More secular confusion about the moon's former magnetic field

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A recent paper by Clèment Suavet *et al.*[1] in the *Proceedings of the National Academy of Sciences* shows that uniformitarian scientists, who assume the world is billions of years old, are still very puzzled about the moon's magnetic field. They don't understand why it was formerly strong but now doesn't exist, and how it could exist in the first place.[2]

Suavet and his colleagues have carefully analyzed the magnetism of two basalt samples brought from the moon by *Apollo 11* astronauts (figure 1). The rocks became magnetized in an ancient magnetic field of about 0.69 (±0.16) Gauss. That's a bit stronger than the earth's magnetic field today (0.6 Gauss at the poles, 0.3 Gauss at the equator). They cite a very conservative lower limit for the moon rocks' magnetizing field strength of 0.13 Gauss, but I don't see the need for such caution, except perhaps to mollify colleagues who want the moon's early field to be weaker.

Dates for the rocks

The rocks came from a basalt field (most of the southwest part of Mare Tranquilitatis) that previous studies dated (by nuclear decay techniques) as having erupted about 3.56 Ga ago. This is the most recent date, by about 0.16 Ga, for moon rocks having a high magnetization. The other high-magnetization rocks, analyzed earlier, have dates ranging from nearly 4 Ga ago to 3.7 Ga ago. The statistical errors estimated for the dates range from ±0.05 Ga to ±0.1 Ga. All moon rocks dated as more recent than about 3.4 Ga ago apparently saw much lower fields, from about 0.1 Gauss down to 0.01 Gauss.

I and the other scientists on the RATE project[3] think that the radioisotope dates above are not accurate in an absolute sense, but are roughly accurate in a relative sense. That is, the episodes of nuclear decay speedup (for which we found multiple lines of evidence) would collapse the radioisotope timescale from billions of years down to thousands of years, but the order of dates would remain the same. Thus a 4 Ga radioisotope age, being close to the 4.5 Ga alleged for the age of the solar system, would have a real date from close to, or in, the Creation Week, about 6,000 years ago. A 0.5 Ga radioisotope age would actually be from the beginning of the Genesis Flood, about 4,400 years ago. So Suavet's 0.16 Ga extension of the duration of high magnetic fields on the moon would actually only represent, at most, a very short period of time, during, or not long after, Creation Week.

Working on a lunar dynamo

Suavet and his colleagues try to apply this new data to current 'dynamo'

Photo: NASA

Figure 1. In 1969, *Apollo 11* astronauts (Buzz Aldrin shown here) collected moon-surface basalt samples which turned out to have been magnetized in a magnetic field that was about as strong as earth's.

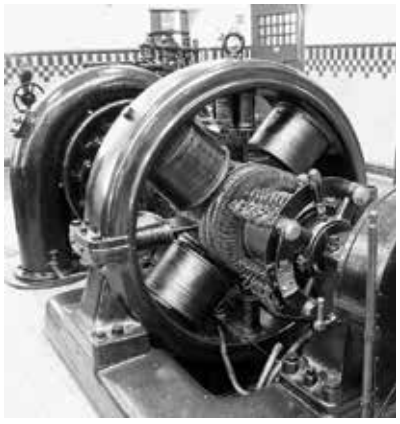

Figure 2. A man-made dynamo (electric generator) is quite complicated.

(the British word for an electric generator, figure 2) theories trying to explain how the moon could have ever had a magnetic field of its own. All the moon dynamo theories assume that the earth's magnetic field is produced by a dynamo, meaning that motions of the molten iron (too hot to be magnetic) in the earth's outer core would somehow act like an electric generator that produces its own magnetic field. Without such a sustaining mechanism, electrical resistance would wear away the electric current producing the field until it was gone within a few dozen millennia. Uniformitarian theorists then extrapolate the assumed earth dynamo to conditions in the moon's core.

