

Jupiter - Solid or Gaseous? Ask Juno © John Ackerman 10/2015

If no use is made of the writings of past ages, the world must remain always in the infancy of knowledge. Marcus Tullius Cicero

Abstract

Deuterium enhancements of 10^{10} in LDNs and heavy elements detected by Galileo (C, O, S, Ar, Kr and Xe) suggest the giant planets accreted slow and cold from snowflakes and dust at their current orbits, forming frozen highly deuterated Methane Gas Hydrate ($d=0.7$) bodies, together comprising >250 earth masses of water. Jupiter incorporated most of the heavy elements in the nascent solar system as dust ($d=1.33$). A recent (6,000 BP) high energy impact on highly deuterated Jupiter triggered a massive nuclear fusion explosion which ejected the Galilean moons and initiated a flaming plume originally extending 2×10^6 km, beyond Callisto. The rapidly rotating plume slowly diminished over ~ 5000 years, resulting in the differences in the Galilean moons. The fusion reaction has diminished to $D+p \rightarrow {}^3\text{He}^+ + \gamma$, but is still producing Jupiter's atmospheric temperature excess and driving the multiple zonal wind bands. A powerful vortex of hot gases rising ~ 700 km from the fusion site is swept westward $\sim 116,000$ km beneath the surface clouds due to Jupiter's rapid rotation, culminating in the Great Red Spot (GRS), from which a continuous blizzard of high energy ${}^3\text{He}^+$ ions, with half-lives of 400 years, are ejected into space. The GRS is the source of the high energy ${}^3\text{He}^+$ ions sensed by Ulysses, Cassini and Galileo at 4AU, synched with Jupiter's rotation period. The Juno MicroWave Radiometer (MWR) system has a good chance to detect the hot vortex extending from the fusion reaction westward to the Great Red Spot, $\sim 22^\circ\text{S}$ latitude, due to its large longitudinal extent. The Juno Radio Science (gravity) experiment should detect the very large basin or flooded palimpsest surrounding the fusion impact site and also east-west ice mountain ranges paralleling the vortex due to the raining out of water as it rises, expands and cools.

Introduction

This paper proposes that Jupiter and Saturn are solid, frozen, Methane Gas Hydrate (MGH) planets which do not reflect the solar composition. The only hydrogen and helium present in their atmospheres today is that which has been continually released from the MGH surface in the last 6,000 years. The MGH formed as the pressure within the accreting planets increased in the presence of ample methane (Figure 1). Laboratory analyses reveal that a dozen or more water molecules form rigid cage-like Type I structures. Each cage typically encapsulates a methane molecule, but can contain other foreign molecules or atoms. Type II cages are larger and can contain larger atoms or compounds, including Ar, Kr and Xe. The two types are usually intermixed. The nominal composition is $(\text{CH}_4)_8(\text{H}_2\text{O})_{46}$, with an average density of 0.9 g/cm^3 , usually has ${}^{13}\text{C}$ slightly enhanced.

Tests have shown that MGH is two orders of magnitude stronger than water ice at 208 K, and the difference increases with decreasing temperature.¹ This strength is further enhanced in highly deuterated MGH.

Giant Planet Formation

Infrared studies of proto-stars and Large Dark Nebulae (LDN 1689N)^{2, 3} noted a 10^{10} enhancement of deuterium fractionation in NH_3 molecules in their outer reaches, suggesting that: (a.) the proto-Sun formed from clouds enhanced in deuterium; (b.) as it contracted and spun-up it acted as a centrifuge, preferentially ejecting heavy elements, including deuterium, into the planetary disk; c.) heavily deuterated ices of volatile molecules (H_2O , NH_3 , CO_2 and CH_4)

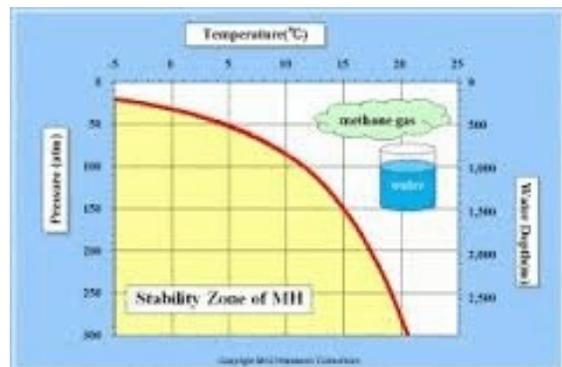


Figure 1 Nominal Phase diagram for Methane Gas Hydrate

formed on small dust grains or nanoparticles⁴ at the 'snow line', the orbit of Jupiter, and accretion began at the smallest scale by the cohesion of snowflakes, further enhancing deuterium fractionation; (d.) by this symbiotic process, Jupiter accreted essentially all of the heavy elements in the nascent solar system within its heavily deuterated Methane Gas Hydrate structure, resulting in its average density of 1.33, versus Saturn's density 0.7, closer to pure MGH.

Due to their large orbital radii and periods, the giant planets formed slowly, therefore cold, over long time spans, perhaps 50 to 400 million years.⁵ An abundance of methane and the increasing internal pressure during accretion resulted in the ideal conditions under which MGH formed. With the exception of a relatively small core, the full spectrum of heavy elements, in nucleogenesis proportions, became evenly distributed throughout the bulk of Jupiter. Cold hydration made possible the incorporation of the noble gases argon, krypton, and xenon which have been detected by the Galileo atmospheric probe.⁶

The most abundant volatile molecules (H₂O, NH₃, CO₂ and CH₄) not accreted in Jupiter, continued outward and formed Saturn and the other giants. Primordial hydrogen and helium not captured in hydrates escaped from the solar system in approximately one million years as observed in very young systems.

