



## **Karst terrains in northern Sinus Meridiani, Mars.**

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Sinus Meridiani is part of the large area known as Terra Meridiani, located near the southwestern margin of Arabia Terra, in the equatorial region of Mars. In this area several studies showed the evidence for past aqueous activity preserved in several distinct units that were identified and classified as layered deposits with monohydrated and polyhydrated sulfate spectral signatures.

In this work we investigate the area in the northern region of Sinus Meridiani located between 2°N to 3°N latitude and 2°W to 1°E longitude.

Through the analysis of the MRO HiRISE images we studied in great detail different surfaces within the study area. In particular, we focused our analysis on the features that we interpreted as karst landforms, investigating the possible processes involved in their formation and shaping.

Our investigation highlights features which are common for karst in high mountain areas or in evaporite terrains on the Earth. The landforms observed on Mars appear to be mainly created by corrosional and solutional processes. In particular, rounded and elongate depressions of different sizes, which we interpreted as polygenetic dolines can be observed in the whole study area. Locally the dolines almost totally occupy the surface, giving rise to polygonal karst landscapes just as it typically happens in the evaporite terrains on the Earth.

The detailed analysis of the landforms clearly indicates the presence of solutional processes, inconsistent with other processes such as wind erosion, or with impact craters heavily eroded or reworked by geomorphic processes. In addition, the comparison among the different surfaces identified in the study area points out that they consist of materials with different solutional properties, displaying different levels and kind of karstification. The results of our study also suggest that liquid water must have existed in this area in the past for enough time to allow the solution features to have formed.