The unified model of nucleosynthesis and star & planet formation in black holes, explosive and effusive volcanism, geochemistry, bolides, gravity and spontaneous explosions of nuclear reactors

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Abstract : ***The heavy elements are synthetized in black holes and expelled thanks to local supercriticities inside. These black hole eruptions produce pieces of heavy atoms catching with them some of the black hole, a wrapping event around that black hole produces the star (in case there is enough mass for sustained fission), planet / moon and nuclear fission is together with fusion the motor of stars. This is demonstrated through many levers. Gravitational waves are constituted by waves of neutrons, when they impact the ground they may trigger underground nuclear blasts, that produce magma caves (explaining volcano swarms). Black holes erupting from the inside of the stars produce hyper variations in the regime of brightness (eruptive variables for instance), and in planets or moons, effusive volcanism, as well as supercavitating bolides (fireballs such as the one causing the event of the Tunguska in 1908). The strike of gravitational waves may be powerful enough, in a rare case, to blast all nuclear plants working in continent-wide regions. Things such as the ridge on Iapetus, the "actinide boost" in stars, "earthquake lights" and the "crown of stars in the sky" (in religious texts) and can be explained thanks to this model.***

Oklo is only the very tip of the iceberg – a seed for thought but nowhere near close to the extent of the importance of nuclear fission in nature – which is hugely significant, crucial in volcanism and star dynamism, and in the production of all stable elements (for the light elements before the split in the Aston curve, through ternary fission products and then fusion under intense pressure and heat). The « actinide boost » in a number of stars is a long-time issue which can be resolved – so is the issue of “volcano clusters” and the extreme solar particle events leading to recorded spikes in 14C and 10Be, as well as the depletion in 238U in volcanic lavas, star “bursts” in nebulaes, antineutrinos found in acute levels near subduction areas of the Earth thanks to KamLAND in Japan, and many other elements that will be concisely presented in this paper. Some stars have been confirmed to be uranium and thorium-rich. This is confirmed by spectral research, see for instance Hill et al 2017 as well as Barbuy et al 2011. Both teams found U and Th – rich stars and used the classical theory to assess that these stars are very old. They should on the contrary be relatively *recent* agglomerates of matter. All of these elements, among others that will be presented below, can be linked to the same very easy explanation of nuclear fission in stars and planets – together with “earthquake lights” that simply show light from underground nuclear explosions escaping thanks to fault lines.

1. On volcanoes

Barytine and zirconium mines are located close to old volcanoes, as cesium and rubidium mines (Bernic Lake for instance is the most famous) ; one of the main mines for palladium and platinum, the Stillwater mine, is in the granitic Beartooth mountains of Montana ; volcano eruptions are also well-known sources of bromine and iodine that are light elements with a very low boiling points (see for instance Aiuppa et al 2005 on Etna emissions of bromine and iodine). All these elements are the daughter products of major fission products, for thermal neutrons. The part 5 of the article points to a geological differentiation based on the yield of fast neutrons, for the atoms indium and tin on which data has been found, explaining why they do not occurr in areas of explosive volcanism (only in granite).

These elements already confirm that nuclear fission is the motor for magmatic formation and explain the contribution of water to explosive increases of magma in subduction magmatic chambers (tornillos which simply are nuclear explosions), as water brought by subduction is the perfect incident neutron moderator for nuclear fission supercriticities propped up sometimes by the impact of neutrons from nuclear supercriticities in stars. It suggests a direct link between novas, supernovas and volcanism. The KamLAND observatory presented the first proof for geoneutrinos in July 2005 (Domogatsky et al 2004 already noted a possible antineutrino confirmation of fission in the Earth's core) – De Meijer & van Westrenen 2008 use them to suggest continuously operating fission reactors in the Earth's core. MacDonald 1988 also notes findings of dihydrogen gas in the Kola borehole in Russian territory. This is also confirmed by the very high intensity of the antineutrino flux in KamLAND (much higher than in other detectors), close to a subduction area of the Pacific belt, as well as by research on the actinide content of volcanic ash. The ash of the St Helens volcano, for instance, was depleted in 238U and 232Th (Strauss et al 1981) when compared with surrounding soils. 238U was also depleted relatively to 230Th in volcanic ash (Huckle et al 2016). 238U was more depleted than 232Th in granite rocks (Rosholt et al 1973), including up to 165 feet underground after drilling the rock. The "removing" of uranium is easily explained by fission instead of erosion (as suggested by the authors of the last article). 238U has in average higher fission cross sections than 232Th, even for neutrons above 1 MeV. These elements confirm that 238U, 232Th are major contributors to fission underground (involving therefore extremely fast neutrons, i.e. relativistic particles that have only begun to be slowed down by the impact onto the superior layers of the Earth's crust). Supercriticities are triggered by the intense pressure of rocks. Each supercriticity causes a "tornillo" and the light part of the molten down rock percolate in the direction of the surface of the Earth, leading to magmatic chamber formation. This percolation depressurizes temporarily the underground, slowing down the nuclear reactor until a new supercriticity is triggered by 1. spontaneous fission or, exceptionally, a nova / supernova where obviously supernovas are the main factor for the most violent cases 2. more pressure from the plaques 3. or an addition of water (and carbon from the organic debris on the plaques) from subduction, 4. or heat (which accelerates the movement of atoms and increases cross section as neutrons are more likely to meet an atom throughout their life (or much more likely several of the above). For the 1., along with spontaneous fission must be added as well reactions of neutron spallation such as alpha,n (and, less frequently, gamma,n if an activation product of an anterior nuclear fission reaction has a gamma ray emission powerful enough to trigger a "photoneutron" - or, obviously, gamma rays from nuclear fissions, or photo-fission...). This is just a natural nuclear reactor. For the continuation of the nuclear fission chain reaction, even the neutron spallation caused by a proton (from neutron decay, or ternary fission products) onto a heavy element like lead (much more frequent underground than the light elements needed for alpha, n and gamma,n), and of course n,n and n,2n with the same heavy elements, can help.

