THE ENERGY BALANCE OF URANUS: IMPLICATIONS FOR SPECIAL CREATION

Abstract

Uranus' thermal behavior is different from that of the other Jovian planets Jupiter, Saturn and Neptune. The implications of this fact for special creation continue to be confirmed by modern data.

Introduction

Prior to the beginning of the Space Age with the launch of Sputnik in 1957, it was relatively easy to generalize planetary properties in such a way as to make them appear explicable by evolutionary planetary origins models. The return of Space Age data from planetary flybys, however, has repeatedly contradicted evolutionary models.

One major area of contradiction has involved the properties of the Jovian planets. Rather than showing the similarities expected by evolutionary theorizing, these planets have emerged as distinctive, even unique, in ways which evolutionary theorizing cannot explain. **Such distinctives would seem to be evidences of special creation.**

Uranus' distinctive thermal behavior has long been recognized as a difficulty for evolutionary models of solar system development. For instance, nearly two decades ago, it was written that, "Both Uranus and Saturn have internal heat sources. What of Uranus? Uranus does not . ... And Neptune, which is virtually Uranus' twin, has a relatively strong heat source ... How could two almost identical planets, formed in the same way at the same time, be so different in this respect? Evidently they were not formed by natural means ... Uranus and Neptune are clear evidence that [these planets] were created ..."[1]

This remains an accurate statement to this day. The evidence of Uranus for special creation can continue to be cited with confidence.

Uranus: A Unique Planet

Until the Voyager 2 flyby past Neptune, there was a mixing model which was in vogue to account for the different thermal behaviors of Neptune and Uranus. According to one scenario of this sort, "Neptune ... suffered a collision late in its formation that stirred the ice and rock of its interior all the way to the center. That mixing helped break down the stratification that would otherwise have greatly inhibited the heat-driven vertical circulation that now carries heat to the surface.

"Uranus' late hit, on the other hand, was way off center, as evidenced by the way it is lying on its side. That kind of collision might have failed to stir up the deep interior, leaving its heat largely trapped there. Because the rotation period provides one indication of how well mixed the interior is, a Neptunian day of 17 hours [versus 17.2 hours for Uranus] would have implied just the difference in mixing between the two planets ... to explain the difference in heat leaking out."[2]

This theory was discredited when Voyager 2 found that Neptune's rotational period is only 16 hours, a period too small to imply the mixing that would explain why Neptune radiates excess heat but Uranus does not.

The now-discredited mixing theory was based on the assumption that all planets contain primordial heat. However, there is no reason to assume that any of the planets initially had hot interiors. **Evidence from radiohalos indicates that the earth was not molten originally.**[3] Uranus may never have contained the same degree of heat as Neptune. It is only a modeling assumption that gravitational contraction is the heat source of three of the Jovian planets, but radioactivity has been an overlooked source. Radioactivity, moreover, is known to supply most of the earth's internal heat.

Yet even this last statement is somewhat questionable. To illustrate how little we really know about radioactive heat generation in planetary interiors, consider this statement about the earth: "The decay of radioactive isotopes of uranium and thorium is one of the major sources of the Earth's internally generated heat, but nobody knows just how much this heat source produces ..."[4] If, however, Neptune's heat is from radioactivity, this implies the presence of elements there which Uranus does not have, making a stronger case for the planetary uniqueness of Uranus, and therefore a stronger case for special creation.

As of 1999, Uranus' lack of internal heat was still being noted: "The temperature of Uranus' atmosphere is consistent with heating only by absorbed sunlight, whereas Neptune is significantly warmer than it would be if it were heated by sunlight alone."[5] On the next page, the same text makes an even more emphatic statement: "Uranus radiates away essentially no internal heat, whereas 60% of the energy emitted by Neptune comes from internal sources."[6]

We now turn to a quantitative consideration of the energy balance of Uranus as compared with the other Jovian planets. Table 1 on the next page presents NASA data on solar irradiance, albedo, and blackbody temperature for the four gaseous planets.[7]

It is evident that the blackbody temperatures T in the table above have been computed by NASA using the quantity S(1 - A) and the Stefan-Boltzmann equation.[8] This is apparent from the nearly constant ratio existing between any two corresponding pairs of S(1 - A) and T.

