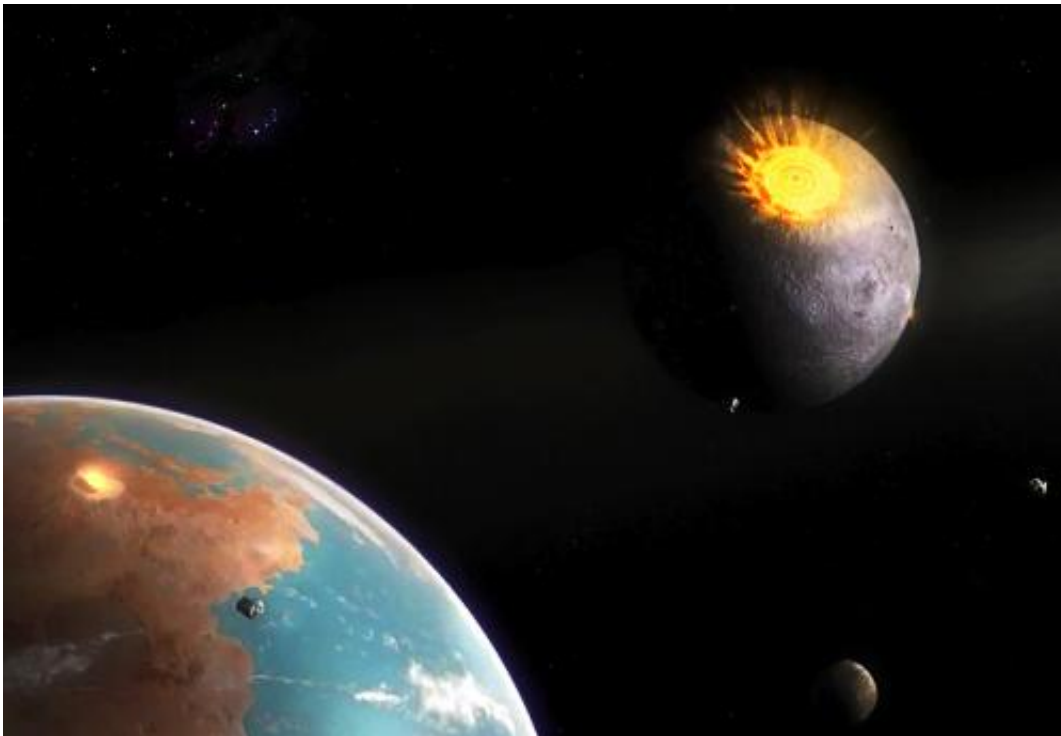


What craters on the Moon teach us about Earth

January 10 2013, by Jason Major



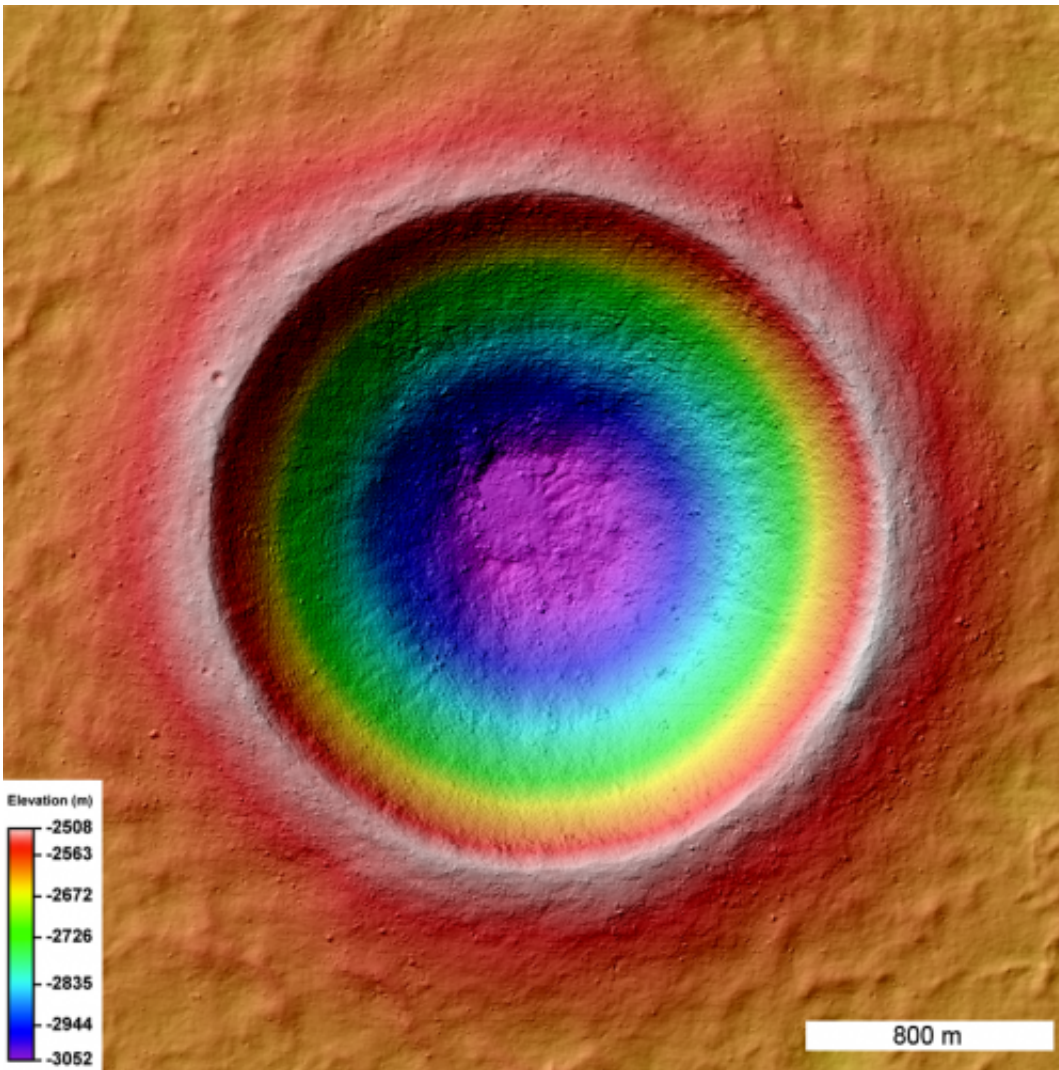
When the Moon was receiving its highest number of impacts, so was Earth.
Credit: NASA/LPI