Many low-scale volcanic events can be triggered without a significant nova (for instance the permanent activity of the Stromboli volcano), yet supernovas are easy to link to simultaneous intense volcanic activity (high VEIs and supervolcanos) in geographic clusters (indicative of impact zone for supernova neutrons), as I show in part 3. These element can allow us to reconstitute not only a planetary motor for temporary increases of fission and fusion (where, underground, the intense pressure onto ternary fission products may allow for some nuclear fusion, explaining the accumulation of dihydrogen as well as other light elements close to the Earth’s surface found for instance in the Kola peninsula noted by MacDonald in 1988, the findings of water as ice in diamonds coming from deep in the mantle by Tschauner et al 2018, or the fact that one of the main minerals containing lithium, lepidolite, contains as well several atoms of oxygen), but also of course for the permanent dual fission-fusion motor of stars, under a much higher pressure due to the initial mass, which I claim to be constituted solely by heavy atoms, i.e. actinides and, if there are islands of stability, atoms that could be much beyond the actinide class, maybe much more exotic atoms not yet produced in experimental research but that could certainly be confirmed one day, and thus more likely to fission due to their heavy mass (and thus obviously unlikely to remain if these atoms have all fissioned earlier in the Universe's history even though some should remain deep underground and in dwarf stars ; or, better said, in the history of our local area, visible to our instruments, as will be pinpointed at the end of the article). The fusion under intense pressure of ternary fission products, beta minus particles and neutrons produces lighter atoms such as oxygen, carbon, and can very clearly be a better explanation for most massive hydrocarbon deposits than the current model of carboniferous-era remains of vegetals and animals (it is simple to note the proximity of all major coal / oil / gas deposits and significant granitic areas / uranium mining areas – the Arabian Peninsula has a magmatic shield, the tar sands mining areas in Alberta, Utah, Wyoming, Colorado are not far from uranium mining areas, the situation is identical in Russia and Kazakhstan, the old coal resources of Eifel in Germany and St-Etienne in France are in plutonic soils, the hydrocarbons in the Northern Sea are close to the granitic areas of Scotland, same for Norway's hydrocarbons near Stavanger) and the hypothesis that carboniferous era remains of vegetals and animals are linked to hydrocarbons is in the view of the author wrong as a whole especially as other deposits e.g. delta deposits are simply explained through river charring of these hydrocarbons. It explains as well as the emergence of the first resources of water (confirming obviously the old theory of water originating from volcanoes).

2. On stars and planets

Type 1A supernovas are evidence : the passing of a big star close to a very small one mean that the small one will receive much more neutrons as well as hydrogen captured by gravity than it is accustomed to in its internal nuclear equilibrium ; thus it reacts extremely violently, and goes hypercritical. The bright light of Type 1A supernovas confirms that dwarf stars are mostly made of heavy actinides (and the more hypothetical heavy transactinides in case there is one or several islands of stability), but that these dwarf stars failed to light up (to stabilize at criticity) due to insufficient mass and thus did not accumulate the much needed hydrogen moderator and fusion fuel. The amount of unfissioned heavy actinides (and hypothetical transactinides) explains extremely well the powerful light of these supernovas which are highly dominated by fission whereas other supernovas are more equilibrated between fission and fusion (as the internal core made out of actinides / transactinides collides with the outer sphere at detonation, compressing it and fusing it). Pluto is absolutely certainly such a sub-brown dwarf star that has been captured by the Sun (as it is in an orbit that is not parallel to the rest of the Solar System) and which underwent temporary criticality at some point in its life before cooling down, the lightest elements produced through fusion processes, i.e. carbon, hydrogen, ending up at the surface, forming methane ice.

The discovery by Head et al 2011 of an intense volcanism on Mercury also confirms the heavy interaction between solid heavy atoms planetary cores and neutrons from the permanent fission processes in stars. Mars, where iron oxyde is significant, can be opposed to Venus, with a lot of basalt and volcanoes (where the planet seems an immense volcano bubble), and thus Mercury certainly was even more active but has, in a way, “expired” because of too much neutron fallouts from the Sun burning fast its actinides (and, potentially, transactinides in case there is/are island(s) of stability but I would hypothesize that such super heavy atoms with a long half life would also have a very elevated cross section for fission ; in fact it seems likely that they would act as “trigger” for the flaring up of stars[1]).

It is obvious that gas bubbles would not alone survive close to a black hole. A much heavier star core, made with actinides and transuranics beyond the actinide class, would however resist the

[1] One scenario is that these extremely heavy atoms, staying close to the core of the star, would need extremely fast neutrons to have a good cross section yet for these extremely fast neutrons (close to c), their cross sections would be much higher than for lighter atoms. It may even be possible that very few of these super heavy atoms could be still found inside the mantle of Earth and that they have a special contribution to explosive volcanism, for super-eruptions).

permanent attraction of the black hole. The recent discovery of proto stars close to a black hole is an excellent confirmation that stars are not made with light elements but with heavy, radioactive actinides and transuranics beyond the actinide class, compressed up to a permanent fission reactor thanks to the strength of gravity, where complex nuclear reactions create the hydrogen fuel (tritium for instance is an unfrequent fission product from ternary fission) for the parallel nuclear fusion process and the thermalisation of neutrons, whereas gravity also increases pressure and thus reduces critical mass.