Giant Elemental Abundances

The MGH hypothesis suggests that Jupiter and Saturn together comprise **>250 Earth-masses** of water. This explains the origin of all the satellites and ring around the giant planets. They are due to impacts which eject material, primarily water into the surrounding space.

In contrast, the 'gas giant' hypothesis suggests Jupiter and Saturn are 90 % H and 10 % He, precluding significant water in 93% of the solar system mass, at the same time failing to explain the origin of the icy satellites and rings and the enhanced oxygen, carbon, sulphur and nitrogen detected by the Galileo atmospheric probe.

The Impact

Prior to 6,000 years BP, Jupiter was a beautiful blue giant, similar to Uranus and Neptune. Ancient texts reveal that at that date, a body impacted Jupiter, triggering events which are still producing the complex features observed today. The initial energy of the impact was described in the earliest Greek texts as Zeus having such a headache that he had Hephaestus split open his head, resulting in the birth of Pallas Athene and that the entire Earth 'cried out', suggesting an incredible impulse of gravitational radiation, since no sound could have propagated through 600 million km of empty space. As a result, everyone on the Earth witnessed the explosion.

The impact instantaneously compressed and raised the temperature of the highly deuterated, closely packed MGH (or MGD) in the impact basin above 100 million K, triggering an inconceivably energetic nuclear fusion explosion which expanded the atmosphere tenfold. Four large masses of heavy elements ejected with less than Jupiter's escape velocity formed the proto-Galilean moons, which quickly entered their current resonant orbits.

The Jupiter Plume

The impact initiated a huge steady-state fusion reaction on the surface of Jupiter, resulting in a wide plume of flaming gases that shot into space two million km from the impact site at 22° South latitude. This was so bright and extensive that it was observed by every person on Earth at the date as shown in Figure 2. It was imagined to be Zeus' *aegis*, a divine shield, because it moved back and forth as in conflict due to Jupiter's rapid rotation. More appropriately *aegis*, literally means a 'violent windstorm'.

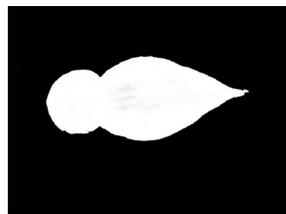


Figure 2 Zeus' *aegis*, Jupiter veil, Mrttanda

In Roman myth, Jupiter was said to have drawn around himself a 'veil of clouds' to hide his mischief but Juno, his wife, was able to look into the clouds and reveal his true nature. This

obviously referred to the plume which was visible to the naked eye on Earth for thousands of years, not as imagined by the Juno mission designers, the few clouds currently present in Jupiter's atmosphere.

The Rg Veda describes the impact on Dyaus-pitar, the heaven father, as caused by his invisible 'Maya', out of which Aditi (The First) was born. The fiery plume "left behind" was described as an elephant (*Mrttanda*)⁷ - a description of the enormously expanded Jupiter and plume as its head, with the tip of the plume representing the elephant's trunk. This interpretation is also corroborated by a statement that the elephant would keep "disappearing and reappearing", suggesting the appearance of the elephant's 'trunk' was due to the rotation of Jupiter every eight or nine hours as in the case of the Zeus' shield.

Much more recent historical

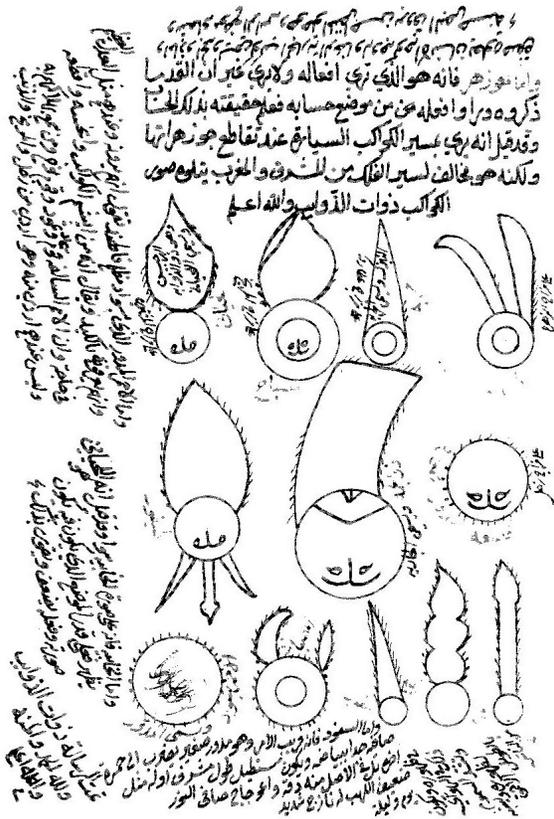


Figure 3 9th century AD Arab epistle on planets. Upper left drawing "one with a forelock" "Long Bearded" "with the temperament of Jupiter"

corroboration of the Jupiter plume appears in a drawing of the shapes of the planets in a 9th century Arabic epistle from Baghdad (Figure 3)⁸, which shows its extent at that date to be ~4xR_J relative to the *apparent* size of Jupiter.

