

IMPACT CRATERS IN THE SOLAR SYSTEM – COMPARITIVE STUDY ON CRATERS IN THE EARTH, MOON AND MARS USING ORBITAL DATA SETS

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Impact craters are the dominant landform on the surface of Mercury, Venus, Earth's Moon, Mars, and other planetary bodies in the Solar System. The process of impact cratering and its geological processes would aid in understanding the planetary evolution, accretion out of planetesimals and to the course of biological evolution. But the need of the study for impact cratering has been recognized only recently. Analyzing the density of impact craters is the key for learning their ages remotely on planetary surfaces. So it is crucially important for the accumulation of the planets in the first place and has played major roles from the formation of the most ancient planetary landscapes to the creation and maintenance of the modern regolith of airless bodies and the most fundamental geologic process in the Solar System [1].

In this study, we analyzed and report the morphology of impact craters and modifications due to geological processes uniquely varies between different worlds. As a case study two impact craters on the Earth, Moon and Mars have been taken and mapped using Remote sensing Orbital mission data. Fewer than 200 impact structures are recognized on Earth, as of 2002 [2]. In this study, the Lonar and Vredefort craters on Earth have been taken for the morphological analysis and the pattern has been recognized by the Topographic maps and Satellite images. Then the morphology of Lunar impact craters Tycho and Aristarchus were analyzed using LRO and Chandrayaan 1 data sets in 3D GIS environment. Finally, crater Yuty and Jezero on Mars were studied. This study suggests that Moon is the silent world with less geological activity, whereas Earth and Mars are geologically active planets. Morphological variations within the Craters of Mars have been understood by the variations due to geological agents present in Earth such as wind, water, etc., Gullies, channels and chaotic terrain are all similar to glacial features found on Earth [3].

In this research, we report the comparison of these craters of different worlds and it provides an insight to the morphological characteristics on the various targets which reveals the recorded event variations in terms of the geological processes.

References

[1] Melosh, 1989 Oxford, University Press, 253 p., 11. [2] Jourdan et al., 2009, Earth and Planetary Science Letters, 286(1-2), 1-13. [3] Vijayan, JGR: P, 122, no. 5 (2017): 927-949.