Neutrons from fission will themselves decay over a certain time into protons, with a beta minus decay, they are the basic bricks of hydrogen. Ternary fission sometimes produces protons. All of these protons can combine with beta particles from fission products to produce hydrogen. Positrons from the capture of helium-4 nucleii of actinide & transuranic decay and ternary fission products (where lighter elements capturing an alpha particle decay by emitting a positron) are another element as they conjoin with neutrons and beta particles of fission products to create hydrogen. Fission products beta particle decay is crucial and demonstrates here its “usefulness” in the global star cycle. Tritium from ternary fission also is a source for helium-3 which then produces protons through neutron impacts. Fission products and their transmutation are a key in production of other elements together with nuclear fusion of for instance helium-4 from ternary fission products (in combination with the electrons of fission products beta decay). Hence ternary fission is key in providing the usual nuclear fusion cycle with its fuel. I claim that light elements in stars are solely the product of nuclear fission, ternary fission products and radioactive decay, through combinations of the elementary particles in a context of high gravity forces and temperature, and of course slow capture of neutrons, which also contributes obviously to the diversity of heavy elements beyond the iron limit of the Aston curve, from neutron activation of fission products combined with radioactive decay.

Neutron stars are also an excellent way to see the expulsion of all fission product matter outwards in violent hypercriticity events where only neutrons remain at the end, agglomerated and compressed by their own gravity forces.

A thermonuclear reactor at equilibrium is obvious (where the progressive loss of heat & mass leads to decompression and the slowing down of fission and fusion), where interactions with nearby supernovas are a major and essential factor in star divergence onto supernova through intakes of neutrons and other elements (hydrogen and helium for instance) disrupting the internal equilibrium, and “waves of supernovas” from one star to another. These neutrons are major constituents of the masses of accelerated matter that explain gravitational waves (which is also confirmed by the recent confirmation of gravitational waves in association with the collision of neutron stars, likely to expel a lot of neutrons at impact & implosion under themselves). In the collision of black holes as well it is not surprising to see them eject very small particles and not heavy atoms.

3. Supernovas and volcanism

It also appears that supernovas close to Earth like the one giving birth to Barnard’s Loop are linked to supervolcanoes, in this case the Huckleberry Ridge Tuff and Cerro Galan supervolcanos. Neutrons from the Lagoon Nebula may also be linked. It may be possible to envision a better datation by linking Lagoon Nebula initial blast to Barnard’s, which could have happened closer to each other than thought until now, and a method for predicting supervolcanoes from supernovas. The high temperature of stars around SN1987A even more suggests that the dramatic event provided neutrons to the fission core of these stars. The sudden relapse of gravity when a star explodes could act as a propulsive power for its own fission and fusion neutrons, which may gain speed up to close to the speed of light. All the VEI 6 volcanic eruptions in the 20th Century can be linked to supernovas which happened close to Earth in recent times : G1.9+0.3 happened approximatively in 1898 according to recent research and this event can be linked to the Santa Maria (VEI 6) and Montagne Pelée (VEI 4) eruptions of 1902 as well as the beginning of the activity of Novarupta (1912, VEI 6 – Hammer et al 2002 suggest that the build up to that eruption could have been slow) and of the Cerro Azul (1903, which led to a VEI 6 eruption in 1932 after a succession of volcanic events). SN 1987A may be linked to the Pinatubo eruption of 1991 (VEI 6), Hudson in Chile (1991, VEI 5+) as well as Rabaul (1990 - 1995) and Unzen volcanos (1991). For the Samalas supervolcano in 1257 (see Lavigne et al 2013 as well as Oppenheimer 2003), SN1006 could be the ideal explanation (in which the magma would have accumulated during a longer period than usual, leading to a bigger eruption than in the VEI 6 cases discussed above). SN1054 and SN1181, after SN1006, may also have contributed if the Indonesian archipelago was on their side at impact. SN 1604 may be linked to a lengthy accumulation of magma leading to the Mount Tambora supereruption (with the possible supplementary contribution of Cas A), and can even be linked locally to events such as the small volcanic eruptions that actually took place in the granitic – uraniferous-rich Mercantour massif in the French Alps, recorded in 1612 after the disappearance of an entire village (St Jacques) into a crater of “flames” (a plaque still commemorates the event near Valdeblore with the inscription “Hic omnes disparuerunt recquiesant in pace – 1612”) and another lava flow recorded at the same time (in the nearby Cians under the Raton mountain near the Dôme du Barrot) – see Rossi (2017), local historian pointing to this eruption in what is obviously a remain of the Alpine Arc volcanic chain close to the Mediterranean and thus still likely to be water-rich in the underground. SN1604 also coincides with highly destructive eruptions in the Mediterranean area (Vesuvius 1631, Kolumbo (Santorini area) 1650 and Etna 1669). It actually makes sense that light may be refracted and slowed down for instance in the Milky Way because of clouds of refractive materials with no similar effect on fast neutrons so that neutrons come *earlier*, hence linking Type 1a SN1006 with the Mount Baekdu supervolcano in the end of the 10^{th} century (sometimes dated in 946 but with some uncertainty), where the magnitude of a Type 1A supernova explains the magnitude and quickness of development of the event. It is extremely critical to see that the 993-994 14C boost (confirming neutron impact) matches perfectly the timeline of that event. Another more powerful 14C boost in 774 – 775 corresponds with a stellar event noted by Chinese astronomers as “comet crash” or “thunderstorm” according to Chai & Zou 2015 but which ought obviously to be another more powerful supernova leading to more powerful super eruptions. Of course as always it is a precise side of the planet that is blown and thus a cluster of eruptions in a localized area, e.g. one continent, ensue. Spontaneous fission of actinides underground and smaller novas explain less powerful eruptions.