The fact that the Jupiter disk was discernable implies that the atmosphere was still greatly expanded, even at that late date, emphasizing the slow multi-millennial decline of the plume.

For almost six thousand years, the plume hurled an immeasurable mass of ejecta into the inner and outer solar system over a wide range of inclined orbits. The ejected gas condensed and froze as it expanded in the weightless environment, forming innumerable dark, porous, low density bodies incorporating the full nucleogenesis spectrum of elements, which 'splatted' at low velocities forming asteroids resembling 'comet' 67P C-G.

The orbits of these bodies were determined by the vector sum of the plume ejection velocity at Jupiter latitude (-22°), spin and orbital velocity of Jupiter, the sum of which was 30 km/s as compared to the present escape velocity of 11 km/s. During each 7 to 9.9 hour rotation, asteroids were dispersed into all parts of the solar system, including the Kuiper Belt, Oort cloud and toward the Sun. In its earliest stages the plume could have formed relatively large bodies such as Pluto. Recent impacts of many asteroids is a

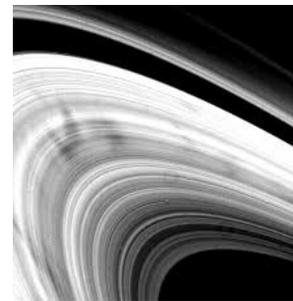


Figure 4 Spokes on Saturn's rings

possible explanation for the formation of its satellites and short-lived rings of Saturn. Spokes, photographed on Saturn's rings by Voyager and Cassini show the effect of dispersed masses of ejecta from recent impacts on Saturn. (Figure 4).

The Galilean Moons

The fusion plume originally (6000 BP) extended as far as Callisto's orbit (Figure 5). It originated at 22° South Latitude, but due to its great width and the rapid spin of the planet, it still enveloped each of the three

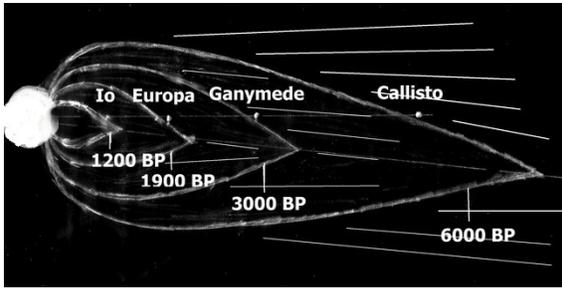


Figure 5 Jupiter flaming fusion plume outlined at dates BP relative to Galilean moon orbits. Straight lines represent icy bodies formed from the plume as it cooled.

inner moons with every rotation of Jupiter for thousands of years. As the flaming plume gradually declined, it first failed to envelope Callisto, but the solidified bodies from the plume still pummeled the outer moon for thousands of years, leaving an icy surface full of impact craters. A dozen crater chains, or catenae, with raised rims, have been identified on Callisto, not associated with any major impact crater.⁹

Several millennia later (3000 BP) it failed to reach Ganymede, but had spent that additional time enveloping, coating and heating it, so a larger core of heavy elements accumulated before the water, and later icy bodies, could condense on its surface. Although a thin icy layer finally accumulated on Ganymede, the temperature was still so high that the craters, including catenae, due to later impacting frozen plume bodies



Figure 6 The differences in the Galilean Moons produced by the timing of the vast fiery plume's slow decline.

slumped, many forming palimpsests - round, completely flat circles. Bands of molecular oxygen have been found imbedded in the trailing hemisphere, that was most impacted by the plume from Jupiter's rapid rotation.

Having been heated for another thousand years after Ganymede, Europa was too hot for water, dominating the plume, to condense on its surface for an additional thousand years. When it finally cooled sufficiently, the water in its orbit all settled, about 1000 BP, forming an ocean 100 km deep, but the heavy element core is still hot, keeping the ocean liquid. Since then, a thin icy crust has formed, with 'chaotic' regions implying a number of penetrating impacts since the ice began to form.¹⁰ Sulphuric acid from the same bodies has been detected on its surface.

Based on the drawing in Figure 3, Io was still being swept by the plume in 800 AD, fitting the suggested time scale of its decline. It's rocky, volcanic, sulphurous surface demonstrates the intense radiation and mass of heavy elements accumulated in the last 6,000 years from the Jupiter plume. Due to the rapid rotation of Jupiter, the blasts of the plume concentrated more heat on Io's trailing hemisphere, evident in the concentration of volcanoes there, acknowledged to be inconsistent with the tidal tug-of-war hypothesis.¹¹ As also stated by Professor William Hubbard's (Planetary Interiors, p. 306) "In order to explain Io's observed heat flux by this tidal dissipation mechanism, we must assume that Io's Q is of the order of unity!" - a meaningless value. The Galilean moons were born out of Jupiter ~6,000 years BP and their apparent differences, shown in Figure 6, are due to the subsequent different exposure times of each to the fusion plume from the impact site.

With the exception of Io, all the satellites and rings surrounding the giant planets reflect the composition of their primaries, ejected by impacts on their MGH surfaces, which comprises primarily water (thus hydrate), but also heavy elements, including iron, in their nucleogenesis proportions. This results in some magnetic field properties not expected in apparently icy bodies.

