Nuclear-Powered Subterrene program (responsible of the nuclear Kyshtym disaster? The Cuban Missile Crisis was made as a military distraction for USA?).

9- The Kaprun disaster was a fire that occurred in an ascending train in the tunnel of the Gletscherbahn Kaprun 2 funicular in Kaprun, Austria, on 11/11/2000. The disaster killed 155 people. The inquest ends on September 6, 2001. The 11/09/2001 attacks in New York City. The 04/10/2001, a Soviet S-200 missile shot down a commercial plane above the black sea, most of the passengers were Israelis visiting their relatives in Russia. The Tohoku nuclear earthquake occurred the 11/03/2011.

10- 222 days after Russia has Declared Greece “Unfriendly” Country the 22th July 2022, Greece experienced their worst train crash. The worst Greek train crash happened just before the Greek General Elections and the train
was completely filled with young graduates. Safety standards were always low in Greece the last 60 years BUT Greece was never in the sights of a very sophisticated terrorist state until very recently. On the night of 29/10/2022, a crowd crush occurred during Halloween festivities in the Itaewon neighborhood of Seoul, South Korea.

11- Earthquake in Tangshan 1976 and the Nevada The Fukushima Daiichi nuclear disaster was DESIGNED? It was the only nuclear plant with a concave sea wall instead of having a convex sea walls like the Fukushima Daini nuclear plant. The tsunami direction had exactly the right angle (oblique angle of 40° counterclockwise) to lean on the sea wall of the reactors 5 & 6 and being redirected to the reactors 1 & 2 & 3 & 4 at a perpendicular angle with the concave sea wall. Moreover, there is only 0.6% probability to have so many $M_w$ 9.1 earthquakes the last 70 years with respect to the 450 years earlier. Secondly, the other historically known $M_w$ 9.1 earthquakes or larger ones far from the Earth’s poles only happened near high mountain chains arranged in double lines unlike the 2011 Tōhoku earthquake not near from any high mountains. Indeed, near the Earth’s poles, the ice erosion is much larger and there is no high mountains. Thirdly, the fault bends significantly 212 km northwest of the epicenter and makes a complete fault rupture almost impossible as required for a $M_w$ 9.1 earthquake. Finally, the Okhotsk plate subsided instead of uplifting as it would be expected for an Oceanic Subduction Zone a test site with underground nuclear tests. The crater in Tangshan 1976 could be a crater from the collapse of a very deep and very large cavity formed by an underground nuclear explosion in Tangshan 1976 (Figure 8).

12- Characteristic building damages from a suspected nuclear earthquake in Tangshan 1976 and two other nuclear earthquakes in Northridge 1994 and in Hanshin 1995 (Figure 9).

13- It could be a crater from the collapse of a very deep and very large cavity formed by an underground nuclear explosion in Nisqually 2001 (Figure 10). The last plot show some initial anomalous strong P-waves of the 2001 Nisqually earthquake at a distance of 1 917 km recorded at the Seismic Station IU ANMO Albuquerque, New Mexico, USA (Figure 10). Since the epicenter was relatively deep (57 km), a smaller nuclear pre-explosions (with a small horizontal alignment) may have been done in order to reduce the first P-waves around the epicenter and the S-waves of the smaller pre-explosions mask the P-waves of the main nuclear explosions (with a vertical line alignment). However, the P-wave of the smaller nuclear pre-explosions are relatively strong far way of the epicenter (horizontal plane) and the seismic attenuation is larger far away for the S-waves than the strong P-waves. Therefore, there is a strong initial peak of the P-waves of the smaller nuclear pre-explosions (Figure 10).