4. Nuclear safety revisited

All the events discussed here have in common that the supercriticity happens in reactors with null or positive void coefficient. Water-moderated reactors are more resistant due to the vaporization of water in case of an increase in the fission rate. The October 1969 accident at St Laurent des Eaux (gas cooled reactor with null void coefficient) was followed by two eruptions in the Northern Atlantic (Hekla in May 1970, Jan Mayen in September 1970). Cosmos 954, a satellite carrying a uranium reactor, exploding above Canada is another example. Its destruction in January 1978 was followed by the eruptions of the Soufrière Hills in 1979 and of the St Helens in 1980. The St Laurent des Eaux (gas cooled reactor with null void coefficient, relatively unstable) 1980 accident was also followed by an eruption of the Hekla in September 1980. Followed another powerful eruption in El Chichon in 1982. The K431 nuclear attack submarine was, according to reports, surfacing and in refueling near Vladivostok at the moment of the blast, and hence unshielded from fast neutrons by layers of water. A bad manipulation in refueling would have officially triggered the supercriticity, nevertheless a simple melting down of the core could have been expected, yet the supercriticity was explosive. Its explosion matches the beginning of volcanic activity in the Nevado del Ruiz (September 1985) and more eruptions in Alaska and Kamtchatka in the following years (Mount Augustine and Chikurachki 1986, Kliuchevskoï 1987, Mount Redoubt 1989-1990) ; it is obvious that as in the earlier cases a wave of relativistic neutrons obviously came on August 10 and destroyed the K431 reactor. The K431 was a fast neutron reactor (with lead bismuth coolant), which together with its surfacing explains the isolated nature of the event in relation to a very small event. For the K431 and the wave of eruptions in Alaska and Kamtchatka neutrons from SN1987A coming before the light of the supernova (due to refractive material slowing photons) are the possible cause esp. as the cluster of volcanic eruptions is stronger – together with the eruptions of the Kelud, Pinatubo and Hudson in 1991 – the more powerful eruptions taking more time to develop in a relative silence, underground except in particular cases such as the immediate presence of water in phreato-magmatic eruptions (Krakatoa 1883 for instance) improving immediately moderation of the neutrons.

5. Giant dipole resonance fission

The cross section for fission at very elevated neutron speeds of all actinides including 238U, 232Th are rising due to second-chance fission, i.e. (n, 2nf), third-chance fission, etc. and giant dipole resonance. Tarrio et al (2011) allow to suggest that even lead, bismuth will fission at high neutrons speeds and there are certainly more stable heavy atoms that can fission with even faster neutrons. The author has observed such a phenomenon in lead paint as he felt a neutron strike in his body on Sept 24, 2018, in the first hours after midnight French time, and saw, *minutes* after that, while looking (in a dark room) at the area painted with that lead paint, the emergence of a few small bubbles of *green* light that quasi immediately disappeared while propelling smaller white sparks that all ricocheted around in a circle, with more or less the same angular momentum for all sparks, making the author claim it is a clear sight of lead fission with the Compton effect following. The green light can be explained with a change in the dominant wavelenght of the photons produced because the high oscillation of the fission products blocks all light (produced in the scission area, in between the two fission products) that is *outside the center of the visible spectrum*. The traditional image of the "black sun" represents obviously historical representations of a phenomenon that is not so unfrequent in nature for people living in caverns where lead is present (in the Scandinavian Alps)[2]. The giant dipole resonance causing fission in lead certainly is a phenomenon with a long metastable state (lasting minutes) before destabilization and fission. It is what has been observed here. This phenomenon can also be confirmed by looking at e.g. yttriaite crystals in tungsten (Mills et al 2011) that indicate fission with relativistic neutrons and the perfect slicing of tungsten producing Y2O3 crystals and other craters in native heavy metals (iridium, gold, platinum etc).

It is anyway obvious that the impact of a significant neutron wave will result in the destruction of all working nuclear reactors in a wide area. The last powerful supernova dates back the 17th century. Nuclear reactors can be expected to be destroyed by the impact, not simply molten down, and the catastrophe should happen simultaneously in reactors on a wide area, e.g. continent-wide.

Such waves cannot be predicted. Clouds of dark matter may make it for instance impossible to see dwarf stars that are in the path of giant red stars, and Type 1A are the most neutron-rich supernovas. It is impossible to shield completely nuclear reactors but building very large pools of water above and on top of current nuclear plants could be a partial remedy, yet the structure must be solid enough to avoid any chance of an explosion bringing flows of water on a molten nuclear core. It is a

[2] In popular culture, the *pokemon* Spiritomb also closely idealizes such a rotating effect with a green bubble in the center and the designers explain that « this Pokemon appears in fissures of caverns », it typically is another representation of that giant dipole resonance fission of lead

good for a bad. The alternative would be to use dihydrogen tanks all around confinement areas, with the obvious fire risk and the clear target it represents for terrorism, yet that light gas ought not to enter in contact with the core in case the confinement is broken by a blast and the moderating effect on neutrons would be much more limited. In future times all new nuclear plants should be built deep underground and all employees should control the plant from a significant distance, allowing that any explosion of the plant be solely an underground earthquake without any human casualty (and the author of the paper campaigns for the generalization of subcritical designs, cooled with helium, using 238U and its decay products, i.e. mine tailings, for instance 234U). The costs for building underground plants will be significant, reducing the competitiveness of nuclear energy. States using nuclear energy for e.g. aircraft carriers should look for alternatives, and the same comment applies for space missions with onboard nuclear reactors. The massive spreading of such underground nuclear reactors would still represent a danger in case an extremely powerful supernova was to happen very close to us, even though this is much less significant and solely economic if the plants are fully robotized. The use of subcritical technology in combination with its burying deep underground (one kilometer at least) would allow for an extremely good level of safety.