The most obvious class of bodies formed from the jet as it diminished are the main belt asteroids, evidenced by their enormous numbers, $>10^6$, orbital ‘families’ and inclinations consistent with the -22° latitude of the plume site. The same range of inclinations apply to the Kuiper belt and Oort cloud bodies. The formation of these bodies from hot gas in a weightless environment dictates porous, low density bodies, often interpreted as ‘rubble piles’. These properties have been noted on several close passes of probes to main belt asteroids.

Jupiter’s Temperature Excess

The temperature excess of Jupiter’s atmosphere is due to the fusion reaction continuing in the impact crater. Although steadily declining for 6,000 years, this blazing furnace is still producing as much energy as the enormous Jupiter receives from the Sun, manifested both as heat and the driving of the pole-to-pole circulation of its atmosphere. The latter results in a relatively constant atmospheric temperature distribution from the equator to the poles, leading to the unfortunate assumption that the entire planet is hot and therefore gaseous.

The Multiple Zonal Vortices

Today, a powerful vortex of hot gases, over a 10^6 K, rises rapidly from the fusion furnace in the impact basin, less than 1,000 km below the cloud tops. It is deflected westward beneath the visible cloud

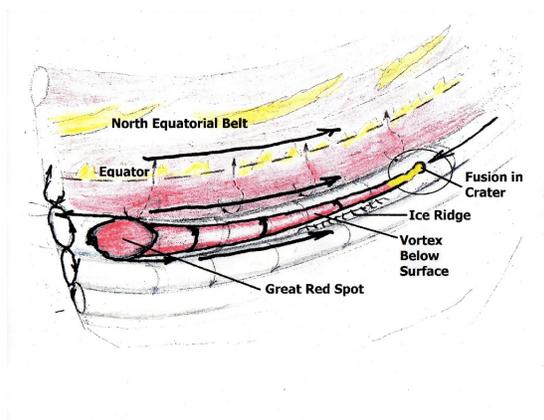


Figure 7 Vortex from fusion source is swept westward beneath cloud-tops by Jupiter’s rotation, surfacing as Great Red Spot

layer some 110,000 km by the rapid rotation (41,626 km/h) of Jupiter where it reaches the cloud-tops as the Great Red Spot. Its counterclockwise rotation is due to the Coriolis effect. The powerful rotation of the GRS produces the highest easterly wind in the south equatorial band to its north and the westerly wind of the south tropical belt to its south (Figures 7 & 8).

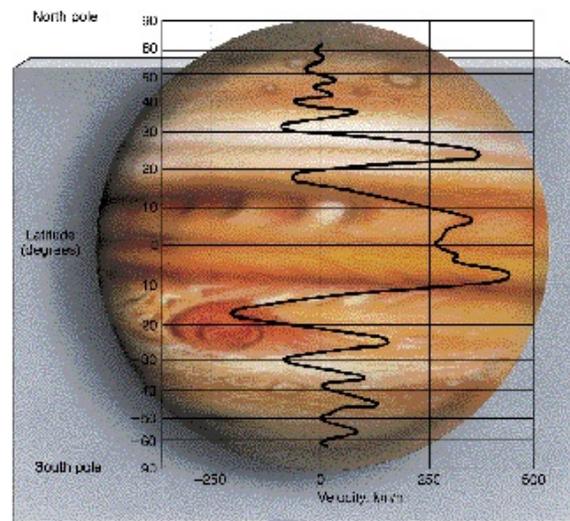


Figure 8 The fastest easterly wind coincides with the northern edge of the GRS. Note the dip in the westerly wind at the equator.

The vortex influences the deeper atmosphere in another significant way. Its horizontally extended component induces secondary vortices of opposite chirality to its north and south, constrained by the solid surface of the planet. The combination of this horizontal vortex and the velocity induced by the spinning GRS is the means by which the singular nuclear furnace drives the entire circulation system. An animated video of this motion is available at the following site:

<https://upload.wikimedia.org/wikipedia/commons/7/76/PIA02863 - Jupiter surface motion animation.gif>

In the equatorial zone, the vortex effect disappears as the Coriolis effect, along with the centrifugal force, induces a vertical motion of the westerly atmospheric flow, raising it, resulting in a slight dip in the wind speed exactly at the equator (Figure 8).

The (reversal) of the Coriolis effect at the equator interrupts the propagation of the vortices through the Equatorial zone, as shown in Figure 8, disrupting the circulation pattern, causing the turbulence visible in the north equatorial belt. This causes large swirls and the gaps in the clouds, revealing the high temperature radiation from deeper in the atmosphere. Further north, a mirror image of the southern winds and vortices is again established, conserving energy and angular momentum.

To generalize, the broad ‘zones’ are the ‘tops’ of vortices and the narrower ‘belts’ are their plunging/rising edges. The spawning of these multiple vortices to all latitudes can only occur with the presence of a hard boundary, the surface of the solid Methane Gas Hydrate Jupiter, less than 1000 km below the cloud-tops. The motion of the vortices explains why the Galileo probe reported strong winds at depth, which obviously preclude the touted three cloud layers.

Great Red Spot

The primary vortex rising from the incredibly hot fusion site produces the Great Red Spot extending some 30 km above the cloud tops. Early Galileo photographs of the GRS showed that it is elliptical and tilted,¹² with the eastern edge rising higher than the western edge. The Galileo infrared imaging spectrometer (NIMS) indicated that top of the GRS is at 0.24 bar and the ‘base’ is very shallow, at 0.7 bar, actually above the arbitrary 1 bar reference level. This apparent shallowness of the GRS has been interpreted as a corroboration of the currently accepted hypothesis that it is a passive anticyclonic whirlpool or ‘soliton’ driven by the opposite winds to its north and south. However, the Galileo view, shown in Figure 9, failed to reveal the extreme horizontal orientation of the vortex leading to the Great Red Spot due to the rapid rotation of Jupiter.

