PLANET JUPITER STRUCTURE

Magnetosphere and the Great Red Spot
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ABSTRACT
A discussion report proposing the broad internal details for the planet Jupiter, as might currently exist.

Keywords:
Jupiter, Great Red Spot, GRS, Magnetic Chamber, Magma Chamber, Heat Exit Chimney, Proto Continent

1) INTRODUCTION.

This study developed following a comment discussion attached to PSI paper *"Black Hole Radiation*: New paper for Open Review".[1] The discussion revolved around the possibility that Jupiter has a rocky surface.

The rocky surface proposition agrees with my published book, Planets Satellites and Landforms, which includes the generic equatorial section of a protoplanet formation, Figure 1, showing how a protoplanet might start forming, immediately after its satellites have launched from the planet surface.[2]

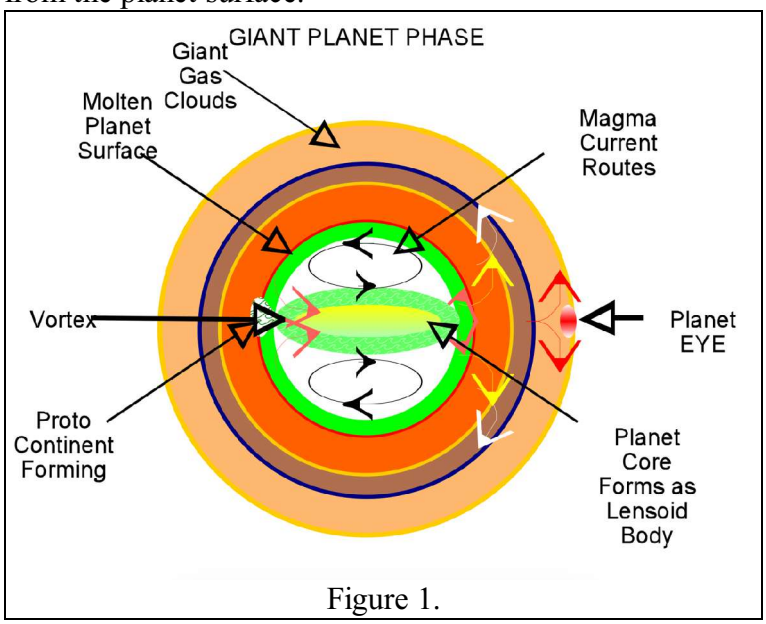

Figure 1.

It was agreed to investigate the situation further which has resulted in this composition.

[1] https://principia-scientific.org/black-hole-radiation-new-paper-for-open-review/

[2] http://www.bosmin.com/PSL/PlanetsSatellitesLandforms.pdf

2) BACKGROUND:

Jupiter is the biggest planet in the solar system and as such, continues to radiate significant primordial heat evident in the famous red spot, or eye as shown in this Hubble Image, Figure 2. The planet is described as a gas giant composed mostly of hydrogen and helium, but may have a rocky core.[1]

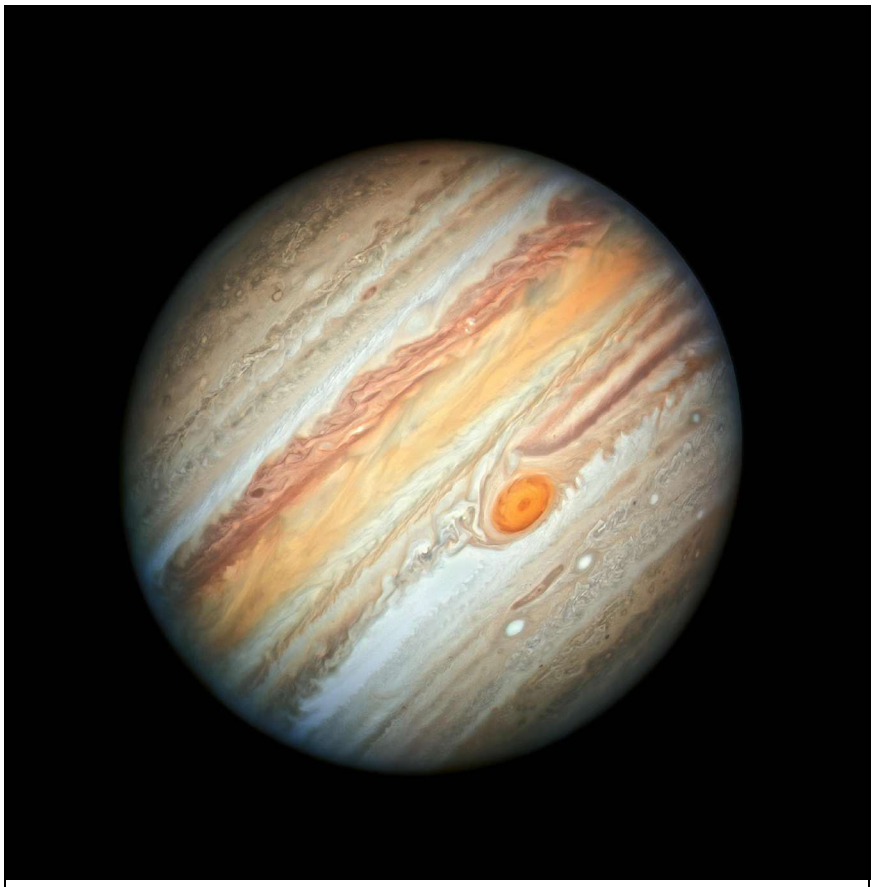

Figure 2.