6. Black holes, their eruptions, the cradle of stars and planets, and the explanation for volcano hot spots

The "bursts" leading to the formation of stars in "waves" (Beccari et al 2017) can be easily explained by waves of what I call *black hole eruptions.* Black holes are the obvious place for the formation of heavy atoms in high volume. It is the sole place where it can be expected that forces are concentrated enough to conflate particles into i.e. uranium and even heavier atoms. The accumulation of energy in black holes cannot and never will be infinite even though it is on human time scales. Planck's temperature leads to this conclusion and the jets of plasma flowing out of black holes are already very well known. Findings of proto-stars close to black holes, as noted in the beginning of this article, and of formation of stars in "bursts" in a nebula known for its black hole (where another black hole is very likely to be expected right at the center of the "three cities" of stars), leads to these black hole eruptions, i.e. the rapid propulsion of fresh "blocks" of very heavy atoms (which can be suggested to be far away from the known end of the periodic table of elements, even with all experimentally known exotic atoms included ; many of these heavy atoms can be expected to have super high cross sections for fission and would certainly contribute very much to the flaring up of whole proto stars (i.e. the beginning of life of stars) if they are part of islands of stability). Black holes are in a metastable state because of the huge amounts of energy captured by atoms very far at the end of the Aston curve. It is very easy to suggest that the so-called Big Bang was solely a massive burst from a super giant black hole that could still be at the center of the known universe, that the cycle of atoms in space has no beginning and end and that space is infinite (which is an hypothesis of common sense and can simply be explained by black matter in the path making it impossible to see too far ; for instance, if the supermassive black hole was in a giant nebula, the energy of the eruption could have pushed away that cloud which would thus be the main barrier for light from outer systems of stars and black holes).

Micro black holes also sit *inside* stars and all planets and explain the volcanic hot spot dynamics as black hole eruptions of lesser power (these tiny black holes inject "bubbles" of heavy atoms into the inner core) here explain the occurrence of flood volcanism through the very rapid rejection of matter that accumulated and fused over millions of years inside these black holes, again as actinides and possible transactinides prompting a quick chain reaction from the very core of the Earth and producing the heavy amounts of magma leading to flood basalt provinces.

For stars, the hypothesis of a black hole at the center provides the ideal explanation for the black hole that is found after very powerful supernovas. This black hole is not produced by the supernova. The very high yield simply means that all atoms fission and that neutrons as well are expelled. The black hole was already inside before. There is in fact no process explaining rationally the formation of a black hole. Black holes are part of space, they agglomerate matter (inside, and when too much elements are attracted onto a too small black hole, the matter coagulates around as in a very strong bottleneck leading to the formation of a proto star). In a supernova of a lesser yield (or with higher magnitude of light as there is a lot of energy from fission but few light atoms to fusion, in a young instable star, leading to a lesser explosive power) the power is not enough to expel many neutrons that will form such a bottleneck, i.e. neutron star. The progressive attraction of atoms from the inner core of the object in the black hole leads to the periodic bubbling of heavy atoms. It is a periodic process. There is, on Earth, a minimal threshold before the beginning of a new hot spot. In stars where much more elements are agitated continuously and the rhythm of exchanges between the bottleneck and the black hole is obviously of rates of vast magnitudes above what happens in planets, the rhythm of eruptions will also be higher, which can be confirmed through the known phenomenon of eruptive variable stars.

As it is obvious that telluric stars simply are very small proto stars which have not received enough neutrons to become critical, it is also obvious they simply have a black hole of smaller size in their core and the hot spot processes on Earth and on Mars are an excellent proof for the eruption of these black holes. Simply, the bottleneck will not be fully stable, the inner core is slowly sucked in the black hole and when enough matter has been captured for the black hole to go out of its metastable state, an eruption happens bringing newly formed heavy atoms into the bottleneck, increasing pressure, producing of course strong nuclear fission supercriticities and bringing that matter up to the less dense areas, as the beginning of a hot spot. Indium is a very rare element on Earth that is found mostly in granitic areas ; this is another proof since granite is linked to hot spot volcanism that cannot involve big amounts of water (at extreme depths) and indium is not produced in high amounts when the neutrons are thermalized. Indium is very frequently found together with tin in granite and tin is also a very unfrequent stable daughter of fission products unless the neutrons are not thermalized. It demonstrates that nuclear fission happens, in hot spots, at very high depths close to the “bottleneck area” under the sole high pressure of bubbles of heavy atoms coming unfrequently from the nano black hole in the center of Earth. “Ice volcanoes” on Pluto are certainly powered as well by the inner black hole of the sub-brown dwarf star, as the pressure produced by bubbles of heavy atoms from the black hole clearly produces small chain reactions and concurrent fusion processes, the produces of which are the lightest part of the magma – hence coming out more easily.

The presence of a “giant ocean” or its remnants in telluric planets (Oceanus Procellarum, the biggest plane on the Moon, the Pacific Ocean for the Earth, the Northern Lowlands for Mars, and the very big sea of ice methane on Pluto are excellent examples) is another excellent demonstration of the existence of a black hole in the center of these planetary objects. When the *outer* parts of the inside of the black hole are expelled by the eruption of energy accumulated from the supercriticity in the inner core of the black hole, they escape with the form of portions of a hollow sphere (as with the small incurved portions of an egg broken from the inside by an emerging chick – one can think of parabolic antennas) the portions all have a small extract of the black hole retained with them in the inside – so a very brutal and extremely rapid (maybe too fast for the eye) *wrapping event* happens :

1. All the atoms liberated from the black hole expand to take their full space, allowing void to occupy ~99% of the volume

2. So a “slingshot effect” around the small black hole inside the cavity means that the exterior areas of the piece collide together and a vast number of fissions and fusions happen. It is clearly the event that will light up the star if powerful enough.