As the hot gases rise from the fusion source and expand, the reduction in pressure within the plume causes considerable water to condense and fall as snow or ice. This accounts for the increase in water vapor detected by the Galileo probe as it descended

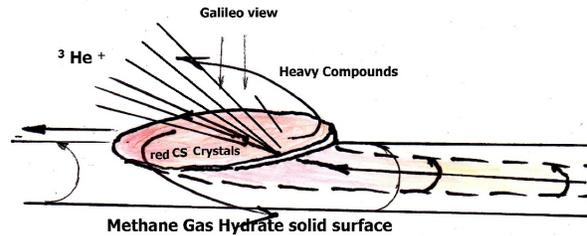


Figure 9 Great Red Spot rises above the cloud-tops, is tilted toward the west and ejects a vast flow of energetic $^3\text{He}^+$ ions.

to 22 bar - only 156 km below the 1 bar reference ‘surface’, where it ceased to function. The water vapor prevented a measurement of oxygen at this depth and led to the mysteriously low measurement of H_2O .

Jupiter Radiation Through the GRS

The Great Red Spot is not the passive ‘whirlpool’ currently imagined. In addition to driving the wind circulation of the entire atmosphere, it is the source of all the invisible high energy particulate radiation which encompasses Jupiter, and during the last 6,000 years, the entire Jovian system. As the fusion conflagration has subsided and the temperature in the fusion furnace has decreased, the reaction in the heavily deuterated, closely packed MGH (or MGD) has been reduced to $\text{D} + \text{p} \rightarrow ^3\text{He}^+ + \gamma$. The energy of this remaining reaction, is too low to destroy the $^3\text{He}^+$ ions, which are quasi-stable, with half lives of 400 years. This reaction is producing an invisible blizzard of particulate radiation, $^3\text{He}^+$ ions, shooting out of the Great Red Spot.

This ‘terrible storm’ (*aegis*) was detected at a rate as high as 2,000 particles/s, by Galileo and Cassini, simultaneously on one occasion, at distances as great as 4 AU coming from the direction of Jupiter with velocities of 200 km/s and the rotational period of Jupiter. Considering the minuscule solid angle subtended by the spacecraft sensors, the measured radiation was only an infinitesimal sample of a huge *invisible* blizzard of $^3\text{He}^+$ ions being continuously emitted from the GRS as Jupiter rotates. The Galileo NIMS data and images suggested that the inner part of the Great Red Spot “probably

represents gas moving upward rapidly”, but the sheer magnitude of this invisible $^3\text{He}^+$ blizzard has never been imagined.¹³

The red color of the GRS is due to carbon and sulfur, two of the heavy elements positively identified by the Galileo atmospheric probe, which combine as CS in the deep hot vortex and form tiny red crystals at 200 C as it rises and expands.

Since the ‘gas giant’ hypothesis engenders no high speed particulate radiation from Jupiter, an elaborate model has been devised suggesting particles from volcanoes on Io are consistently being accelerated by Jupiter’s rotating magnetic field to 200 km/s. Obviously Occam’s Razor favors a source in Jupiter itself. The high velocities of the $^3\text{He}^+$ particles are simply produced in the fusion reaction itself. They travel through a curved chimney and exit into space through the Great Red Spot. This is not surprising in light of the magnitude and recentness of the plume which originated from the same fusion source.

Recall that the Galileo orbiter instruments and computer memory were repeatedly knocked out by unidentified “particulate radiation”. When it approached for its 11 R_J perijove to get high resolution images of the center of the GRS, the software stopped running and the mechanical filter wheel jammed. This was the result of the same high speed $^3\text{He}^+$ reaction products from the Great Red Spot causing faults in the software, even at great distances from Jupiter.

Galileo Probe Data

Consistent with this interpretation, the Galileo atmospheric probe reported a “new, intense radiation belt, 10 times as strong as Earth’s Van Allen belts, between Jupiter’s ring and the uppermost atmospheric layers, reported as “*high energy helium ions ($^3\text{He}^+$) of unknown origin*”. The radiation belt is not aligned with the equator, but inclined at an estimated 10 degrees. This is due to the emission of the $^3\text{He}^+$ ions from the GRS, which is located well below the equator.

The fusion reaction continually releases methane, hydrogen, oxygen,

nitrogen and the entire spectrum of heavy elements from the solid Methane Gas Hydrate. The elevated fractionation of deuterium is not reflected in the atmosphere measured by the Galileo probe since it is consumed in the fusion reaction and is tightly bound in the MGH. The continuing supply of methane in all the giant planet atmospheres is obviously from impacts on the MGH surfaces.

Because of their distribution throughout the MGH, the heavy elements are continuously being released in the high temperature environment immediately above the crater where they form oxide, sulfide and hydroxide micro-grains. They are carried above the cloud-tops by the primary vortex and sprayed into the upper atmosphere by the spinning Great Red Spot¹⁴, producing the unidentified colors of the clouds which surround the planet, currently believed to be ammonia.¹⁵ This warm heavy element material was sensed by the Galileo atmospheric probe when it reported a denser and warmer atmosphere than ‘expected’ above the cloud tops. In the MGH hypothesis this heavy element layer also acts as a heat blanket, further disguising the fusion source.

