

Lunar Caves: Cosmic Potential. Rahul Sharma¹ and Austin Mardon², ¹Antarctic Institute of Canada (#303- 11919 82 street, Edmonton, Alberta, Canada T5B 2W4) , ²Antarctic Institute of Canada .(#103 – 11919 – 82 street, Edmonton, Alberta, Canada, T5B 2W4.E-mail: aamardon@yahoo.ca)

Science fiction writers have often written about the colonization of other planets. Science fact tells us that the moon, being the closest solar entity to Earth, is the place to start. And, just like on Earth, we may begin by dwelling in caves.

The surface of the moon is a harsh environment. Space suits offer little protection against gamma and extreme U.V radiation from the sun. Since the moon has no magnetic field, charged particles from the sun rain down freely upon the surface[1].

The caves spoken of earlier take the form of lava tubes. Lava on the moon's surface hardens into a protective shell. When the shell interior collapses, a hollowed out shell is left behind, aka a lava tube[1]. Yes, lava tubes exist on Earth as well, but are not nearly as large as those on the moon. This is due largely to the moon's weaker gravitational field.

Some of these tubes are nearly 1 mile(1.6km) wide and over 6 miles long. They offer a 'ready made protection against the sun'. Of course, the hazards of occupying the moon are harsher than what cro-magnon man faced but humans are more technically capable now.

This remains far from a done deal; many unknowns still persist. For example, the cave may be partially collapsed or caused by highly fractured faults. In such cases, they may not be as stable as first thought[3].

In this regard, David Blair, a researcher at Purdue University, showed that a lava tube big enough to contain the city of Philadelphia would be stable on the moon[2].

Since lava tubes comprise a hollowed out area, ice deposits are thought to exist inside that have been shielded from the moon's harsh surface environment[3].

Furthermore, researchers caution that lava tube sites with potential for human use should be 'studied and vetted by robotic space craft' prior to human settlement. The lava tubes, if their potential is explored and developed, also provide an excellent opportunity to learn about off planet living before astronauts are sent to Mars.

References:

- 1.<https://www.space.com/32795-moon-lava-tubes-protect-astronauts.html>
- 2.<https://www.theguardian.com/science/2017/oct19/lunar-cave-discovery-raises-hopes-for-human-colonisation-of-moon>
- 3.<http://www.nationalpost.com/news/world/these-huge-moon-caves-could-shelter-humans-new-study-confirms-presence-of-lunar-lava-tubes>