In telluric planets, the “giant ocean” is the remain of that fission & fusion event, it is always circular before continental drift changes too much its shape as on Mercury and Venus where the more acute neutron flux from the Sun accelerated magmatism, as noted earlier. We can expect the exact same phenomenon on each planet containing a black hole in its core.

Another proof is, for some small satellites, the ridge that is very easy to see, on Iapetus for instance in the middle of the giant "sea". It proves definitively the "closure event" which is particularly obvious with the "walnut shape" of Iapetus. These are minor pieces with either a very tiny black hole inside (so far no volcanism is known on Iapetus but the number of craters suggests there could be some minor volcanism) or (hypothesis most likely for even smaller objects like Pandora, Pan, Prometheus, Atlas which have even more the shape of a "flying saucer" and no apparent crater) none at all. So the black hole from which the small piece was expelled hinders the wrapping event and the extremities (the "flaps") of the piece (shard) propelled out of the black hole are not perfectly brought together, there is a ridge that remains because of the exterior attraction forces and lack of inward attraction forces (a too small black hole inside means that centrifuge forces are dominating over centripete forces) : the flaps do not swing back around the center perfectly and the pressure at impact is more limited, explaining the ridge remaining on these objects.

Gas giants can be simply seen as star cores which have underwent criticity but were not massive enough to stay critical. They must come from shards bigger than those leading to telluric planets, but smaller than those of actual stars. The heavy atoms subsided, gases from ternary fission products and their interaction with other particles and neutrons such as hydrogen and helium are at the periphery.

It is simple to suggest that the relatively powerful closure event led to the satellisation of some of the matter fused at the closure point, a simple way to explain the formation of rings around such giant gaseous planets. For the Sun, a much more powerful closure event certainly created Kuiper’s Belt and explains why chondrites are iron-rich.

The ridge on Iapetus is covered by light hydrocarbons (Cruikshank et al 2008) and Saturn's rings are composed mostly of ice water and amorphous carbon (Poulet and Cuzzi 2002) whereas chondrites are mostly made of silicates and other elements up to iron and nickel, confirming extremely clearly the more important intensity of the fusion event for a more massive shard leading to a fully critical star satellising lots of fused matter at the moment of the impact of the closure of the shard. Yet the fusion happened outside of a black hole and could not overcome the limit set by the high stability of the iron atom, unlike the processes in black holes described in this paper.

The so called metastable state in black holes can be expected to end through slow chain reactions starting in the very core of the hole ; it can be expected to happen solely with heavy atoms that have a good cross section for *almost absolutely inert neutrons* – so this should certainly explain the natural rarity of 235U as opposed to 238U, for instance. 235U, 239Pu etc. can be expected to be produced in vast amounts in black holes ; there is no reason why the random processes of nucleosynthesis in black holes would give birth to so much 238U and so few 235U ; yet if some neutron manages to become a free radical in the compressed "magma" of atoms of the central part of the black hole, that neutron can be expected to travel *extremely slowly* and subsequent fission neutrons will also be slowed down almost infinitely by the extremely intense pressure so this presents a simple basic explanation of the 235U/238U ratio found usually on Earth in spite of the constant regeneration of actinides by the black hole at the center of Earth and subsequent hot spot geodynamism.

67. Gravity forces and the graviton / antigraviton couple

It is, lastly, obvious that gravity is only dependent on the presence of a black hole inside stars and planets, i.e. that gravity is a black-hole dependent phenomenon. This is the simple epistemological conclusion of the research, easily demonstrated with the absence of gravity on comets and asteroids. It is also inviting for what concerns research on a possible graviton ; the simplest hypothesis in the view of the author is to envision the graviton as a particle present together with all atoms in matter outside black holes and attracted by antigravitons produced exclusively in black holes during the abovementioned nucleosynthesis of heavy atoms, and partially expelled, by supercriticities, inside the smaller black holes of the shards ; strong attraction *inbetween antigravitons* in addition to the mutual attraction of gravitons and antigravitons (whereas of course there is no attraction between gravitons) is also a simple explanation for the consistency and permanence of black holes and for the tendency of black holes to collide ; it can here be expected that antigravitons turn into gravitons when expelled out of a black hole in the shards thanks to the release of pressure (high intensities of pressure together with heat can be seen crucially as the condition for a graviton to be turned into an antigraviton, which is simply another way of stating that strong attraction inbetween antigravitons is key in the consistency and permanence of black holes). At the expulsion, the antigravitons that are most separated from the cluster are set free from the minimum level of pressure required for them to be attracted by each other, and become gravitons. The pressure forms quasi-unbreakable links between gravitons as they become antigravitons. In shards, the presence of many atoms close to the antigraviton cluster is enough to keep fueling the antigraviton production process and to ensure a good binding of the outer layers of matter (the "slingshot effect") around it (it is obvious that a lot of the matter that erupts from the main black hole and whose antigravitons turn into gravitons is immediately sucked back into the smaller black hole of the shard).

The model, together with black hole eruptions for instance, can be even confirmed through historical events reported in the New Testament through a romanticized approach : the "crown of stars in the sky" - which simply is the obvious crown of the Pleiads, which can be seen gravitating around a spinning black hole, the product of a recent black hole eruption. Flying matter from that eruption obviously led stars closer to us, in the path, to increase activity : these stars are found in the Taurus and form more or less the shape of a human body. It is obvious that this was watched by many and led to apocalyptical descriptions in religious texts. The more traditional representations of the Virgin Mary show her with a crown of stars that is not circular but ovoid, her head (A^1-Tau) bowing down “in prayers” to collate with the “aureola” (Ain is a shoulder, O^2-Ori a foot, ν-Tau the other foot, Aldebaran the pelvis and the stars forming a triangle (Ain included) the body, λ-Tau a hand, τ-Tau the other hand). It describes the stars around the spinning black hole in a way closer to reality.