Proto-Solar D/H and $^3\text{He}^+$ / ^4He

Considerable analysis has been performed on the deuterium to hydrogen (D/H) and helium 3 to helium 4 ($^3\text{He}^+ / ^4\text{He}$) ratios measured by the Galileo probe under the assumption that this would reveal the proto-solar makeup of the Sun.¹⁶ In the proposed scenario, the composition of Jupiter’s atmosphere is due exclusively to the molecules released from the solid MGH planet by the 6,000 year-old fusion reaction which is still burning, and therefore cannot provide any information concerning the proto-solar system.

Slowing of Jupiter’s Rotation

Since 1910 historical records of the transit times of the GRS determined by telescopic observations have been plotted assuming Jupiter’s current rotation rate, based on cycles in its magnetic field, has remained constant for 4.6 billion years (Figure 10). This has been interpreted as a ‘drift’ of the GRS, thought to confirm that it is merely a ‘storm’

on a gaseous planet. However, if the GRS were free to drift, it would not have remained at the *same latitude* on Jupiter for the entire 360 years it has been telescopically observed. This would be impossible for a ‘storm’ on a planet with such a large Coriolis effect. For example, consider the northward movement of hurricanes formed at 20° latitude on the slowly rotating Earth.

In the proposed scenario the plume has been ejecting an enormous mass at such high velocities, thus angular momentum, during the last 6,000 years, that the rotation of the giant Jupiter had been measurably slowing down until 1940. This trend probably stopped due to the reduction of the temperature in the fusion furnace below a threshold for a more energetic (deuterium-

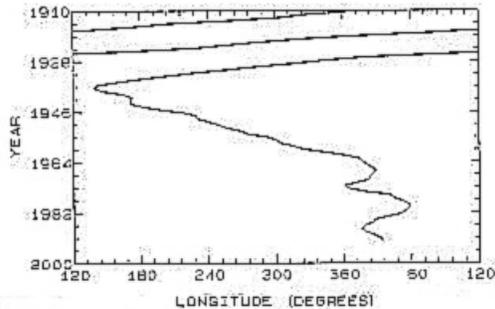


Figure 10 Historical observations of the Great Red Spot give a record of Jupiters slowing rotation up to 1940.

tritium?) reaction. The apparent increase in rotation rate which then took place from 1937 to 1968 was due to the deflation and settling of the atmosphere. Once that process was completed Jupiter and the GRS have settled down to an essentially constant rotation rate. This again emphasizes the very recent nature of the events which have shaped Jupiter ‘right under our noses’.

Sir Fred Hoyle estimated the rotational period imparted to Jupiter during its accretion assuming (apologetically) small incremental mass captures.¹⁷ His initial result was a period of 1 hour. Since the period is now almost 10 hours, he assumed his initial simplifications were flawed. However, there is reason to believe that Jupiter has experienced at least three huge impacts

including the latest one 6,000 years ago. If each impact increased Jupiter’s rotational period by three hours, then Hoyle’s initial calculation may have been quite accurate.

Shoemaker - Levy 9 ‘Main Events’

The ‘main events’ associated with the larger Shoemaker - Levy 9 fragments (G & L) appeared 6 minutes after the initial impacts, lasted over ten minutes, attaining peak intensities much greater than the precursor and the fireball. The MGH hypothesis suggests the *only viable explanation*: The larger fragments penetrated the atmosphere and impacted the deuterated Methane Gas Hydrate surface of Jupiter triggering nuclear explosions which produced the observed shock waves traveling outward at 450 m/s for two hours (1,620 Km), proving the presence of a solid surface. The six minute delays preceding the detection of the most energetic radiation, significantly termed the ‘main events’, was the time required for the ‘mushroom clouds’ from the surface explosions to reach the cloud tops until the roiling plume became detectable, lasting ten minutes. These plumes emitted spectra of a number of heavy elements never before observed on Jupiter, including iron, magnesium, silicon, *sulfur* and *carbon*. (as CS₂). The fact that the direct radiation from the blast was not detected, is consistent with the inability to detect the continuing fusion reaction which is the origin of the GRS, attesting to the thickness of the heavy element cloud layer covering the entire planet.

Juno MWR Experiment

“The Juno mission aims to reveal the story of Jupiter’s formation and details of its internal structure.” However, the Micro Wave Radiometer (MWR) wavelengths are designed specifically to find evidence of the touted three cloud layers inherent in the ‘gas giant’ hypothesis. The MWR’s sparse coverage, only 5 of the 33 orbits, reflects the belief that (a) the cloud layers cover the entire planet, even though the Galileo probe failed to detect them, and (b) because it is anticipated that the radiation encountered by Juno on the first few orbits will rapidly degrade the MWR instrument.

