

Discovery of skylights on the flank of Elysium Mons, Mars

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The Martian caves have revived interest in the field of speleology because they are viewed as potential destinations for future human residences and astrobiological research. The skylights are formed by the collapse of surface material into the subsurface void spaces hence they are the doors to access the subsurface cave. Realizing their significance skylights have been discovered on the flank of Elysium Mons in this study. Signature of life is probable in a sub-surface cave on Mars as it can protect life from the harsh and dangerous radiation environment of the surface. In a cave, there may be an abundance of minerals, fluids and other key resources. Hence, locating skylights is essential and very crucial in formulating future plans for robotic/human exploration of the Red Planet Mars. Remote sensing data have been used in this study for identifying, mapping, and analysis of skylights. We have used remote sensing data from MRO (Mars Reconnaissance Orbiter; NASA), MGS (Mars Global Surveyor; NASA) and Mars Odyssey (NASA) to identify and examine skylights on the basis of their morphology, morphometry and thermal behavior. Thirty-two pit craters have been examined, which includes twenty-one newly discovered ones and eleven earlier reported ones mostly via data captions and press releases. Out of these, seventeen have been classified as Atypical Pit Craters (APCs) and fifteen as Bowl-shaped Pit craters (BPCs). Among these, there are twelve newly discovered APCs and nine newly discovered BPCs. The APCs are considered as skylights which are the potential cave candidates.