In a black hole eruption the pieces of matter ejected can be much smaller than satellites. The form of Ultima Thule simply shows an atom in the process of fission that was ejected before the end of the scission. It is a direct confirmation of the production of extremely heavy atoms in a black hole – it is obvious that as the atom is “extracted” the particles dissolve and form lighter atoms, but the still strong closeness will mean that the first stable setups for these particles will be extremely heavy transuranics. The asymettry of Ultima Thule confirms fission with very slow neutrons (one side of Ultima Thule is smaller than the other) in black hole eruptions, exactly as predicted in the model. Such atoms can be ejected very fast and will tend to conserve some antigravitons in a small cluster self-regenerating thanks to a “supercavitating effect” - as the piece flies extremely fast some atoms are pushed into the antigraviton cluster, and as they fuse in it they produce some antigravitons which replace the antigravitons lost as the contact of the matter of the object. This explains why fireballs (bolides), unlike meteors made of rocks, have a systematic tendency to aim at particular areas with a high density of matter : castles, geothermal areas with a dense magma pocket active below, dense industrial areas for instance (the area of Krasnoyarsk presents both a geothermal pocket and heavy industries, it attracted the object of the Tunguska event that confirms the huge content of heavy actinids of fireballs with a megatonic nuclear explosion[3], and the 2013 Cheliabinsk event is another example, the flash in the sky confirming as well fission, this time before contact with the soil, because of solar neutrons as it happened during daytime). The typical scission of fireballs at the end of their path (observed on the ground) can be related to the shape of Ultima Thule and to the idea that the supercavitating fireballs are atoms that were interrupted in their fission by the strength of the black hole eruption, keeping this atypical bi-hemispheric shape. It is simple to predict that these fireballs are constituted of extremely heavy actinids with a high cross section for fission and long half-life : in the line of known exotic atoms curium-247 fits the pattern but heavier atoms, unknown of the researchers on exotic atoms, might be also certainly a very strong option. The combination of the two points : scission at the end under the corroding forces of the atmosphere, and the actinide content, leads to a simple rational explanation for the destruction of the twin cities of Sodom and Gomorrha in the Ancient Testament.

Conclusion

There is no way gravitational waves could be predicted, in the future, with full certainty. Computation may lead to successful experiments yet it is impossible to claim we will have models good enough to ensure 100% confidence in the fact nuclear power plants could be shut down at the exact periods where neutron impacts have to happen. There will be always a risk, especially because of black matter and the limits it imposes on space imagery and monitoring. The option quickly drafted in this paper (deeply buried underground subcritical designs) is much safer for

[3] In this case alpha radiation against light atoms from the ground certainly was the trigger at impact for the supercriticity from compression of the bolide.

future times to come and would allow still to use depleted uranium, transuranics and uranium mine tailings as energy source so as to eliminate the need for uranium mining and for the long term underground stockpiling of waste in closed repositories – already existing tunnels could even be recycled for the installation of such subcritical designs deep underground, at 500 meters depth in Onkalo for instance, with a large amount of biomass on top of the tunnel to complete the anti neutron bunker.[4]

Humans nevertheless should take into account fireballs and consider again the heavy developments that the current shape of the economic and military organization has produced.

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Bibliography :

The Hamburg/ESO R-process Enhanced Star survey (HERES) XI (2017). The highly r-process-enhanced star CS 29497-004, V. Hill, N. Christlieb, T. C. Beers, P. S. Barklem, K.-L. Kratz, B. Nordström, B. Pfeiffer and K. Farouqi, 2017, Astronomy and Astrophysics 607, A91 https://www.aanda.org/articles/aa/pdf/forth/aa29092-16.pdf last accessed 13-02-2018

First stars – XV. Third-peak *r*-process element and actinide abundances in the uranium-rich star CS31082-001, B. Barbuy, M. Spite, V. Hill, F. Primas, B. Plez, R. Cayrel, F. Spite, S. Wanajo, C.

[4] As regards coolant the author never supports sodium for obvious reasons of security and would recommend helium for an efficient and extremely safe DU-burner subcritical design

Siqueira Mello Jr., J. Andersen, B. Nordström, T. C. Beers, P. Bonifacio, P. François and P. Molaro, 2011, Astronomy and Astrophysics 534, A60 https://www.aanda.org/articles/aa/abs/2011/10/aa17450-11/aa17450-11.html last accessed 13-02-2018

Emission of bromine and iodine from Mount Etna volcano, A. Aiuppa, C. Federico, A. Franco, G. Giudice, S. Gurrieri, S. Inguaggiato, M. Liuzzo, A. J. S. McGonigle, M. Valenza, 2005, Geochemistry. Geophysics. Geosystems, 6, Q08008.

Neutrino Geophysics at Baksan: On Searches for Antineutrinos and Radiogenic-Heat Sources in the Interior of the Earth, G. V. Domogatsky, V.I.Kopeikin, L.A.Mikaelyan, and V.V.Sinev, 2004, Physics of Atomic Nucleii, 69, 1 https://link.springer.com/article/10.1134/S1063778806010078 last accessed 13-02-2018

The feasibility and implications of nuclear georeactors in Earth's core–mantle boundary region, R.J. de Meijer and W. van Westrenen, 2008, South African Journal of Science 104 https://research.vu.nl/ws/files/2327569/211497.pdf last accessed 13-02-2018

Major Questions About Deep Continental Structures. G.J. MacDonald. In A. Bodén and K.G. Eriksson. Deep drilling in crystalline bedrock, v. 1. 2008 Springer-Verlag