Some questions about our own planet are best answered by looking someplace else entirely... in the case of impact craters and when, how and how often they were formed, that someplace can be found shining down on us nearly every night: our own companion in space, the Moon.

By studying lunar [impact craters](#) both young and old scientists can piece together the [physical processes](#) that took place during the violent moments of their creation, as well as determine how often [Earth](#)—a considerably bigger target—was experiencing similar events (and likely in much larger numbers as well.)

With no substantial atmosphere, no weather and no [tectonic activity](#), the surface of the Moon is a veritable [time capsule](#) for events taking place in our region of the Solar System. While our constantly-evolving Earth tends to hide its past, the Moon gives up its secrets much more readily... which is why present and future lunar missions are so important to science.

Take the crater Linné, for example. A young, pristine [lunar crater](#), the 2.2-km-wide Linné was formed less than 10 million years ago... much longer than humans have walked the Earth, yes, but very recently on lunar geologic terms.



It was once thought that the circular Linné (as well as other craters) is bowl-shaped, thus setting a precedent for the [morphology](#) of craters on the Moon and on Earth. But [laser-mapping](#) observations by [NASA's Lunar Reconnaissance Orbiter](#) (at right) determined in early 2012 that that's not the case; Linné is actually more of a truncated inverted cone, with a flattened interior floor surrounded by sloping walls that rise up over half a kilometer to its rim.

On our planet the erosive processes of wind, water, and earth soon distort the shapes of craters like Linné, wearing them down, filling them in and eventually hiding them from plain sight completely. But in the Moon's airless environment where the only [weathering](#) comes from more impacts they retain their shape for much longer lengths of time, looking brand-new for many millions of years. By studying young craters in greater detail scientists are now able to better figure out just what happens when large objects strike the surface of worlds—events that can and do occur quite regularly in the Solar System, and which may have even allowed life to gain a foothold on Earth.

Most of the craters visible on the Moon today—Linné excluded, of course—are thought to have formed within a narrow period of time between 3.8 and 3.9 billion years ago. This period, called the Late Heavy Bombardment, saw a high rate of impact events throughout the inner Solar System, not only on the Moon but also on Mars, Mercury, presumably Venus and Earth as well. In fact, since at 4 times its diameter the Earth is a much larger target than the Moon, it stands to reason that Earth was impacted many more times than the Moon as well. Such large amounts of impacts introduced material from the outer [Solar System](#) to the early Earth as well as melted areas of the surface, releasing compounds like water that had been locked up in the crust... and even creating the sorts of environments where life could have begun to develop and thrive.

(It's been suggested that there was even a longer period of heavy impact rates nicknamed the "late late heavy bombardment" that lingered up until about 2.5 billion years ago.)

In the video below lunar geologist David Kring discusses the importance of impacts on the evolution of the Moon, Earth and eventually life as we know it today:

"Impact cratering in Earth's past has affected not only the geologic but the biologic evolution of our planet, and we were able to deduce that in part by the lessons we learned by studying the Moon... and you just have to wonder what other things we can learn by going back to the Moon and studying that planetary body further."

– David Kring

David is a senior staff scientist at the Lunar and Planetary Institute in Houston, TX.

It's these sorts of connections that make lunar exploration so valuable. Keys to our planet's past are literally sitting on the surface of the Moon, a mere 385,000 km away, waiting for us to just scoop them up and bring them back. While the hunt for a biological history on Mars or resource-mining an asteroid are definitely important goals in their own right, only the [Moon](#) holds such direct references to Earth. It's like an orbiting index to the ongoing story of our planet—all we have to do is make the connections.

Source: [Universe Today](#)

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