The Great Red Spot rotates at a different pace to the magnetic field recorded at Jupiter, and it is generally concluded the GRS is the result of a persistent storm cloud and not directly associated with surface activity on the planet.

[1] https://en.wikipedia.org/wiki/Jupiter

3) PLANET JUPITER FACTS.

Several empirical facts are known about Jupiter as shown at the NASA site.[1] These are included in Table 1, together with other quantities estimated to produce the known planet mass of 1.90E+27 kg.

Inputs			
	Jupiter Mass	kg	1.90E+027
	Jupiter Diameter	km	142800
	Jupiter Cloud Layer Height	km	5000
	Jupiter Mean Density	kg/m3	1273
	Jupiter Upper Atmosphere Density	kg/m3	192
	Jupiter Lower Atmosphere Density	kg/m3	672
	Magma High Density	kg/m3	2400
	Magma Low Density	kg/m3	2112
	Sial Layer Density	kg/m3	2688
	Sima Layer Density	kg/m3	2928
	Jupiter Core Density	kg/m3	12960
	Solid Spherical Core Solid Volume	m3	1.94E+020
	Spherical Magnetic Chamber Solid Volume	m3	4.58E+022
	Spheroid Magma Chamber Solid Volume	m3	7.87E+023
	Spheroid Proto Continent Solid Volume	m3	6.69E+020
	Spherical Lower Atmosphere Solid Volume	m3	1.08E+024
	Spherical Upper Atmosphere Solid Volume	m3	1.48E+024
Outputs			
	Jupiter Volume	m3	1.49E+024
	Solid Spherical Core Volume	m3	1.94E+020
	Core Density	kg/m3	12960
	Spherical Magnetic Chamber Volume	m3	4.56E+022
	Magma Chamber Density	kg/m3	2400
	Spheroid Magma Chamber Volume	m3	7.41E+023
	Magnetic Chamber Density	kg/m3	2112
	Spheroid Proto Continent Volume	m3	6.69E+020
	Proto Continent Density	kg/m3	2808
	Spherical Lower Atmosphere Volume	m3	3.37E+023
	Lower Atmosphere Density	kg/m3	672
	Spherical Upper Atmosphere Volume	m3	1.14E+024
	Upper Atmosphere Density	kg/m3	192
	Solid Spherical Core Mass	kg	2.5139E+024
	Spheroid Magma Chamber Mass	kg	1.09E+026
	Spheroid Magnetic Chamber Mass	kg	1.57E+027
	Spheroid Proto Continent Mass	kg	6.69E+020
	Spherical Lower Atmosphere Mass	kg	2.27E+026
	Spherical Upper Atmosphere Mass	kg	1.14E+024
	Jupiter Check Mass	**kg**	**1.90E+027**

TABLE 1.

[1] https://nssdc.gsfc.nasa.gov/planetary/factsheet/jupiterfact.html

The volume estimates are used to construct a vertical wire frame section of planet Jupiter as shown in Figure 3.