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16- The weight of the multiple nuclear H-bombs in Tohoku 2011 is roughly the weight of two Statues of Liberty or the Payload to LEO of the sea Dragon:

$$r_H \cong (17.59)/(6.015122 + 2.014101)/931.49 \times 9 \times 10^{16}$$

$$\cong 2.117 \times 10^{17} \text{ J/ton}$$

$$M_H \cong 1.995 \times 10^{12}/C_Z \times R_Z/(50\% \ r_H)$$

$$\cong 1.995 \times 10^{12}/16.819 \times 173.139/(50\% \ r_H)$$

$$\cong 550 \text{ tons}$$

17- The 2010 Haiti nuclear earthquake and the 2023 Turkey-Syria nuclear earthquake may have been chosen to occur during the electoral campaign of the general elections and during a period of heavy rains to increase the nuclear earthquake devastation with soil liquefaction and to make more difficult rescue operations at a critical political time. The Haiti place may have been chosen to circumvent the United States embargo against Cuba by destabilizing neighboring countries (Cubans travel to Haiti searching for shopping bargains) and the Turkey-Syria place may have been chosen to reduce the number of Russian soldiers needed in Syria during the Ukraine war launched by Russia.
18- The natural earthquake in San Francisco 1906, the nuclear earthquake in Tangshan 1976 and the nuclear earthquake in Turkey–Syria 2023 have overturned few trains. HOWEVER, the train overturned by a natural earthquake in 1906 was ON the San Andreas fault (Figure 13).

19- The 2023 Turkey-Syria earthquake created a canyon 35 meters deep and 200 meters wide. It could be a land subsidence from the collapse of a very deep and very large cavity formed by an underground nuclear explosion (Figure 14).

20- The Russian international terrorism globally pushes to increase the use of contactless technologies, to increase the digitalization of human activities, to increase the redundancy of safety standards and to raise the level of safety standards.

21- Within the context of the 30 giant nuclear earthquakes, the Chernobyl accident was fake and used for two purposes. The first one, to show a fake easily detectable unprofessional appearance with respect to the nuclear energy. The second one, to ensure a secrecy at an extremely high level within the Russian Federation by doing a PLANNED purge of political dissidents by sending them to deadly radioactive areas for unsafe decontamination work or by delaying their evacuations or giving them permanent jobs years ago in the Chernobyl region. The Russian Federation may have used some dirty nuclear activities as a “Final Solution” against political dissidents.

22- The Russian Federation may have created the LONG COVID disease as an attempt to globally reduce the intelligence of investigations about the 30 giant nuclear earthquakes around the world that have struck dense urban areas under an existing Natural Seismic Hazard (nuclear explosions are spatially arranged and temporally synchronized to reduce the P-waves and to trigger the rupture of the existing seismic faults).

23- Perhaps, the next step in trying to make nuclear earthquakes forget is to detonate a few small nuclear bombs in Ukraine. It may be a sketch already carefully decided in advance, the Russian army loses "too much" and is "forced" to use a few small tactical nuclear bombs in its "retirement" in Ukraine. Everyone is obsessed with those potential events and no one is thinking at all about giant nuclear earthquakes.... who knows?

24- Natural seismic hazard is an unwanted indirect consequence of the large reduction of the cosmic rays on the Earth’s surface. A strong Earth’s magnetic field is needed to avoid the Earth’s atmosphere erosion from the solar flares. A strong Earth’s magnetic field is possible only with a powerful Dynamo Mechanism creating also an unwanted natural seismic hazard. The Nuclear Technologies has reduced the natural benefits of the powerful Earth’s Dynamo Mechanism by amplifying significantly and subtly the existing Natural Seismic Hazard with 30 giant nuclear earthquakes. Finally, the Symmetric Deterrence theory does not hold at all to avoid an
irreversible nuclear escalation but rather an Extreme Asymmetric Development holds to avoid a nuclear escalation. In the last case, both sides try to "win" in a very different way and in a very difficult way without a central point of contact between both sides. Within a Symmetric Deterrence theory, there is always a central point of contact between both sides which creates an exponential escalation reaching relatively fast the irreversible nuclear escalation level. In the current Extreme Asymmetric Development, one side tries to "win" by compromising significantly the economic development of the other side with a massive use of the nuclear technology in a hidden way and in a inefficient way and without any detectable nuclear fallout (an inefficient way using an extremely compact source of energy is still a very strong way as it is the case for the 30 giant nuclear earthquakes). The second side tries to "win" by increasing massively its own economic development with stronger and stronger safety standards and by exploiting more and more its natural resources. Both sides can not exclude they have a "winnable" strategy in that Extreme Asymmetric Development and there is no central point of contact between both sides that could trigger an exponential escalation. Finally, the fact that the nuclear technology was only used within 4 days and within 300 km to kill directly other humans over the last 78 years is just a myth (Atomic bombings of Hiroshima and Nagasaki).