A lunar dynamo faces an uphill battle for existence. All the dynamo theories (there are many variations) say that the threshold for dynamo action (if one exists) depends on an astronomical body's speed of rotation and the size of its conducting fluid core. The faster the rotation and the bigger the core, the more likely it is that a dynamo could work. Even if the earth really were to have a working dynamo, the moon's core (probably also molten iron) is ten times smaller and rotates thirty times slower. The latter point is what moon dynamo theorists work on, trying to figure ways that the moon could have temporarily rotated faster in the past. Some theorists try to have large meteor impacts speeding up the moon's rotation for a while. But the most recent impact large enough to do the job (possibly) is radioisotope dated at 3.73 Ga old. Suavet points out that the more recent 3.56 Ga age for his group's rocks, giving a large field more recent than the large impacts, casts doubt upon the impact theory. Anyhow, all lunar dynamo theories are too vague to make numerical estimates of how long the moon's field might have lasted.[4]

Is earth's dynamo a dud?

Remember that the basis for lunar dynamo theories is the dynamo assumed to be working in the earth. That is, theorists say, "If the earth can do it, then here's how the moon might do it." But can the earth really do it? A recent review[5] I've done of nearly a century of failed dynamo theories says, "no". I delve into the central equations of the leading dynamo theory and use them to show that the earth's core appears to be several orders of magnitude below the threshold (if one really exists) for dynamo action. I also review the failed attempts to verify dynamo theory by numerical simulation in large computers, and by experimental attempts to simulate dynamo action under earth-like conditions. Significantly, dynamo theory hasn't seemed to be able to predict success or failure in the most recent such experiment, which has been running for over a year without report of any dynamo action.

So prospects don't seem to be good for a dynamo in earth. How much less likely is it that a dynamo could work in the moon?

The creation solution

On the other hand, the moon's magnetic data fit creation science theories very well. A Bible-based theory for how God created the initial magnetic fields of planets and moons gives a created (6,000 years ago) field for the moon that is about as strong as the earth's field is today, in accord with the high-field lunar samples.[6,7] With no dynamo to sustain it, the field would then decay freely. Estimates of the electrical conductivity in an iron core[8] the size of the moon's give a half-life for the field that is less than 500 years. If the moon's core was turbulent most of its history, the half-life could have been much less than a century.[9] So the creationist view is that the high-magnetization moon rocks recorded the high field that existed shortly after creation, the low-magnetization rocks recorded a significantly decayed field many centuries after creation, and after that the field rapidly wasted away to the essentially zero level it has today. The mystery (for uniformitarians) of the moon's former magnetic field finds a simple explanation in the Bible's account of a recently created solar system.

References

1. Suavet, C. *et al.*, Persistence and origin of the lunar core dynamo, *Proceedings of the National Academy of Science*, published online before print on 6 May 2013, www.pnas.org/content/early/2013/05/02/1300341110.full.pdf+html?sid=44d30a0b-9f5a-45e3-8ed5-bafb01b5f5e7, accessed 13 May 2013.
2. Humphreys, D.R., The Moon's former magnetic field, 15 November 2011, creation.com/moons-magnetic-puzzle.
3. RATE stands for the Radioisotopes and the Age of the Earth research initiative, which ran from 1997 to 2005. See: creation.com/rate-group-reveals-exciting-breakthroughs and www.icr.org/rate/.
4. Vagueness is characteristic of all dynamo theories to date. Few people, including most scientists, seem to be aware that dynamo theories are so incomplete that they cannot make quantitative predictions. See Humphreys, ref. 5.
5. Humphreys, D.R., Planetary magnetic dynamo theories: a century of failure, Accepted by *The Seventh International Conference on Creationism*, Pittsburgh, PA, 4–8 August 2013; Information and Proceedings available at: www.creationicc.org/.
6. Humphreys, D.R., The creation of planetary magnetic fields, *Creation Research Society Quarterly* **21**(3):140–149, 1984; creationresearch.org/crsq/articles/21/21_3/21_3.html.
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8. Pozzo, M. *et al.*, Thermal and electrical conductivity of iron at Earth's core conditions, *Nature* **485**:355–358, 2012.
9. Humphreys, ref. 5, see eq. (14c) and discussions of turbulent resistivity, which is usually much larger than ohmic resistivity.