The Methane Gas Hydrate hypothesis delineates two currently unrecognized features on Jupiter that could be detected by the MWR experiment: (a) The nuclear fusion in the crater, which constitutes a point source of fusion energy equal to the total solar energy, 3×10^6 megawatts (30 x US nuclear power capacity); (b) The vortex of hot gases

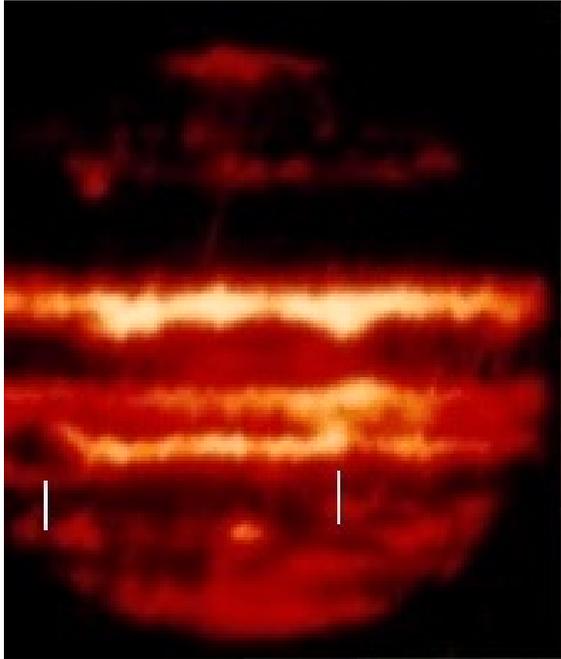


Figure 11 IR image - GRS (dark) at left, fusion source (estimated) in crater at right, with vortex between obscured by the visible cloud layer.

extending from the fusion source to the Great Red Spot. The fusion furnace is located at the same latitude as the GRS (22° S), an estimated 110,000 km to the East. The vortex extends westward, expanding as it rises from the fusion source until it is revealed as the Great Red Spot (Figure 11). The longitudinal extent of the vortex virtually guarantees one detection, due to the greater sensitivity of the six independent wavelength channels in the MWR. Detection of the fusion reaction, a point source, is problematic due to the limited orbit coverage, even with the 20° beam. As the orbit precesses, the footprints at the latitude of interest, 22° S, can increase to as much as 10° longitude.

The detection of the extended primary vortex should lead to the conclusion that it is the source of the Great Red Spot, and to the MGH as the true composition of Jupiter. If Juno passes over or just to the west side of the GRS it will be exposed to the constant blizzard of $^3\text{He}^+$ ions from the fusion reaction (Figure 9), which caused more than twenty software outages on the Galileo orbiter when it was as far as $11R_J$ from the planet.

The MWR is designed specifically to detect the three cloud layers predicted by the 'gas giant' hypothesis. As shown in Figure 12, the signals in the different wavelength channels are 'expected' to originate from different depths. But the radiometer is a passive instrument, not a radar and also

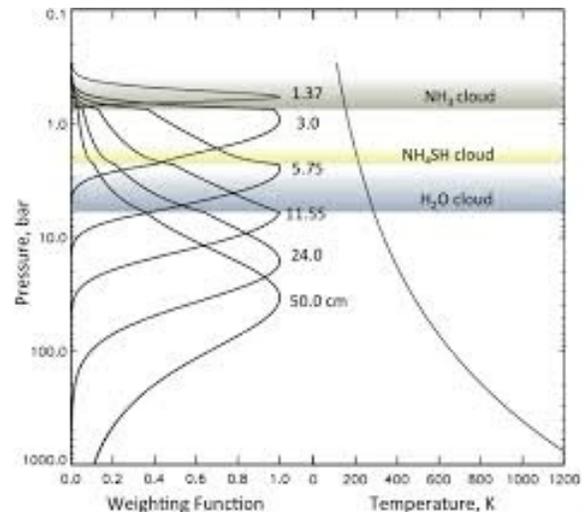


Figure 12 Weighting functions used to associate MWR wavelengths with depths. Hypothetical three cloud layers also shown.

cannot identify molecular species. If the radiometer experiment detects the predicted fusion and/or the vortex rising to the GRS the data will have to be interpreted differently.

Juno Radio Science Experiment

The Radio Science experiment uses doppler variations in two frequency bands which are transmitted from Earth, detected by Juno, and retransmitted back to Earth (a transponder) to measure the gravitational field of the planet. Due to the assumed 'gas giant' hypothesis, this instrument is designed to sense very small gravitational changes due to radial differences in the interior with depth

and possibly atmospheric density fluctuations due to mass wasting.

As a result, it should have sufficient sensitivity to detect solid features on the surface of Jupiter during the low altitude science (pole to pole) passes, taking into account the low average density of deuterated Methane Gas Hydrate. These include the impact basin in which the fusion burning is occurring and the range of ice mountains extending beneath the vortex. Fortunately, the raw data will be stored in a way that small doppler shifts, detected second-by-second, can be examined in minute detail.

Although the original impact and fusion explosion extended hundreds of millions of square kilometers on Jupiter's surface, the MGH in that region became melted, and may have refilled the crater with water as the fusion reaction decreased, so the craters will probably not have raised edges. However, considering the enormous mass that was initially blasted into space plus that ejected over the following 6,000 years, estimated to be greater than one Earth mass, there is little doubt that the radio science experiment will reveal the basin in which the fusion is centered.

Another potential surface feature, shown in Figure 8 is anticipated. This would result in a positive gravitational free-air anomaly, as opposed to the crater which produces a negative anomaly. As the hot fusion plume rises today, water in it condenses falls as snow or hail along a section of the longitudinal path from the fusion furnace toward the Great Red Spot. This should leave a linear ice mountain range extending westward from the fusion source toward the Great Red Spot at -22° latitude.