We could compute *fictitious* heat emission rates H using the given blackbody temperatures. These values of H would not be real, because they would not include thermal emission due to intrinsic luminosity, i.e., internal heat sources. However, if we compare S(1 - A) and H for each planet as in the last column, we get nearly constant ratios, with very little

Table 1. Thermal Data for Jovian Planets

Planet	Solar Irradiance S, W/m^2	Albedo A	Blackbody Temp T, K	Heat Emission[9] Rate H, W/m^2	S(1 - A)/H
Jupiter	50.50	0.343	110.0	8.301	4.00
Saturn	14.90	0.342	81.1	2.453	4.00
Uranus	3.71	0.300	58.2	0.6505	4.00
Neptune	1.51	0.29	46.6	0.2673	4.01

difference for any planet from the others. If we (wrongly) drew conclusions about planetary intrinsic luminosity from these ratios, we could conclude that Uranus shows thermal emission behavior no different from the other three giant planets.

Hubbard[10] provides values of planetary "effective temperatures" for the giant planets computed via the Stefan-Boltzmann equation using intrinsic luminosity and thermal luminosity. These are given in Table 2 below, along with NASA's current blackbody temperatures repeated from the table above, and the blackbody temperatures as they were known in 1984.

Table 2

Temperatures in kelvins

Planet	1984 Blackbody Temperature,	Current Blackbody Temperature	Effective Temperature,
Jupiter	109.5 ± 1.6	110.0	124.4 ± 0.3
Saturn	82.5 ± 1.3	81.1	95.0 ± 0.4
Uranus	57	58.2	58 ± 2
Neptune	46	46.6	55.5 ± 2

Uranus is the only planet of the four in the table whose effective temperature and blackbody temperature are nearly matched. For the other planets, the excessive effective temperatures mean that they are radiating more heat than they receive from the sun, but Uranus is not.

As of 1984 the radiation of Jupiter and Saturn had been analyzed by Voyager 2, so it is not surprising that the 1984 blackbody temperatures for these two planets agree so well with the current values. What is surprising, however, is the agreement between the 1984 and current blackbody temperatures for Uranus and Neptune. In 1984, as Hubbard noted,[11] "[T]he values of A [used to compute blackbody temperatures, were] obtained from theoretical models," yet they agree well with the current values. The reason for this surprise is that "it is normally necessary to perform this important measurement from a spacecraft, because when we observe a distant outer planet from the earth, we see only the component of the sunlight which is scattered back in the earth's and sun's direction."[12]

With this theoretical precision existing for A, it would appear also that the intrinsic luminosities for Uranus and Neptune were predicted accurately in 1984, and from them the effective temperatures given in the table above. This is indicated by the quotations above emphasizing the thermal distinctiveness of Uranus. **Uranus had therefore been predicted to be thermally unique before the Voyager 2 flyby.** Rather than confirming the case for solar system evolution – as some hoped would happen -- Voyager 2 simply confirmed the case that Uranus is a specially created planet.

Notes

1 Paul M. Steidl, 1983, "Planets, Comets, and Asteroids," *Design and Origins in Astronomy* (ed. George Mulfinger), Norcross, GA: Creation Research Society, p. 100.
2 Richard A. Kerr, 1989 (September 29), The Neptune System in Voyager's Afterglow, *Science*, 245:1450.
3 R.V. Gentry, 1992, *Creation's Tiny Mystery*, Earth Science Associates, pp. 29-32. J. Henry, 2006, "Polonium Radiohalos: Evidence for Special Creation and a Young Earth," <creationconcepts.org>, pp. 4-5..
4 Dennis Normille, 1999, Experiment Uses Nuclear Plants to Understand Neutrinos, *Science*, 284:1911.
5 John D. Fix, 1999, *Astronomy*, WCB/McGraw-Hill, p. 286. **6** ibid., p. 287.
7 NASA data at the following websites updated February 17, 2000: <nssdc.gsfc.nasa.gov/planetary/factsheet/jupiterfact.html>, <nssdc.gsfc.nasa.gov/planetary/factsheet/saturnfact.html>, <nssdc.gsfc.nasa.gov/planetary/factsheet/uranusfact.html>, <nssdc.gsfc.nasa.gov/planetary/factsheet/neptunefact.html>.
8 William B. Hubbard, 1984, *Planetary Interiors*, Van Nostrand Reinhold, pp. 114-115.
9 Computed using the Stefan-Boltzmann equation with an emissivity of 1.0.
10 ibid., p. 116. **11** ibid., p. 115. **12** ibid.