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Mars' catastrophic geology

Wayne Spencer

New information about Mars is highlighting the catastrophic nature of its past. Planetary geologists are finding a variety of indications of very rapid processes in Mars history. These processes often have some parallel on Earth but because Mars is much colder and has a very different atmosphere there are differences in the effects even for well known Earth-like processes.

Martian processes include flooding, volcanism, glacial movement, sedimentary processes and even geysers. NASA and the European Space Agency have gathered valuable data on Mars geology from recent missions that will give new insights into Mars history. How should young-age creationists understand this new information?

The Northern part of Mars is called the Northern Lowlands because it averages about 4–5 km lower in elevation than the Southern half of the planet. The Southern Highlands are very densely cratered but fewer craters are seen on the surface in the Northern Lowlands. On the other hand, the Northern Lowlands has many buried craters. In 2006, the European Space Agency's Mars Express mission (also known as MARSIS) found evidence of what are apparently impact structures buried under the surface ranging from 130 to 470 km in diameter.[1] This was using a special instrument known as a sounding radar. Mars is well known for many channels on its surface as well. Most of the channels formed as a result of subsidence phenomena, but there are often dendritic drainage patterns in or around them, indicating water drained into them or eroded in them after their formation.

Mars' atmosphere is quite thin and if there were liquid water on the surface of Mars today it would quickly evaporate and/or freeze. Water and carbon dioxide ice exist on both the poles of Mars and water ice under the surface. Recently the Mars Odyssey spacecraft mapped patches of water ice just below the surface.[2] Being a planet with a relatively low density (3.9 g/cm^3 compared to 5.5 for Earth), Mars has the potential for having a lot of volatile material in its interior, such as water and carbon dioxide.

Evidence seems to have been discovered recently of water eruptions[3] sometime in Mars' past from two channels on Mars known as Mangala Fossa and Cerberus Fossa, described as graben fractures. Mangala Fossa seems to have had hot water carrying mud with it. Scientists have estimated 10^7–10^8 m^3/s for the water volume flux from Mangala Fossa from a fracture about 200 km long. Cerberus Fossa (fracture about 35 km long) seems to have been a carbonated water geyser with a volume flux of about 2×10^6 m^3/s. Both of these eruptions propelled material several kilometres laterally across the surface. The nature of the channels and ridges produced by these eruptions seem to rule out volcanic flows. Cerberus Fossa is believed to have sent hailstones several kilometres. The force of these eruptions requires that the water come from aquifers as deep as 3–4 km below the surface.

These water eruptions are just one example of a variety of large-scale rapid catastrophic events that have shaped the surface of Mars in its past. There are also massive volcanoes and evidence of glaciation. A major ongoing mystery is how the Martian atmosphere could support so much liquid water in the past, as is indicated by all the evidence of water on the surface. There are sedimentary deposits of sulfate and clorite compounds (evaporites), as well as hematite. A mineral similar to granite was also found in limited quantities.[4] This suggests a variety of processes that may involve water coming up from below the surface.

There is much yet to be thoroughly researched and examined on Mars from a young-age creation perspective. For example, was Mars created with a thicker atmosphere than present that

was partially lost as a result of large impacts? It is very possible for the explosion of a large impact to blast gases away at greater than escape velocity, especially since Mars gravity is about 38% of Earth's. An alternative might be powerful outgassing from the interior after creation (possibly driven by accelerated radioactive decay) that increased the density of the atmosphere at least temporarily. Then heating from the interior could have triggered a massive melting of glaciers and subsurface ice, causing much erosion of the surface from liquid water that flowed for some period of time. There's obviously been massive lava flows on Mars as well. But, something has caused a melting or evaporation of water under the surface that led to water flows creating many surface channels. There may have also been large regions once glaciated on Mars that have been resurfaced by basalt and dust.

Whatever happened in Mars' past, it was dramatic and catastrophic. Though this is all tentative at this point, Martian geology will generally demand rapid catastrophic processes and thus will fit a young-age viewpoint nicely.

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Youngest and brightest galaxy … or is it?

John Hartnett

The European Space Agency and Hubble Information Centre announced finding the strongest evidence for the youngest and brightest galaxy so far—that is a galaxy with a redshift significantly above 7.[1] Their press release of 12 February 2008 says:

> 'Detailed images from Hubble's Near Infrared Camera and Multi-Object Spectrometer (NICMOS) reveal an infant galaxy, dubbed A1689-zD1, undergoing a firestorm of star birth as it comes out of the dark ages, a time shortly after the Big Bang, but before the first stars completed the reheating of the cold, dark Universe.'[1]

It certainly sounds like they have made some astounding astronomical observations, considering the grand scale of the events they describe. But have they really? We need to look more carefully at the detail.

Their announcement is basically a vivid retelling of the standard big bang story of the origin and evolution of the universe. They have only added a tiny bit of extra data. The 'fact' of the big bang as the true origin of the universe is assumed without question. It is like saying 'It must have happened this way because we *can* see these galaxies today'.

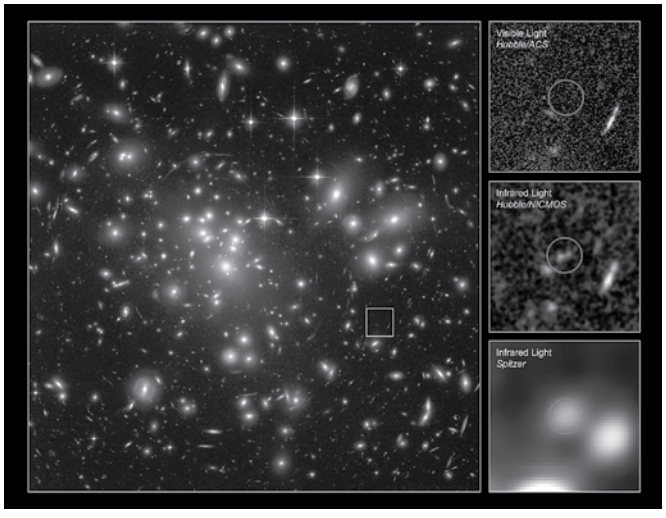
Isn't that just a statement of belief? Yes! First they accept by faith that the big bang happened that 'nothing exploded' and filled the universe with mostly hydrogen. Then they accept that cosmological 'dark ages' took over until at some point the neutral hydrogen coalesced to form stars and galaxies. Then, they imagine that as the nuclear reactions within the stars turned on, the galaxies heated up and re-ionized the intergalactic medium, which became transparent, and we see these 'early' galaxies.

Galaxy far, far away

In other words, their entire report is wrapped up in their belief about what happened in a galaxy far, far way (billions of light-years in fact), and in the far, far distant past.

But when you look at what they actually measured, you find it is very meager indeed. And even those results seem to bordering on the speculative.

First they quote a redshift for the galaxy of 7.6. This would be quite an achievement because the noise associated with such a measurement would be significant—possibly of the same order of magnitude as the signal they are trying to detect. Clearly they are pushing the limits of what the Hubble Space Telescope can see. Something of the incredible amount of subjective interpretation can be seen when you examine the



Credit: NASA, ESA, L. Bradley (JHU), R. Bouwens (UCSC), H. Ford (JHU) and G. Illingworth (UCSC).

Figure 1. Images of claimed galaxy. The galaxy is within the square on the main image. In visible light (top right) it does not show, but in the infrared Spitzer (bottom right) it appears as a white blob.