Since this ice has been accumulating for at least 85 years, since the slowing of Jupiter's rotation ceased, around 1940 (Figure 10), at which date the higher energy vortex likely extended much further to the west before reaching the cloud-tops. As a result, these ice mountain ranges may be found to extend further west than the current position of the GRS. Although both the MWR and radio experiments cannot be used on the same passes, the longitudinal extent of

these features and the coincidence of their latitude and longitude greatly improves the probability of their positive detection and correct interpretation.

The Methane Gas Hydrate hypothesis predicts a total of at least three such major impacts throughout the solar system history. Although the ancient craters have long frozen over, they and the associated east-west ice ranges should still be detectable by the radio experiment, unless obscured by one of the later events.

Sneak-Peek Experiment Assignments

One revolutionary aspect of the revised Juno mission plan is a sneak-peek feature, which places Juno in a 53.5-day practice run with science instruments on, followed by another 53.5 day period before the final engine burn places it into its 14-day science orbit. The longer orbit allows more time for safe mode recovery which, due to the powerful emission of $^3\text{He}^+$ particles from the GRS, will probably be necessary.

The primary function of the sneak-peek period should be to schedule the experiments so that Juno does not pass directly over or, more specifically, within 30° longitude west of the Great Red Spot during a MWR pass. Considering the problems caused by the high energy $^3\text{He}^+$ particulate radiation on the Galileo orbiter, which never got closer than 11Rj, the same radiation will undoubtedly shut down the Juno radiometers (MWR) if they are directly exposed.

The Great Red Spot Fading

The cessation of significant mass ejection (~ 1940), the recent shrinking of the GRS and the lowest energy fusion reaction presently occurring, suggest that the fusion furnace is approaching its extinction. At extinction, the GRS will immediately disappear along with the multiple zonal vortices. Here's hoping that Juno completes its mission before that occurs.

References

1. Durham W.B., Kirby, S.H., Stern, L.A., and Zhang, W. (2003) The strength and rheology of methane clathrate hydrate. *Journal of Geo-physical Research*, 108, 2182.
2. Roueff et al. Interstellar deuterated ammonia: from NH₃ to ND₃, (2005) Observations of the cold (<50K) outer regions of large dark nebula (LDNs) e.g. 1689N, surrounding proto-stars can produce deuterium enhancements of 10¹⁰, based on observations of the disks at distances where giant planets would form. Such compounds have stronger binding energies, consistent with the giant planets being rigid and incompressible.
DOI: 10.1051/0004-6361:20052724
3. *Solar System History From Isotopic Signatures of Volatile Elements*, edited by Kallenbach et al.
4. Zhang, Lei et al. Platinum-based nanocages with subnanometer-thick walls and well-defined, controllable facets, *Science*, 24 July 2015, vol. 349, p. 379, 412.
5. Habing N. J. et al., Disappearance of stellar debris disks around main-sequence stars after 400 million years, *Nature* 401, 456-458 (30 September 1999).
6. Ogienko A. G. et al. Gas Hydrates of Argon and Methane Synthesized at High Pressures: Composition, Thermal Expansion, and Self-Preservation, *J. Phys. Chem B*, 2006, 110 (6), pp 2840-2846.
7. In the Rg Veda X.72.8-9 states "Of the eight sons (*Adityas*) who were born from the (rebounded) body of *Aditi*, she approached the gods (moved into the solar system) with seven, but cast away [the eighth] *Marttanda*. *Marttanda* was shapeless, so the *Adityas* (sons of *Aditi*) changed his shape. An elephant resulted from the pieces of flesh cut away i.e. the plume (*Marttanda*) was described as an elephant."
8. Supporting material available at cycliccatastrophism.org/Rowsonletter
9. McKinnon W. B., Shenk P.M. Estimate of comet fragment masses from impact craters on Callisto and Ganymede, *Geophysical Research Letters* vol. 22, No.13, p.1829-1833.
10. Cox, R and A.W. Bauer, Impact breaching of Europa's ice: constraints from numerical modeling,
doi:10.1002/2015JE004877
11. Tyler R.H. et al., Tidal Heating in a Magma Ocean within Juniper's Moon Io, *The Astrophysical Supplement Series*, Vol. 218, No. 2, 2015.
12. Beeton M. J. S. et al. "Galileo's First Images of Jupiter and the Galilean Satellites", *Science* V. 274, 18 Oct. 1996: "Both the small size of the features and their rapid changes are reminiscent of terrestrial thunderstorms. However, their linear structure and 300-km spacing of the features are similar to slantwise convection on Earth, in which convective rolls are aligned in the direction of the wind."
13. Often, g. et al, *Science* v.274, p.359, 1996
14. Oxford Scientists Uncover the Strange Workings of Jupiter's Great Red Spot, Fred W. Taylor, UK National Astronomy Meeting, March 31, 1998.
15. NASA Galileo Fact Sheet 0309 http://www.jpl.nasa.gov/news/fact_sheets/galileo0309.pdf
"It is still a mystery why only fresh clouds, covering about 1 percent of Jupiter, show the ammonia signature while the remaining clouds, which probably also contain ammonia, lose their sharp spectral signature."
16. Mahaffy, P. R. et al. "Galileo Probe Measurements of D/H and ³He/⁴He In Jupiter's Atmosphere", *Space Science Reviews* 84, no. 1-2 (1998): 251-263.
17. "The Cosmogony of the Solar System", Sir Fred Hoyle, Chapter 10 "The Rotations of Jupiter and Saturn", Enslow Publishers, NJ. ISBN 0-89490-023-4