References

[1] A. Zaganidis, “Mathematica Notebooks and Pictures: A specific magnitude budget for the detection of 30 nuclear earthquakes in urban areas subject to an existing natural seismic hazard.” https://drive.google.com/drive/folders/1Rid5ZDbbUkgq1t1XH5dVGLiYODgAv50AU?usp=share_link.


Figure 12. The Fukushima Daiichi nuclear disaster was DESIGNED? It was the only nuclear plant with a concave sea wall instead of having a convex sea wall like the Fukushima Daini nuclear plant. The tsunami direction had exactly the right angle (oblique angle of 40° counterclockwise) to lean on the sea wall of the reactors 5 & 6 and being redirected to the reactors 1 & 2 & 3 & 4 at a perpendicular angle with the concave sea wall. Moreover, there is only 0.6% probability to have so many $M_w$ 9.1 earthquakes the last 70 years with respect to the 450 years earlier. Secondly, the other historically known $M_w$ 9.1 earthquakes or larger ones far from the Earth’s poles only happened near high mountain chains arranged in double lines unlike the 2011 Tōhoku earthquake not near from any high mountains. Indeed, near the Earth’s poles, the ice erosion is much larger and there is no high mountains. Thirdly, the fault bends significantly 212 km northwest of the epicenter and makes a complete fault rupture almost impossible as required for a $M_w$ 9.1 earthquake. Finally, the Okhotsk plate subsided instead of uplifting as it would be expected for an Oceanic Subduction Zone.
Figure 13. The natural earthquake in San Francisco 1906, the nuclear earthquake in Tangshan 1976 and the nuclear earthquake in Turkey–Syria 2023 have overturned few trains. HOWEVER, the train overturned by a natural earthquake in San Francisco 1906 was ON the San Andreas fault at Point Reyes, United States.

Figure 14. The 2023 Turkey-Syria earthquake created a canyon 35 meters deep and 200 meters wide. It could be a land subsidence from the collapse of a very deep and very large cavity formed by an underground nuclear explosion.
Figure 15. Nikita Sergeyevich Khrushchev had the Napoleon-complex?
For a deep event, the energy radiated in the P- and S-waves can be estimated directly from measurements of the energy flux in the body-wave arrivals. Neglecting directivity, Brune and Shearer (1986) derived the "point source" formula:

\[ E_P = 4\pi c (R_P^3) / (p_P^3) \]  
\[ E_S = 4\pi c (R_S^3) / (p_S^3) \]

relating the total energy radiated in the body wave to the energy flux in the P- and S-waves.

\[ M_0 = 10 \log \left( \frac{E}{10^{-17} \text{ joules}} \right) \]  

The results of this analysis are compiled in Table 3; the average estimate of the seismic moment is \( M_0 = 15 \pm 0.6 \times 10^{26} \text{ joules} \). This scatter is similar to the estimate of \( 1.7 \times 10^{26} \) joules from the long-period body-motion data by A. A. Harkrider and others (1983), and is consistent with the results of Brune and Shearer (1986) obtained in the same region of the Indian Ocean. The average estimate of the last two columns is \( 17 \pm 0.9 \times 10^{26} \) joules, which is consistent with the previous results. The scatter is similar to the estimate of \( 1.7 \times 10^{26} \) joules from the long-period body-motion data by A. A. Harkrider and others (1983), and is consistent with the results of Brune and Shearer (1986) obtained in the same region of the Indian Ocean.

Figure 16. The Energy Budget may have been used incorrectly in the following article: "Observational constraints on the fracture energy of subduction zone earthquakes" written by Venkataraman, Ampama and Kanamori, Hiroo in 2004.

Figure 17. Raw data of the 30 nuclear earthquakes.

Figure 18. Raw data of some 15 natural earthquakes.