

The Use of Mars Lava Tubes As Emergency Shelters and Storage

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Abstract:

This paper outlines the importance of Mars lava tubes and how they may be used as emergency storages for supplies and emergency dwellings, once humans will step on Mars' surface again. Lava tubes are formed from fast moving lava which later on cools and thus constitutes caves that may serve for various functions on future space explorations to Mars. There are many issues that astronauts may face while on a space exploration mission to Mars, which include but are not limited to fatal levels of radiation, exposure to rapidly changing extreme temperatures, as well as falling micrometeorites. While on Mars' surface, radiation levels are much higher than those on earth, and exposure to such fatal levels of radiation is both harmful to the human body, and even deadly. Radiation comes in many ways on Mars' surface such as solar flares which are constituted similarly to the solar wind, but the individual particles hold higher energies, and galactic cosmic rays which are composed of very high energy particles, mostly protons and electrons. Lava tubes may help to protect astronauts from such levels of radiation, while on a space mission. Also, it is important to take into account that while on earth we have an atmosphere and magnetic field which are able to provide sufficiently great protection from the high levels of radiation, while Mars lacks it. Exposure to extreme temperatures likewise must be taken into account, for Mars is located further from the sun, than the earth, thus the temperatures on Mars are much colder than on earth. The average daytime temperature on Mars in the winter season is about -80 degrees Fahrenheit, or -60 degrees Celsius in the daytime, while about -195 degrees Fahrenheit, or -125 degrees Celsius at night. In the summer time, the average daytime temperature is heating up to about 70 degrees Fahrenheit and 20 degrees Celsius.

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Keywords:

Mars, Lava tubes, Emergency Shelters, Storage, Surface, Space exploration, Radiation, Extreme temperatures, Micrometeorites.