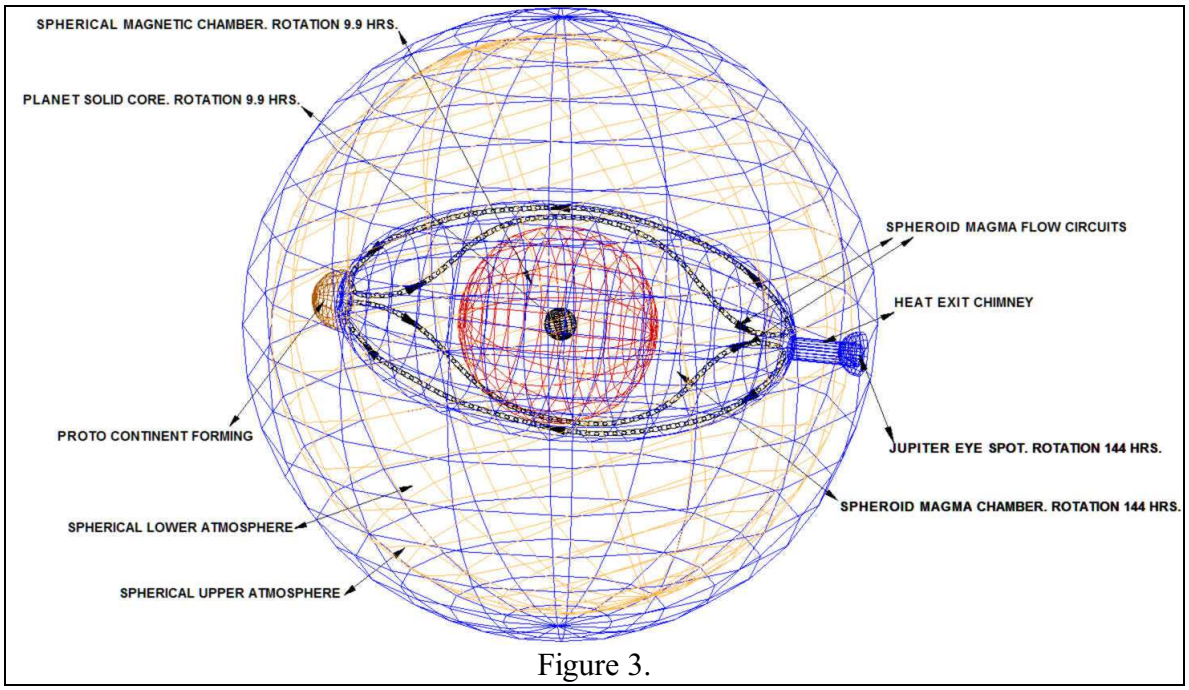

Figure 3.

Jupiter appears to have a solid core surrounded by a spherical shaped mobile Magnetic Chamber. Here magma circulates rapidly in the chamber with a rotation period of 9.9 hours, and powers the magnetosphere which surrounds Jupiter.

Another spheroid shaped Magma Chamber exists outside the Magnetic Chamber. Magma circulating in this chamber moves more slowly, with the Chamber rotation period of 144 hours.

Magma moves past the outer surface of the Magnetic Chamber, towards the base of the Heat Exit Chimney. Here the magma cools, with the heat convecting up to the surface and terminating at the GWS.

The magma returns from the base of the Chimney, within the Magma Chamber towards the Proto Continent location. Lighter components from the magma deposit at the edge of the Proto Continent. The incoming magma squeezes the deposit together from all sides, forming a compact floating Proto Continent. The Proto Continent has a high central core, and deep roots penetrating into the Magma Chamber.

4) JUPITER UPPER LAYERS.

Beyond the Proto Continent, two realms of liquid hydrogen and helium exists with the inner region having an average density of 672 kg/m^3 and the upper layers averaging 192 kg/m^3.

The visible clouds on Jupiter are a mix of dust coming from lower levels. A density of 192 is estimated for the highest and least dense layer, but which includes a high entrained dust portion. The dust material has been swept off the surface of the Proto Continent surface. Numerous Jovian satellites, currently assessed at 79 moons, continuously stir up the atmosphere causing dense dust clouds to form. The most prominent are the four Galilean satellites shown in Figure 4,[1] are expected to be the most influential in impacting upper Jovian atmospheric condition.

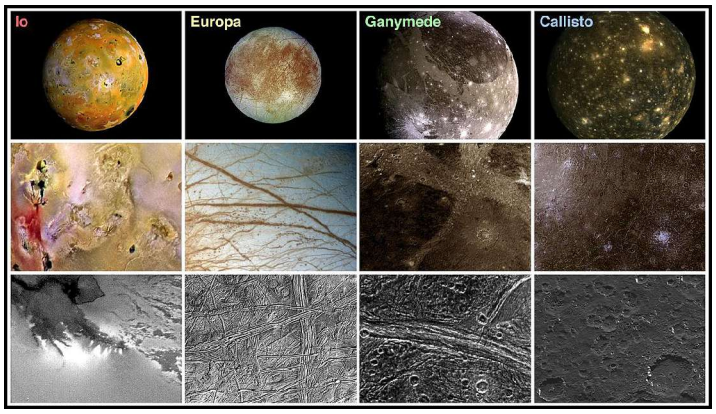

Figure 4.

The GRS appears in the Upper Atmosphere layers above the Heat Exit Chimney, and rotates in synchronisation with the Spheroid Magma Chamber, rotating at 144 hours per cycle, or 6 Earth days.

GRS changed in size since first observed in the 1800s:[2]

> *The Great Red Spot is large enough to accommodate Earth within its boundaries. Mathematical models suggest that the storm is stable and may be a permanent feature of the planet. However, it has significantly decreased in size since its discovery. Initial observations in the late 1800s showed it to be approximately 41,000 km (25,500 mi) across. By the time of the Voyager flybys in 1979, the storm had a length of 23,300 km (14,500 mi) and a width of approximately 13,000 km (8,000 mi). Hubble observations in 1995 showed it had decreased in size again to 20,950 km (13,020 mi), and observations in 2009 showed the size to be 17,910 km (11,130 mi). As of 2015, the storm was measured at approximately 16,500 by 10,940 km (10,250 by 6,800 mi), and is decreasing in length by about 930 km (580 mi) per year.*

As the heat expires from Jupiter, the Heat Exit Chimney is expected to reduce in size and have a more erratic location. This could include a number of pipe branches forming in the upper chimney which appear on the surface as multiple eye spots.

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[1] https://en.wikipedia.org/wiki/Galilean_moons

[2] https://en.wikipedia.org/wiki/Jupiter#Great_Red_Spot_and_other_vortices