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DETERMINING THE GEOGENIC FORCES INVOLVED IN THE FORMATION OF ORCUS PATERA

Abstract

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Determining the geogenic forces involved in the formation of "Orcus Patera"

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Abstract

Mars, the Red Planet, is one of the most explored planets and may have been habitable billions of years ago. To understand if there is life on the Martian surface? We propose a mission to explore a unique Martian site "Orcus Patera". Orcus Patera is an enigmatic elliptical depression between the volcanoes Elysium Mons and Olympus Mons with a unique morphology. Orcus Patera illustrates the heterogeneous nature of Mars through its geological chronology and speculations were made for its formation.Volcanism and impacted craters at a shallow angle were the two main competing theories. Because of the uneven distribution of geological periods, the frequent striking dark stripes on rims suggest the presence of ice or underlying groundwater, and the recent volcanic and flood activity in the surrounding area, the study location is favourable for discovering evidence that led to its formation. Thus, we propose a hypothesis to understand the geogenic forces that led to the formation of Orcus Patera. To reach our objectives, we aim to support our idea by analyzing geological activity, biological evidence, meteorological information, and information from previous missions.

To understand different aspects involved in formation of Orcus Patera, we plan on utilizing various essential instruments in a rover. Martian subsurface water can be detected using Compact Reconnaissance Imaging Spectrometer and the Mars Atmospheric Water Detector (MAWD). Ground Penetrating Radar (GPR), will also assist in in same using electromagnetic radiation pulses to examine the subsurface. Seismometer with the triangulation method, will detect surface vibrations for tectonic activity study. Referring from Insight lander, Heat Probe Assembly will be utilized to measure internal heat. A Drilling arm with sample collecting assembly will also be used to collect samples from the martian surface for further analysis of the minerals' makeup.

From this research, we hope to explore every scientific and geological aspect of Orcus Patera. By determining the geogenic factors that created its morphology and its chemistry, by determining the precision and efficacy of numerous tools that scan Martian geology, and by comprehending new technologies necessary for this research. In the end, this research will determine if Mars is, or was, suitable for human life, as well as how best to explore it.