Ice-VII inclusions in diamonds: Evidence for aqueous fluid in Earth's deep mantle. O. Tschauner, S. Huang, E. Greenberg, V. B. Prakapenka, C. Ma, G. R. Rossman, A. H. Shen, D. Zhang, M. Newville, A. Lanzirotti, K. Tait, 2018, Science, 369, 6380

Measurement of radioactivity in mount st. helens volcanic ash by x/γ ray spectrometry, M. G. Strauss, I. S. Sherman, R. H. Pehl, 1981, IEEE Transactions in Nuclear Science, 28, 1 http://ieeexplore.ieee.org/document/4331173/ last accessed 13-02-2018

U-series isotopic signatures of soils and headwater streams in a semi-arid complex volcanic terrain, D. Huckle, L. Ma, J. McIntosh, A. Vázquez-Ortega, C. Rasmussen, J. Chorover, 2015, Chemical Geology, 4, 3 https://arizona.pure.elsevier.com/en/publications/u-series-isotopic-signatures-of-soils-and-headwater-streams-in-a- last accessed 13-02-2018

Lead isotope systematics and uranium depletion in the granite mountains, Wyoming, J. N. Rosholt, R. E. Zartman, I. T. Nkomo, 1973, GSA Bulletin, 84, 3 *https://pubs.geoscienceworld.org/gsa/gsabulletin/article-abstract/84/3/989/201380/lead-isotope-systematics-and-uranium-depletion-in?redirectedFrom=fulltext last accessed 13-02-2018*

Magma storage prior to the 1912 eruption at Novarupta, Alaska, J. Hammer, M. J. Rutherford, W. Hidreth, 2002, Contributions to Mineralogy and Petrology, 144, 2 http://www.soest.hawaii.edu/GG/FACULTY/JHAMMER/documents/Hammer_CMP_2002.pdf last accessed 13-02-2018

Source of the great A.D. 1257 mystery eruption unveiled, Samalas volcano, Rinjani Volcanic Complex, Indonesia, F. Lavigne, J-P Degeai, J-C Komorowski, S. Guillet, V. Robert, P. Lahitte, C. Oppenheimer, M. Stoffel, C. M. Vidal, Surono, I. Pratomo, P. Wassmer, I. Hajdas, D. S. Hadmoko,

E. de Belizal, 2013, Proceedings of the National Academy of Sciences, 110, 42 https://www.ncbi.nlm.nih.gov/pubmed/24082132 last accessed 13-02-2018

Ice core and palaeoclimatic evidence for the timing and nature of the great mid-13th century volcanic eruption, C. Oppenheimer, 2003, International Journal of Climatology, 23, 4 http://onlinelibrary.wiley.com/doi/10.1002/joc.891/abstract last accessed 13-02-2018

Observation of Gravitational Waves from a Binary Black Hole Merger, B. P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), 2016, Physical Review Letters 116, 6 https://physics.aps.org/featured-article-pdf/10.1103/PhysRevLett.116.061102 last accessed 13-02-2018

Légendes et chroniques insolites des Alpes-Maritimes, Edmond Rossi, 2017, Editions des Régionalismes

Flood volcanism in the northern high latitudes of Mercury revealed by MESSENGER, J W Head, C F Chapman, R G Strom, C I Fassett, B W Denevi, D T Blewett, C M Ernst, T R Watters, S C Solomon, S L Murchie, L M Prockter, N L Chabot, J J Gillis-Davis, J L Whitten, T A Goudge, D M Baker, D M Hurwitz, L R Ostrach, Z Xiao, W J Merline, L Kerber, J L Disckon, J Oberst, P K Byrne, C Klimczak, L R Nittler, 2011, Science, 333, 6051 https://www.ncbi.nlm.nih.gov/pubmed/21960625 last accessed 13-02-2018

Deep-Earth reactor: Nuclear fission, helium, and the geomagnetic field, D. F. Hollenbach and J. M. Herndon, 2001, Proceedings of the National Academy of Sciences USA, 98, 20 http://www.pnas.org/content/98/20/11085.full last accessed 13-02-2018

High-energy Neutron-induced Fission Cross Sections of Natural Lead and Bismuth-209. D. Tarrio et al., 2011, Journal of the Korean Physical Society, 59, 2 http://hal.in2p3.fr/in2p3-00656399/ last accessed 13-02-2018

"Searching for events in Chinese ancient records to explain the increase in ^{14}C from 774–775 CE and 993–994 AD". Ya-Ting Chai & Yuan-Chuan Zou, 2015, Research in Astronomy and Astrophysics, 15, 9.

Yttriaite-(Y): The natural occurrence of Y_(2)O_(3) from the Bol'shaya Pol'ya River, Subpolar Urals, Russia. Stuart J. Mills, Pavel M. Kartashov, Chi Ma, George R. Rossman, Margarita I. Novgorodova, Anthony R. Kampf, Matti Raudsepp, American Mineralogist, 96 (7), 2011. pp. 1166-1170

A Tale of Three Cities: OmegaCAM discovers multiple sequences in the color-magnitude diagram of the Orion Nebula Cluster, G. Beccari, M.G. Petr-Gotzens, H.M.J. Boffin, M. Romaniello, D. Fedele, G. Carraro, G. De Marchi, W.-J. de Wit, J.E. Drew, V.M. Kalari, C.F. Manara, E.L. Martin, S. Mieske, N. Panagia, L. Testi, J.S. Vink, J.R. Walsh, N.J. Wright, 2017, Astronomy and Astrophysics 604, A22

Hydrocarbons on Saturn's satellites Iapetus and Phoebe, D. P. Cruikshank et al, 2008, Icarus, 193, 2.

The Composition of Saturn's Rings, F. Poulet, J. N. Cuzzi, 2002, Icarus, 160, 2.